Appendix G
Traffic Impact Analysis

HOLY NAME OF JESUS CHURCH PROJECT TRAFFIC IMPACT ANALYSIS

City of Redlands

November 8, 2021

gandini

Traffic Engineering • Transportation Planning • Parking • Noise & Vibration
Air Quality • Global Climate Change • Health Risk Assessment

HOLY NAME OF JESUS CHURCH PROJECT TRAFFIC IMPACT ANALYSIS

City of Redlands

November 8, 2021

prepared by

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18-0232

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The purpose of this study is to evaluate the potential for transportation impacts resulting from development of the proposed project in the context of the City of Redlands's discretionary authority for conformance with locally established operational standards. This study was prepared in consultation with City of Redlands staff and in accordance with the procedures and methodologies for assessing transportation impacts established by the City of Redlands. To assess the project's conformance with local operational standards, this study evaluates the project's effect on traffic operations and, if necessary, identifies recommended improvements or corrective measures to alleviate operational deficiencies substantially caused or worsened by the proposed project. For California Environmental Quality Act (CEQA) purposes, the significance of project-related transportation impacts is measured by vehicle miles traveled (VMT) relative to thresholds established by the City of Redlands as the lead agency. The VMT analysis is provided within a separate Section of this document.

Although this is a technical report, effort has been made to write the report clearly and concisely. A glossary is provided in Appendix A to assist the reader with technical terms related to transportation engineering.

Project Description

The approximately 18.7-acre project site is located west of Dearborn Street between Pennsylvania Avenue and Lugonia Avenue in the City of Redlands. The project site is currently vacant. The proposed project consists of a phased construction of a Catholic Church including a Parish Hall and a Sanctuary with a 1,454-seating capacity as well as a 530-student school. The proposed project will provide two full access driveways on Dearborn Street. The third driveway is a right-turn in / right-turn out restricted access is on Lugonia Avenue west of Dearborn. The proposed project is anticipated to be constructed in phases with the church operational in 2022 and fully operational by Year 2031 with the school.

Project Phasing

The proposed project is anticipated to be built in four (4) phases. For the purposes of the construction, Phase 1 consists of the preliminary church building and the Dearborn Street driveway; Phase 2 consists of some of the educational buildings and playgrounds; Phase 3 consists of the secondary church building and the Lugonia Avenue driveway; and Phase 4 consists of the remaining educational buildings and ballfields.

Existing Levels of Service

The study intersections currently operate within acceptable Levels of Service (C or better for the City of Redlands and D or better for Caltrans) during the peak hours for Existing conditions, with the exception of the following study intersections that currently operate at Levels of Service D or worse during peak hours:

3. Church Street at San Bernardino Avenue	(E-AM / E-PM peak hour)
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)
14. Revelation Way at Lugonia Avenue	(D-AM / F-PM peak hour)

Project Trip Generation

Full buildout of the proposed project is forecast to generate a weekday total of approximately 2,818 weekday daily trips, including 497 trips during the AM peak hour and 182 trips during the PM peak hour. The Sunday operation of the project is forecast to generate a total of approximately 1,759 Sunday daily trips, including 785 trips during the mid-day peak hour.

Level of Service Analysis

Level of Service Analysis

The study intersections are forecast to operate within acceptable Levels of Service (C or better for City of Redlands and D or better for Caltrans) during the peak hours for Existing Plus Project conditions, with the exception of the following study intersections that are forecast to operate at Levels of Service D or worse during peak hours:

Existing Plus Project (Phase 4)

3. Church Street at San Bernardino Avenue	(F-AM / E-PM peak hour)	LOS degrades in AM
7. Judson Street at San Bernardino Avenue	(E-AM peak hour)	LOS degrades in AM
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)	no LOS change
14. Revelation Way at Lugonia Avenue	(E-AM / F-PM peak hour)	LOS degrades in AM

The proposed project is forecast to result in project related traffic deficiency at three (3) study intersections for Existing Plus Project conditions without improvement based on the established thresholds of significance (see Table 5).

Phase 1 and 2

3. Church Street at San Bernardino Avenue	(E-AM / E-PM peak hour)	no LOS change
7. Judson Street at San Bernardino Avenue	(D-AM peak hour)	LOS degrades in AM
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)	no LOS change
14. Revelation Way at Lugonia Avenue	(D-AM / F-PM peak hour)	no LOS change

The proposed project is forecast to result in project related traffic deficiency at one (1) study intersection for Existing Plus Project (Phase 1 and 2) conditions without improvement based on the established thresholds of significance (see Table 6 and Table 7).

Since three of the intersections (#3-Church Street at San Bernardino Avenue, #10-Judson Street at Colton Avenue, and #14-Revelation Way at Lugonia Avenue) are currently deficient with pre-existing issue, improvement measures to improve intersection delay to the pre-project condition are specified in the following section. Additionally, two of the intersections (#3-Church Street at San Bernardino Avenue and #7-Judson Street at San Bernardino Avenue) have been identified in the County of San Bernardino Nexus Program to improve acceptable Level of Service.

Level of Service Improvements

The following improvements are to be provided by the proposed project for Existing Plus Project conditions to reduce the project related traffic deficiency and maintain acceptable Level of Service in accordance with existing guidelines. The direct impacts for the project are based on the total project trips. The direct impacts will be provided by the project and installed with the completion of the phase of construction which causes the Level of Service to degrade. The direct impact improvements are consistent with City of Redlands Measure U and provide either Level of Service of C (or better), or maintain Level of Service to pre-project conditions where the existing Level of Service is E or F.

Phase 1

Judson Street (NS) at San Bernardino Avenue[1] (EW) - # 7

- Restripe the westbound approach and receiving lanes to accommodate one additional lane such that the interim configuration consists of one shared left turn/through lane and one shared through/right turn lane.

- Restripe the eastbound approach and receiving lanes to provide lateral shift of the centerline to accommodate westbound lanes.

Phase 4

Church Street (NS) at San Bernardino Avenue[1] (EW) - # 3
- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane, one through lane, and one de facto right turn lane.

Judson Street (NS) at Colton Avenue (EW) - # 10
- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane and one shared through/right turn lane.

Revelation Way (NS) at Lugonia Avenue (EW) - # 14
- Install signing and pavement markings on the northbound approach to accommodate right turn only.
- Install signing and pavement markings on the southbound approach to accommodate right turn only.

Conceptual signing and striping layout figures are included in Appendix F for the above off-site intersection improvements necessary to improve the Existing Plus Project significant impacts. Figure 40 graphically illustrates the identified improvements.

Site Access Improvements

The proposed project shall construct the following improvements to provide project site access:

Phase 1

Dearborn Street (NS) at Project North Driveway (EW) - # 17
- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one shared left-right turn lane.

Dearborn Street (NS) at Project South Driveway (EW) - # 18
- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one left turn lane and one right turn lane.

Phase 3

Project East Driveway (NS) at Lugonia Avenue (EW) - # 16
- Install southbound stop control.
- Construct the southbound approach to provide restricted access to consist of one right turn only lane.
- Construct additional westbound lane adjacent to project south frontage to provide one through lane and one shared through/right turn lane.
- Construct raised median in the existing two-way left turn lane on Lugonia Avenue

Dearborn Street (NS) at Lugonia Avenue (EW) - # 13
- Revise striping for westbound lanes to include a right-turn only lane at intersection approach.

[1] County of San Bernardino Nexus Study specifies San Bernardino Avenue to be improved from 2-lanes to 4-lanes to maintain LOS D.

Site Access Queueing Analysis

Adequate storage length is forecast to be provided for the left turn lanes and the shared-turn lanes at the project driveways and the adjacent intersection, with the exception of study intersection (#13) which is forecast to require additional eastbound left lane storage during the Sunday mid-day peak hour. Based on the queueing analysis, the eastbound left turn lane for #13-Dearborn Street at Lugonia Avenue intersection should be restriping the storage lane will achieve the additional storage length.

Phase 1

- Dearborn Street at Lugonia Avenue - #13
  - Restripe eastbound left turn storage lane lengthened from 130 to 200 feet.

Sight Distance Evaluation

Given the relatively straight horizontal and vertical alignment of Lugonia Avenue and Dearborn Street north of the project driveway, there does not appear to be any physical roadway geometrics which would cause substantial obstructions to the required sight distances. However, given the horizontal curve alignment of Dearborn Street south of the project southern driveway, there appears to be approximately 525 feet of sight distance. Based on the sight distance evaluation, the eastbound left turn lane for #18-Dearborn Street at Project South Driveway intersection should restricted to prohibit left turns for trucks which require approximately 557 feet of line of sight for corner sight distance at the prevailing speed.

- Dearborn Street at Project South Driveway - #18
  - Left turn prohibited for trucks, post sign R3-2 (modified – FOR TRUCKS).

General Recommendations

Improvements at the project driveways are project design features which shall be constructed by the project. Site-adjacent roadway improvements shall be constructed in conjunction with the project.

On-site and site-adjacent improvements including project driveways, roadway design, traffic signing and striping, and traffic control improvements relating to the proposed project should be constructed in accordance with applicable engineering standards and to the satisfaction of the City of Redlands.

Sight distance at project access points should comply with applicable City of Redlands/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met.

Off-street parking should be provided to meet the City of Redlands Municipal Code requirements.

As is the case for any roadway design, the City of Redlands should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Vehicle Miles Traveled Assessment

The proposed project satisfies the low VMT area and project type screening criteria established by the City of Redlands and therefore can be presumed to result in a less than significant VMT impact.

1. INTRODUCTION

This section describes the purpose of this traffic impact analysis, project location, proposed development, and study area.

Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

PURPOSE AND OBJECTIVES

The purpose of this traffic impact analysis is to provide an assessment of traffic operations resulting from development of the proposed Holy Name of Jesus Church Project and to identify measures necessary to improve potentially project related traffic deficiencies. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA). The City of Redlands is the lead agency responsible for evaluation of potential environmental impacts associated with the proposed project. This report analyzes traffic impacts for the anticipated project opening year in 2031, and for a Year 2040 scenario reflective of the County of San Bernardino General Plan buildout.

Although this is a technical report, effort has been made to write the report clearly and concisely. A glossary is provided in Appendix A to assist the reader with technical terms related to transportation engineering.

PROJECT DESCRIPTION

The approximately 18.7-acre project site is located west of Dearborn Street between Pennsylvania Avenue and Lugonia Avenue in the City of Redlands. The project site is currently vacant. The proposed project consists of a phased construction of a Catholic Church including a Parish Hall and a Sanctuary with a 1,454-seating capacity as well as a 530-student school. The proposed project will provide two full access driveways on Dearborn Street. The third driveway is a right-turn in / right-turn out restricted access is on Lugonia Avenue west of Dearborn.

PROJECT PHASING

The proposed project is anticipated to be built in four (4) phases. For the purposes of the construction, Phase 1 consists of the preliminary church building and the Dearborn Street driveway; Phase 2 consists of some of the educational buildings and playgrounds; Phase 3 consists of the secondary church building and the Lugonia Avenue driveway; and Phase 4 consists of the remaining educational buildings and ballfields.

It should be noted that certain project components provide an auxiliary function for the primary land use and do not separately generate project related trips. When the Sanctuary is in operation, the Parish Hall does not accommodate additional trip-generation patrons for mass and is an auxiliary use for the church. However, if the Parish Hall construction precedes the Sanctuary, the Parish Hall will serve as the church for mass until such time as the church Sanctuary is built. For the purposes of the traffic analysis, the full contribution of church trips will occur in Phase 1 with the first of the church related buildings (Parish Hall or Sanctuary) and the second later building will not add additional trips in Phase 3. The construction phasing shows school buildings and auxiliary uses being built in phases 2, 3, and 4. The contribution of school trips will occur with the construction of student educational buildings based on the number of students for phases 2, and 4. For the purposes of the traffic analysis, the partial contribution of school trips will occur in Phase 2 with the first of the educational buildings, and the full contribution of school trips will occur with additional trips in Phase 4. Additionally, the playground, basketball courts, ball fields and Building 6 (art, science, and/or singular education) are auxiliary uses of the school that do not generate additional trips.

For the purposes of this report, the proposed project is analyzed in three phases 1, 2 and 4. In Phase 1, the church will be fully operational for Sunday and mid-week services in year 2022 with access to the Dearborne

Street driveway. In Phase 2, the church and partial opening of the school will be operational with access to the Dearborne Street driveway. For Phase 3, the Sanctuary and Lugonia Avenue driveway will be constructed in 2028; however, Phase 3 does not add additional trips, so it is not analyzed. In Phase 4, the church and school will be fully operational in year 2031 with access to both the Dearborne Street and Lugonia Avenue driveways. For the purposes of this report, Existing Plus Project conditions will include the completion of the school and the church with both access driveways.

ANALYSIS SCENARIOS

The following scenarios are analyzed during typical weekday AM and PM peak hour conditions:

- Existing
- Existing Plus Project
  - Existing Plus Project Phase 1
  - Existing Plus Project Phase 2

STUDY AREA

Based on the study intersections identified in the scoping agreement (Appendix B), the study area consists of the following study intersections and project driveways within the City of Redlands:

Study Intersections		Jurisdiction
1.	Orange Street (NS) at San Bernardino Ave (EW)	City of Redlands
2.	Orange Street (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
3.	Church Street (NS) at San Bernardino Ave (EW)	City of Redlands
4.	Church Street (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
5.	University Street (NS) at San Bernardino Ave (EW)	City of Redlands
6.	University Street (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
7.	Judson Street (NS) at San Bernardino Ave (EW)	City of Redlands
8.	Judson Street (NS) at Pennsylvania Ave (EW)	City of Redlands
9.	Judson Street (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
10.	Judson Street (NS) at Colton Avenue (EW)	City of Redlands
11.	Dearborn Street (NS) at San Bernardino Ave (EW)	City of Redlands
12.	Dearborn Street (NS) at Pennsylvania Ave (EW)	City of Redlands
13.	Dearborn Street (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
14.	Revelation Way (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
15.	Wabash Avenue (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
16.	Project East Driveway (NS) at Lugonia Avenue (EW)	City of Redlands / Caltrans
17.	Dearborn Street (NS) at Project North Driveway (EW)	City of Redlands
18.	Dearborn Street (NS) at Project South Driveway (EW)	City of Redlands

SUNDAY FOCUSED STUDY FOR CHURCH DRIVEWAYS

In addition to the standard AM and PM peak hour analysis, an operational analysis for the Sunday mid-day peak hour is also be included in Section 7 of this report. While the project Sunday peak hour traffic is higher than the AM peak hour traffic, the Sunday background street traffic is less than weekday peak hour background street traffic volumes.

than the AM peak hour traffic, the Sunday background street traffic is less than weekday peak hour background street traffic volumes.

Legend

Study Intersection

Figure 1
Project Location Map

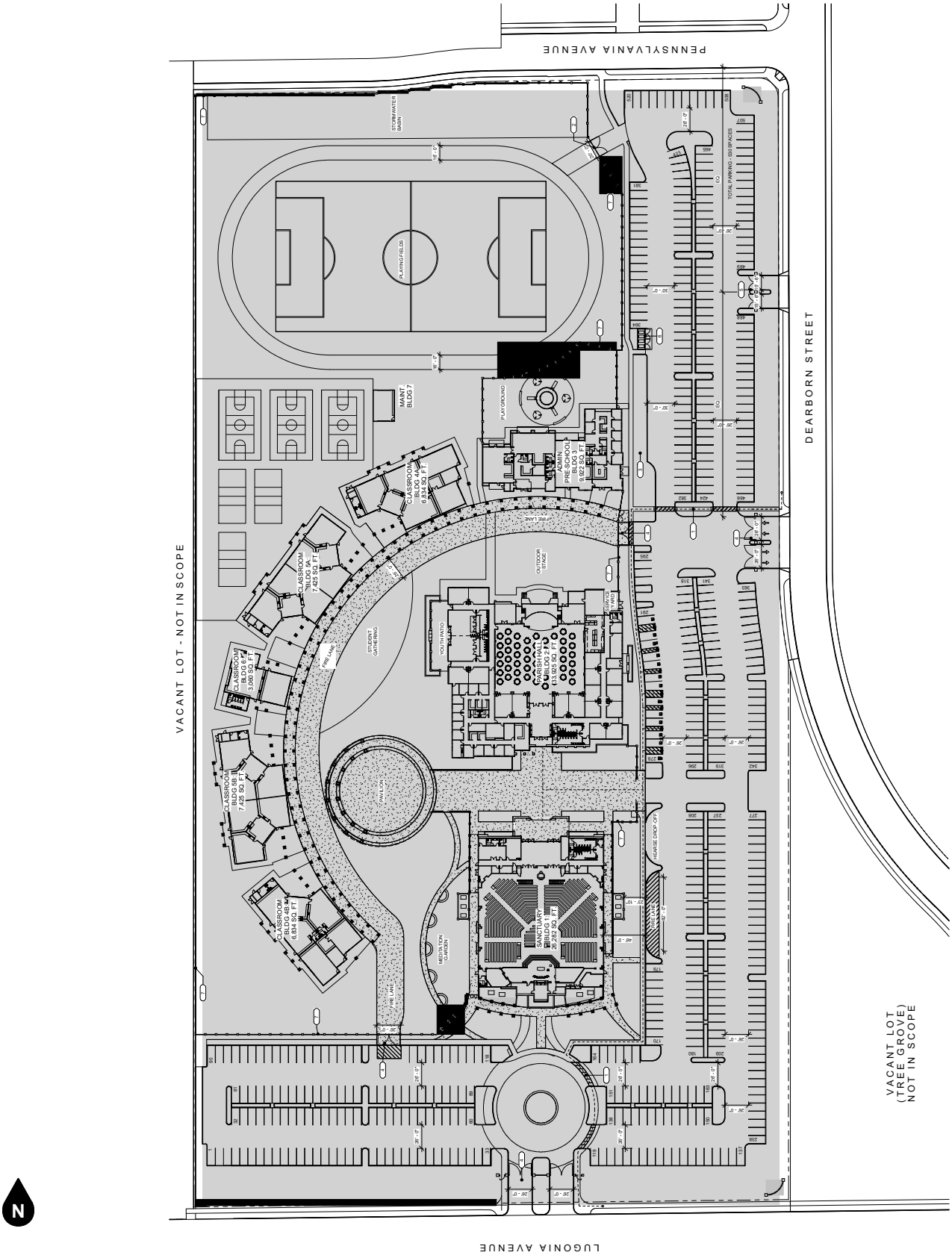


Figure 2
Site Plan

2. METHODOLOGY

This section describes the analysis methodologies used to assess transportation facility performance as adopted by the respective jurisdictional agencies.

INTERSECTION DELAY METHODOLOGY

The technique used to assess the performance of intersections within the City of Redlands and California Department of Transportation jurisdiction is known as the intersection delay methodology based on the procedures contained in the *Highway Capacity Manual* (Transportation Research Board, 6th Edition). The methodology considers the traffic volume and distribution of movements, traffic composition, geometric characteristics, and signalization details to calculate the average control delay per vehicle and corresponding Level of Service. Control delay is defined as the portion of delay attributed to the intersection traffic control (such as a traffic signal or stop sign) and includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The intersection control delay is then correlated to Level of Service based on the following thresholds:

Level of Service	Intersection Control Delay (Seconds / Vehicle)		Description
	Signalized Intersection	Unsignalized Intersection	
A	≤ 10.0	≤ 10.0	EXCELLENT OPERATION. Unrestricted flow.
B	> 10.0 to ≤ 20.0	> 10.0 to ≤ 15.0	VERY GOOD OPERATION: Stable flow.
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0	GOOD OPERATION. Occasionally backups.
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0	FAIR OPERATION. No long-standing traffic queues. Typical, peak period design standard.
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0	POOR OPERATION. Some long-standing vehicular queues.
F	> 80.0	> 50.0	FORCED FLOW. Backups may restrict intersection movements; and potential for stop-and-go type traffic flow.

Source: Transportation Research Board, *Highway Capacity Manual* (6th Edition).

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure). At intersections with traffic signal or all way stop control, Level of Service is determined by the average control delay for the overall intersection. At intersections with cross street stop control (i.e., one- or two-way stop control), Level of Service is determined by the average control delay for the worst individual movement (or movements sharing a single lane). Intersection delay analysis was performed using the Vistro (Version 6.00-00) software using default values recommended in the *Highway Capacity Manual*.

PERFORMANCE STANDARDS

City of Redlands

The existing General Plan has established the minimum acceptable Level of Service (LOS) for roadway segment and peak hour intersection operations. The General Plan states that peak hour intersection operations of Level of Service C or better are generally acceptable. Therefore, any intersection operating at Level of Service D to F is considered deficient.

In accordance to the City of Redlands Measure U Section 1A.60 Principle Six (a), all new development projects shall assure by appropriate improvement measures that, at a minimum, traffic Levels of Service are maintained at a minimum of Level of Service C throughout the City, except where the current Level of Service is lower than Level of Service C, or as provided in Section 5.20 of the Redlands General Plan where a more intense Level of Service is specifically permitted. In any location where the Level of Service is below C at the time an application for a development project is submitted, improvement measures shall be imposed on that development project to assure, at a minimum, that the Level of Service is maintained at Levels of Service that are no worse than those existing at the time an application for development is filed, except as provided in Section 5.20b.

Measure U Section 5.0 Circulation Element sections 5.20a, 5.20b, 5.20c are listed as "*Guiding Policies: Standards for Traffic Service*":

5.20a Maintain Level of Service C or better as the standard at all intersections presently at Level of Service C or better.

5.20b Within the area identified in the General Plan (Figure 5.3), including that unincorporated County area identified as the "donut hole," maintain Level of Service C or better; however, accept a reduced Level of Service D on a case by case basis upon approval by a four-fifths (4/5ths) vote of the total authorized membership of the City Council.

5.20c Where the current Level of Service at a location within the City of Redlands is below the Level of Service C standard, no development project shall be approved that cannot be improved so that it does not reduce the existing Level of Service at that location except as provided in Section 5.20b.

California Department of Transportation

As stated in the *Vehicle Miles Focused Transportation Impact Study Guidelines* (State of California, May 20, 2020), "California Department of Transportation (Caltrans), will review the lead agency VMT thresholds for consistency with OPR's recommendations for the state reduction in Vehicle Miles Traveled (VMT) and greenhouse gas emissions (GHG). For consistency with local requirements, the VMT assessment will follow the local lead agency specified guidelines prepared in accordance to state standards. Additional information and a detailed project assessment are provided in the Vehicle Miles Traveled section presented later in this report.

While automobile delay is no longer considered a significant impact per revised guidelines, Caltrans endeavors to maintain a target LOS (Level of Service) "D" using *Highway Capacity Manual* (HCM) intersection delay methodology on State highway facilities.

Additionally, as stated as stated in the *Interim Local Development and Intergovernmental Review - Safety Review Practitioners Guidance* (Caltrans, December 2020), the purpose of the safety review to identify safety impacts based on locations which may be significantly affected by the proposed project and review for potential conflicts or safety mitigation measures.

OPERATIONAL THRESHOLDS

City of Redlands

For study intersections within the City of Redlands, a project traffic impact requires improvement if the addition of project-generated trips is forecast to cause or worsen[2] Level of Service D, E, or F at a study intersection.

California Department of Transportation.

For State Highway study intersections, a potentially project related traffic deficiency is defined to occur if the addition of project generated trips is forecast to cause the performance degrade from an acceptable Level of Service (D or better) to unacceptable Level of Service (E or F).

VEHICLE MILES TRAVELED ANALYTICAL METHODOLOGY (CEQA)

The metric used to evaluate the transportation impact of land use and transportation projects under CEQA is known as vehicle miles traveled (VMT). In general terms, VMT quantifies the amount and distance of automobile travel attributable to a project or region. The VMT analysis has been prepared in accordance with the City of Redlands*'s CEQA Assessment VMT Analysis Guidelines*. These guidelines established VMT methodologies and thresholds for project screening and VMT assessment for non-screened development. Additional information and a detailed project assessment are provided in the Vehicle Miles Traveled section presented later in this report.

POTENTIAL IMPROVEMENT MEASURES

If a project is forecast require roadway improvement, feasible improvement measures that will reduce the delay to a less than or equal to pre-project condition will be identified. Improvement measures can be in many forms, including the addition of lanes, traffic control modification, or demand management measures. If no feasible improvement measures can be identified for an affected roadway facility, the impact will remain significant and unavoidable and a statement of overriding considerations will be required.

To improve a significant project impact at facilities with acceptable Level of Service under pre-project conditions, the project shall provide or contribute to improvements that would, at a minimum, provide Level of Service C or better for City of Redlands and Level of Service D or better Caltrans.

To improve a project impact at facilities with unacceptable Level of Service under pre-project conditions, the project shall provide or contribute to improvements that would, at a minimum, provide Level of Service that is equal to or better than pre-project conditions.

[2] Source: The City of Redlands staff defines an increase in delay makes the Level of Service worse as Level of Service is measured by level of service letter grade.

3. EXISTING CONDITIONS

EXISTING ROADWAY SYSTEM

Figure 3 identifies the lane geometry and intersection traffic controls for Existing conditions based on a field survey of the study area. Regional access to the project area is provided by the I-10 Freeway south of the project site. The key north-south roadways providing local circulation is Orange Street, Church Street, University Street, Judson Street, Dearborn Street and Wabash Avenue. The key east-west roadway providing local circulation is San Bernardino Avenue, Pennsylvania Avenue, Lugonia Avenue and Colton Avenue.

San Bernardino Avenue is a two-lane undivided to four-lane undivided east-west roadway. San Bernardino Avenue classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands General Plan. On-street parking, bicycle lanes and sidewalks are generally provided on both sides of the street west of Cheryl Street. On-street parking, bicycle lanes and sidewalks are provided on south side of the road from Cheryl Street to Nelson Street. On-street parking, bicycle lanes and sidewalks are provided on north side of the road from Dearborn Street to Wabash Street.

Pennsylvania Avenue is a two-lane undivided east-west roadway west of Judson Street. Pennsylvania Avenue classified as a two-lane Collector (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally permitted on both the north and south side of the road. On-street bicycle lane sharrows are provided on both sides of the road. Sidewalks are provided on both sides of the road.

Lugonia Avenue is a two-lane divided to four-lane divided east-west roadway. Lugonia Avenue classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally prohibited on both the north and south side of the road. On-street bicycle lanes are not provided. Sidewalks are generally provided on both sides of the road, except for some areas of undeveloped frontage.

Colton Avenue is a two-lane undivided to two-lane divided east-west roadway. Lugonia Avenue classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally permitted on both the north and south side of the road. On-street bicycle lanes are not provided on either side of the road. Sidewalks are generally provided on both sides of the road.

Orange Street is a two-lane undivided to four-lane undivided east-west roadway. Orange Street classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally prohibited on both the east and west side of the road. On-street bicycle lanes are not provided on either side of the road. Sidewalks are provided on both sides of the road.

Church Street is a two-lane undivided east-west roadway west of Judson Street. Church Street classified as a two-lane Collector (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally permitted on both the east and west side of the road. On-street bicycle lanes are provided on both sides of the road. Sidewalks are provided on both sides of the road.

University Street is a two-lane undivided east-west roadway west of Judson Street. University Street classified as a two-lane Collector (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally permitted on both the east and west side of the road. On-street bicycle lanes not provided on either side of the road. Sidewalks are provided on both east side and west side of the road.

Judson Street is a two-lane divided to four-lane divided east-west roadway. Judson Street classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands

General Plan. On-street parking is generally permitted on east side of the road south of Pennsylvania. On-street bicycle lanes are provided on both sides of the road south of Pennsylvania. On-street bicycle lane sharrows are provided on both sides of the road north of Pennsylvania. Sidewalks are provided on east side of the road south of Pennsylvania and west side of the road south of Lugonia.

Dearborn Street is a two-lane undivided east-west roadway west of Judson Street. Dearborn Street classified as a two-lane Collector (various roadway cross-section) in the City of Redlands General Plan. On-street parking is generally permitted on both the east and west side of the road south of Lugonia. On-street bicycle lanes are provided on both sides of the road south of Lugonia and are not provided north of Lugonia. Sidewalks are provided on east side of the road.

Wabash Street is a two-lane undivided to two-lane divided east-west roadway. Wabash Street classified as a two-lane divided to four-lane undivided Minor Arterial (various roadway cross-section) in the City of Redlands General Plan. On-street parking is prohibited on both the east and west side of the road. On-street bicycle lanes are not provided. Sidewalks are generally provided on both sides of the road, except for some areas of undeveloped frontage.

PEDESTRIAN FACILITIES

Existing pedestrian facilities in the project vicinity are shown on Figure 4. As shown on Figure 4, a pedestrian sidewalk is currently provided along the project site frontage.

TRANSIT FACILITIES

Figure 5 shows the existing transit routes available in the project vicinity. As shown in Figure 5, the study area is currently served by Omnitrans Route 8 along Lugonia Avenue.

GENERAL PLAN CONTEXT

Figure 6 shows the City of Redlands General Plan Circulation Element roadway classifications map. This figure shows the nature and extent of arterial and collector highways that are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan. The City of Redlands standard roadway cross-sections are illustrated on Figure 7.

BICYCLE ROUTES

Pennsylvania Avenue west of Judson and Judson Street north of Pennsylvania are existing Class III bike routes. Church Street, Judson Street (Pennsylvania to Colton), Dearborn south of Lugonia and San Bernardino Avenue (Orange to Cheryl) are existing Class II bike routes. On-street bicycle lanes are proposed in the study area on the City of Redlands General Plan for San Bernardino Avenue (west of Cheryl), Lugonia Avenue, Orange Street, University Street, Dearborn Street (north of Lugonia), and Wabash Street. The City of Redlands General Plan Bike Routes is depicted on Figure 8.

TRUCK ROUTES

Figure 9 shows the designated truck routes as identified in the City of Redlands General Plan. Lugonia Avenue, Orange Street, Judson Street, and Wabash Street are designated truck routes.

EXISTING ROADWAY VOLUMES

Figure 10 shows the Existing average daily traffic volumes. The Existing average daily traffic volumes have been obtained from the *2017 Traffic Volumes on California State Highways by the California Department of*

Transportation and factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

Evening Peak Hour (Approach Volume + Exit Volume) x 11.5 = Leg Volume.

Existing peak hour intersection turning movement volumes are based upon AM peak period and PM peak period intersection turning movement counts obtained in November 2019 during typical weekday conditions. The AM peak period was counted between 7:00 AM and 9:00 AM and the PM peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15-minute periods with the highest total volume when all movements are added together. Thus, the weekday PM peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15-minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C.

In addition, Sunday mid-day peak hour counts (10:00 AM to 2:00 PM) were conducted adjacent to the project site to determine typical Sunday conditions. The existing counts have been classified into passenger cars and trucks by number of axles. The truck volumes have been converted to Passenger Car Equivalent (PCE) trips based on PCE factors recommended by the County of San Bernardino Congestion Management Program.

To account for traffic volume growth associated with regional development and because of abnormal travel patterns associated with the COVID-19 pandemic, a growth rate of two percent (2.0%) per year over a two-year period was applied to the peak hour intersection volumes collected in November 2019 to determine existing 2021 volumes. This equates to a total growth factor of approximately 1.04. This is a conservative assumption since the ambient growth was applied to all movements at the study intersections.

Figure 11 and Figure 12 show the Existing AM peak hour and PM peak hour intersection turning movement volumes, respectively. Traffic volumes are shown in PCE trips.

EXISTING INTERSECTION LEVEL OF SERVICE

The study intersection Levels of Service for Existing traffic conditions have been calculated and are shown in Table 1. Existing Level of Service worksheets are provided in Appendix D.

As shown in Table 1, the study intersections currently operate within acceptable Levels of Service (C or better for City of Redlands and D or better for Caltrans) during the peak hours for Existing conditions, with the exception of the following study intersections:

3. Church Street at San Bernardino Avenue	(E-AM / E-PM peak hour)
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)
14. Revelation Way at Lugonia Avenue	(D-AM / F-PM peak hour)

Table 1
Existing Intersection Levels of Service

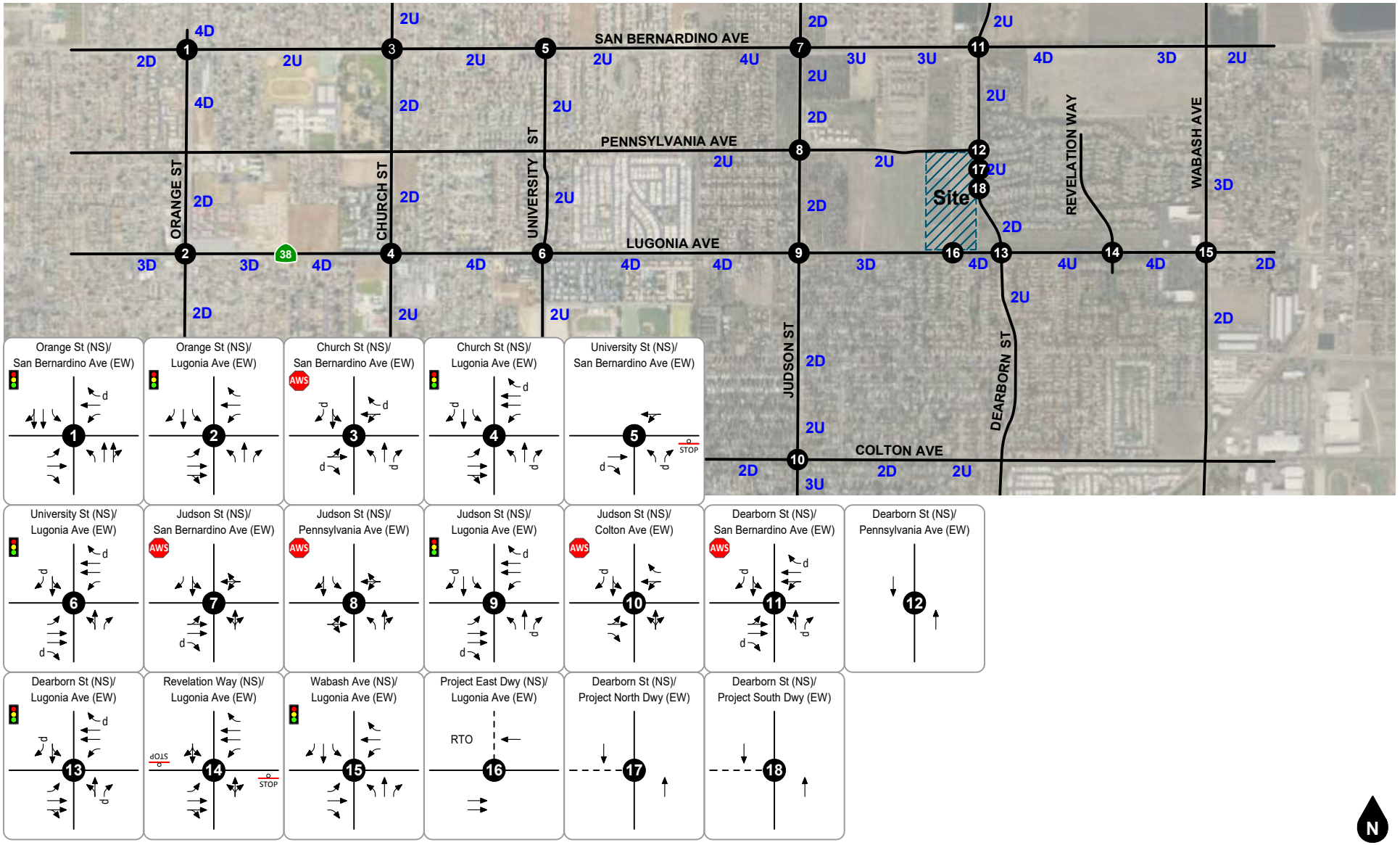
ID	Study Intersection	Traffic Control[1]	AM Peak Hour		PM Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]
1.	Orange Street at San Bernardino Ave	TS	14.6	B	15.2	B
2.	Orange Street at Lugonia Avenue	TS	49.5	D	40.7	D
3.	Church Street at San Bernardino Ave	AWS	38.6	E	43.2	E
4.	Church Street at Lugonia Avenue	TS	23.7	C	26.5	C
5.	University Street at San Bernardino Ave	CSS	18.0	C	15.2	C
6.	University Street at Lugonia Avenue	TS	16.6	B	14.7	B
7.	Judson Street at San Bernardino Ave	AWS	25.0	C	12.0	B
8.	Judson Street at Pennsylvania Ave	AWS	13.6	B	8.7	A
9.	Judson Street at Lugonia Avenue	TS	16.3	B	15.7	B
10.	Judson Street at Colton Avenue	AWS	62.1	F	30.3	D
11.	Dearborn Street at San Bernardino Ave	AWS	10.5	B	11.2	B
12.	Dearborn Street at Pennsylvania Ave	CSS	9.2	A	9.6	A
13.	Dearborn Street at Lugonia Avenue	TS	20.6	C	27.1	C
14.	Revelation Way at Lugonia Avenue	CSS	32.5	D	59.6	F
15.	Wabash Street at Lugonia Avenue	TS	46.2	D	31.2	C

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn movement.

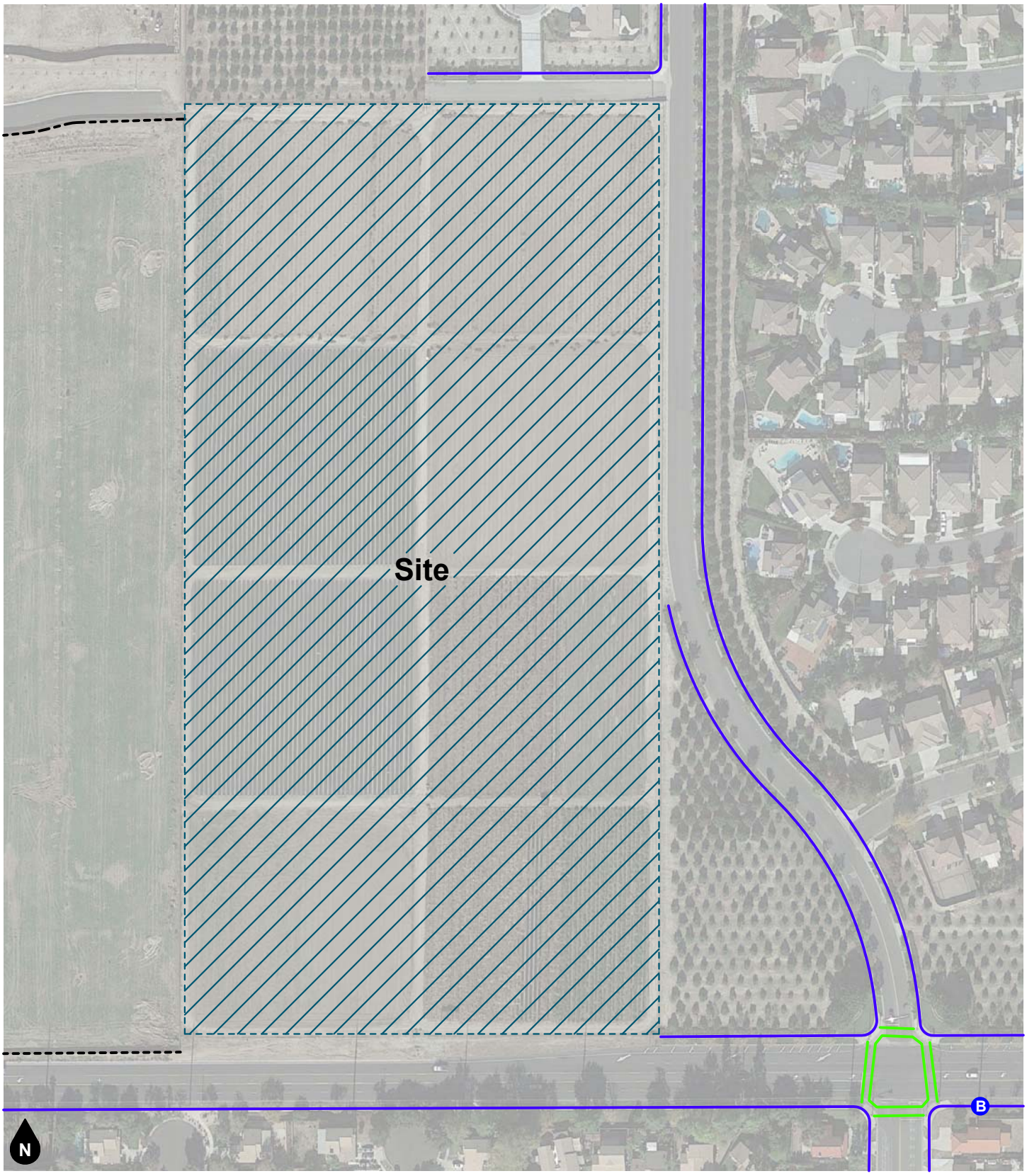
(3) LOS = Level of Service



Legend

- Traffic Signal
- AWS All Way Stop
- STOP Stop Sign
- #D #-Lane Divided Roadway
- #U #-Lane Undivided Roadway
- Existing Lane
- d De Facto Right Turn Lane
- Project Driveway
- RTO Right Turn Only

Figure 3
Existing Lane Geometry and Intersection Traffic Controls



Legend
- Sidewalk
- Cross Walk
- B Bus Stop
- Sidewalk Under Construction With Adjacent Property Development

Figure 4
Existing Pedestrian Facilities

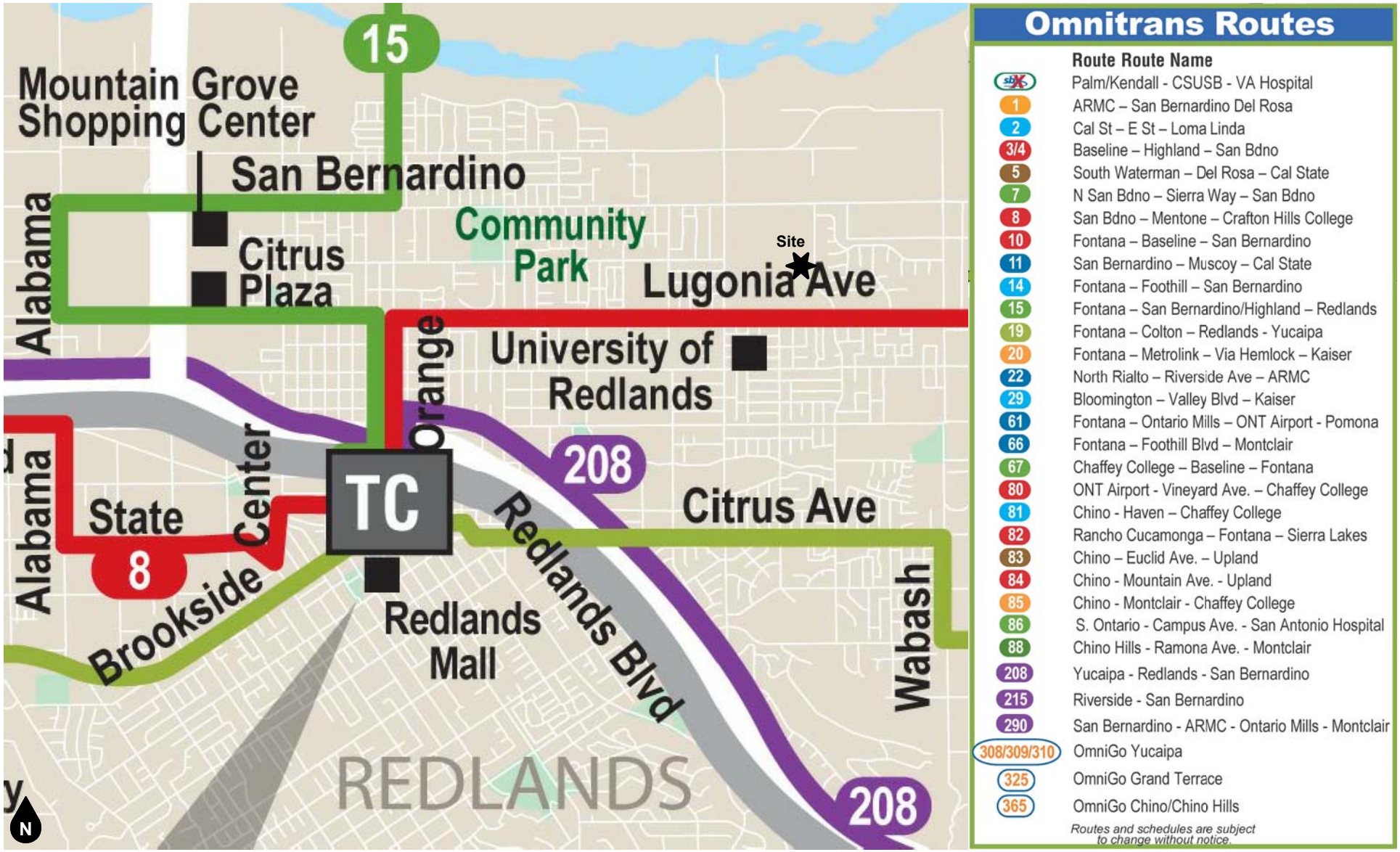
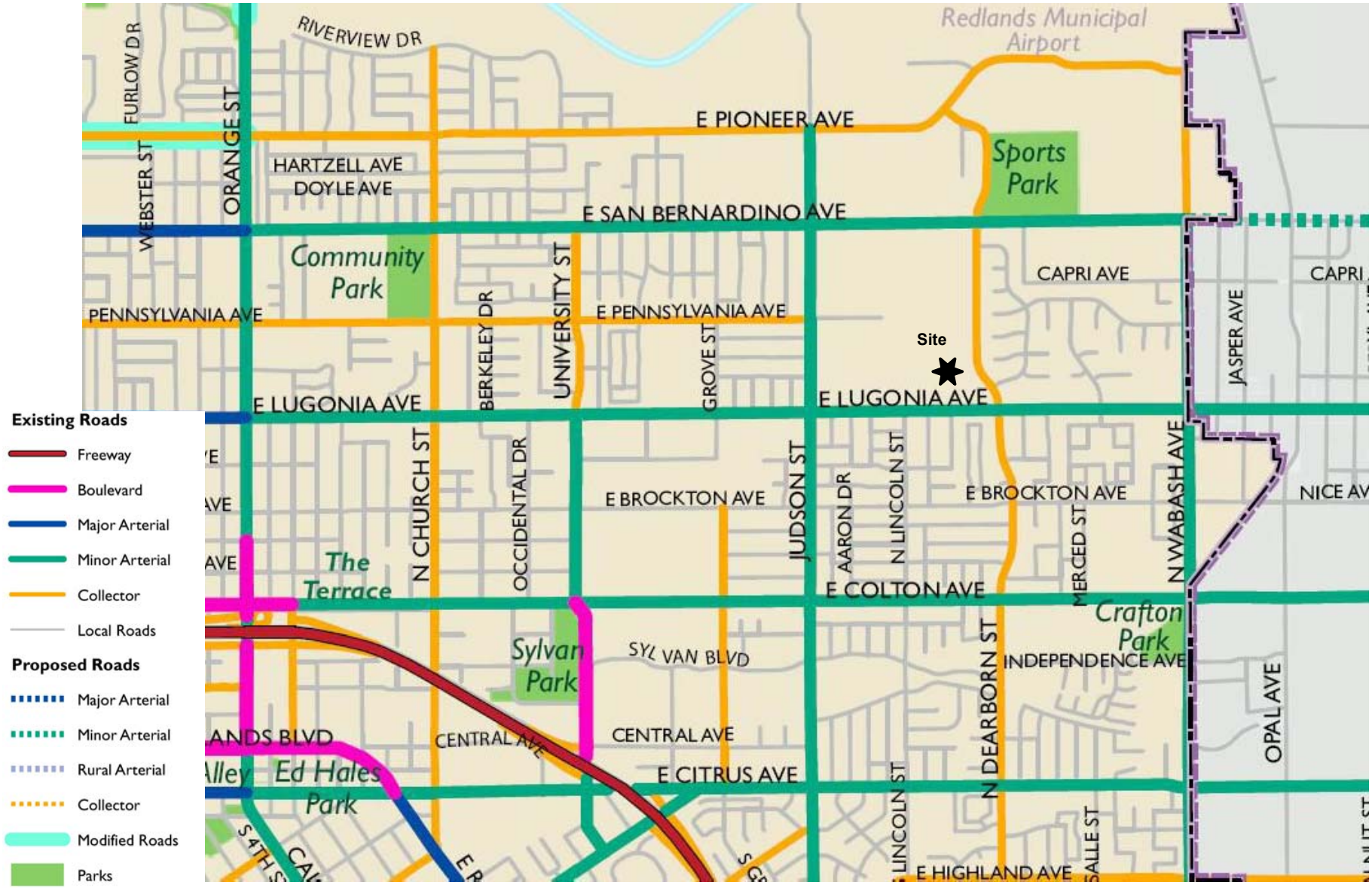


Figure 5
Existing Transit Routes

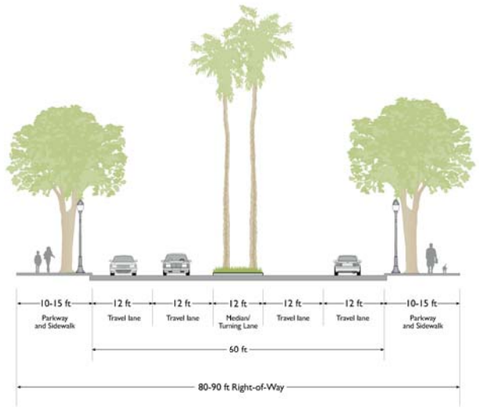
Source: OmniTrans



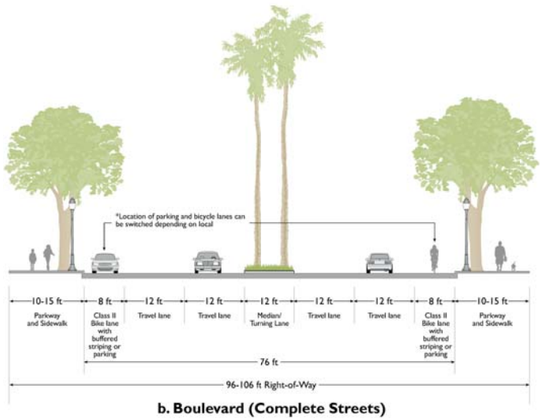
Source: City of Redlands

Figure 6
City of Redlands General Plan Circulation Element

BOULEVARDS

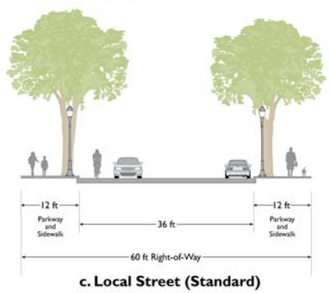


a. Boulevard (Standard)

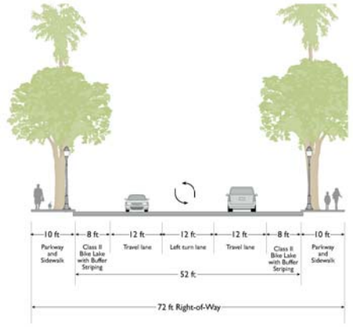


b. Boulevard (Complete Streets)

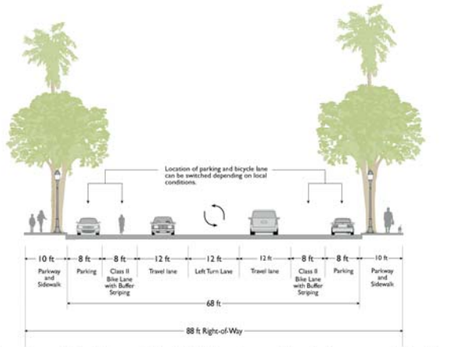
LOCAL STREET



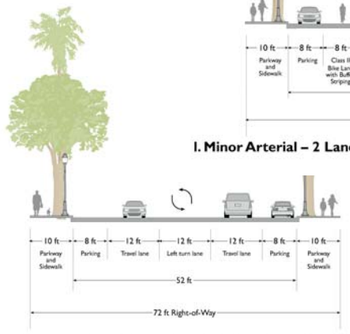
c. Local Street (Standard)



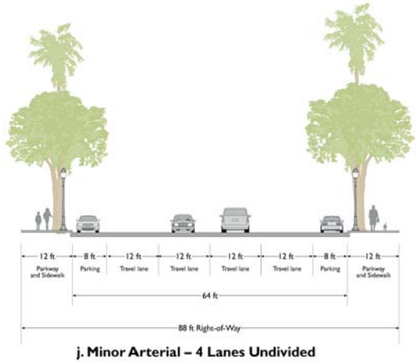
k. Minor Arterial – 2 Lanes Plus Left Turn Lane (Complete Streets)



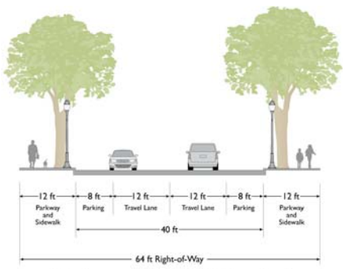
l. Minor Arterial – 2 Lanes Plus Left Turn Lane, Bicycle Lanes, and Parking (Complete Streets)



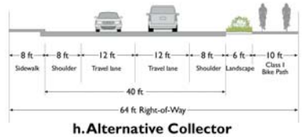
i. Minor Arterial – 2 Lanes Plus Left Turn Lane (Standard)



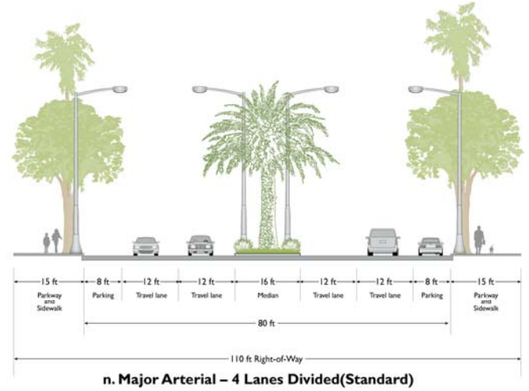
j. Minor Arterial – 4 Lanes Undivided (Standard)



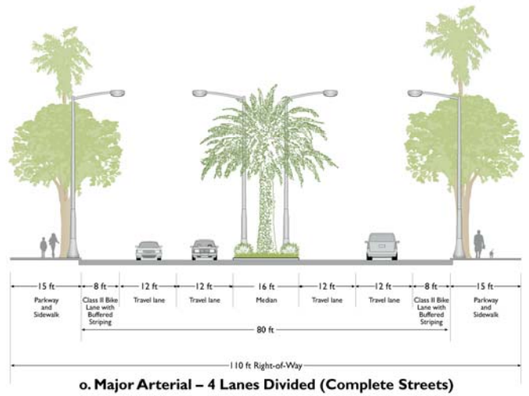
d. Collector – Residential (Standard)



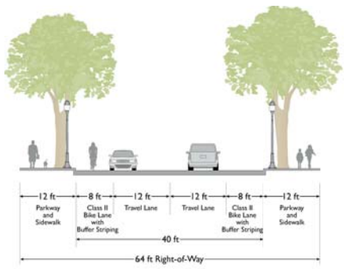
h. Alternative Collector



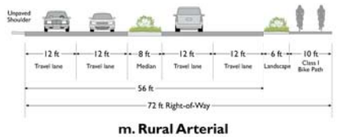
n. Major Arterial – 4 Lanes Divided(Standard)



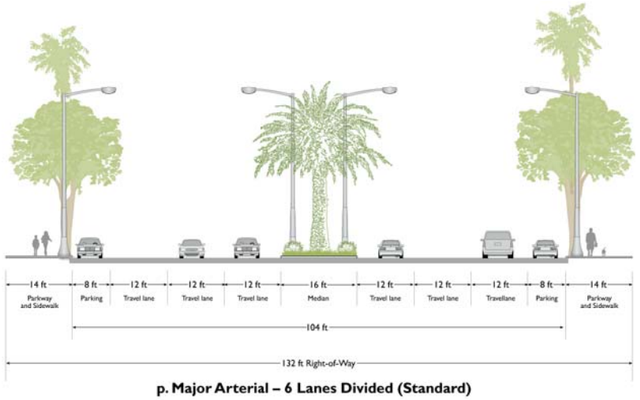
o. Major Arterial – 4 Lanes Divided (Complete Streets)



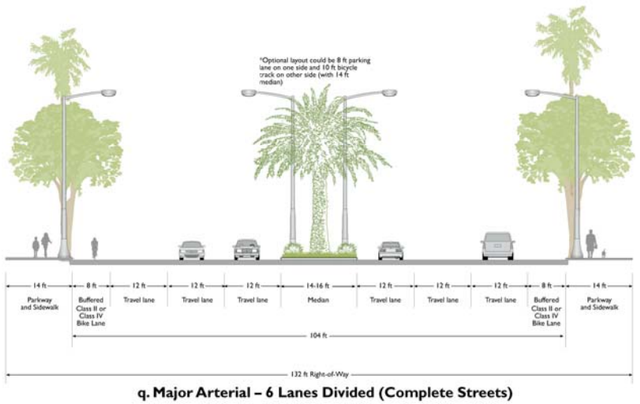
e. Collector – Residential (Complete Streets)



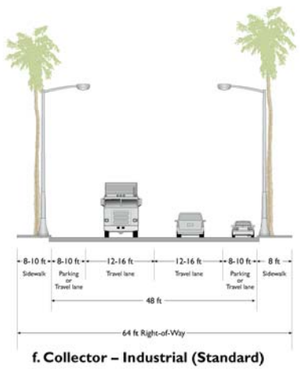
m. Rural Arterial



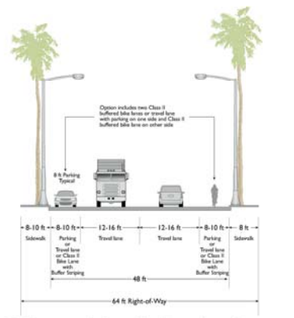
p. Major Arterial – 6 Lanes Divided (Standard)



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



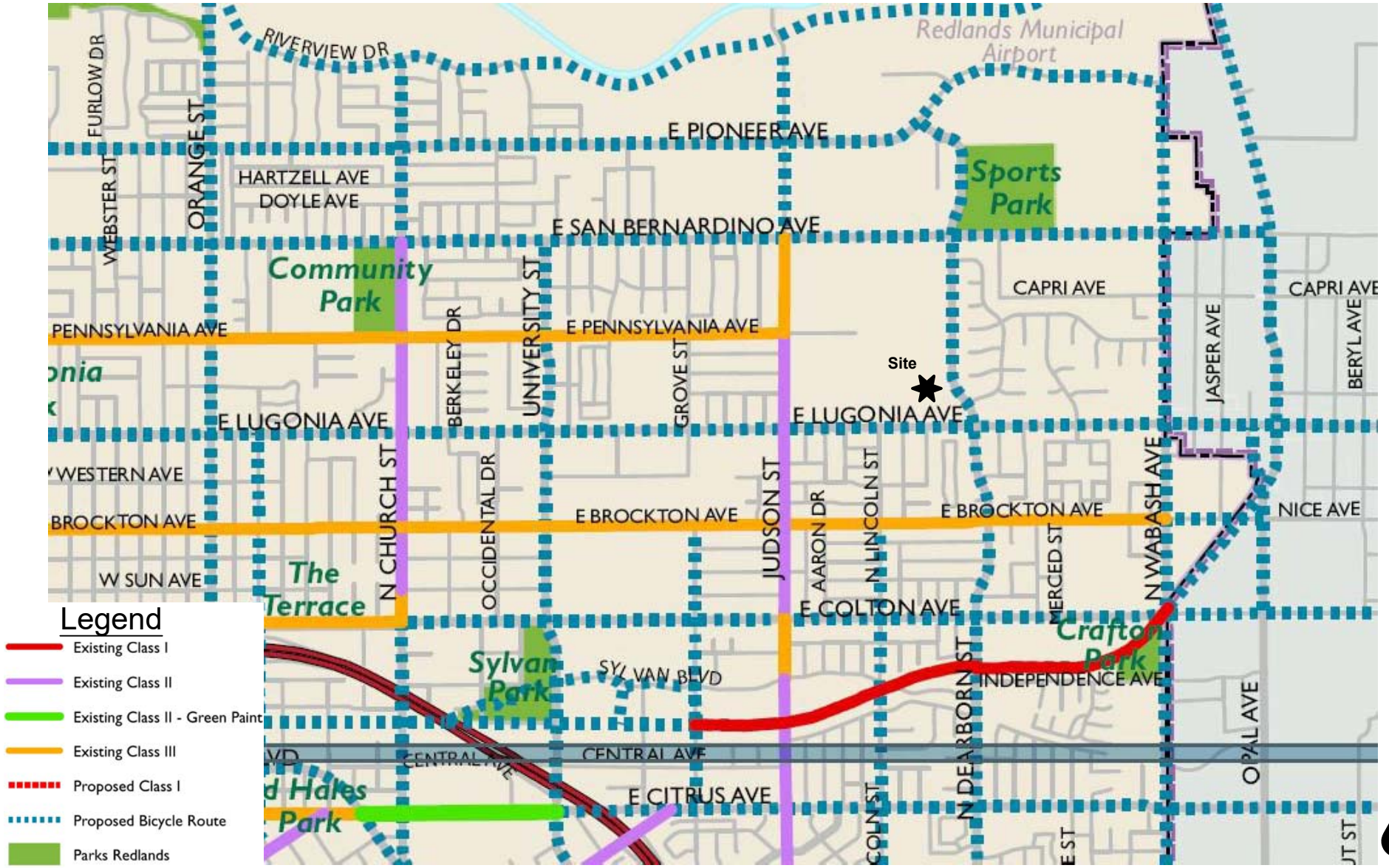
f. Collector – Industrial (Standard)



g. Collector – Industrial (Complete Streets)

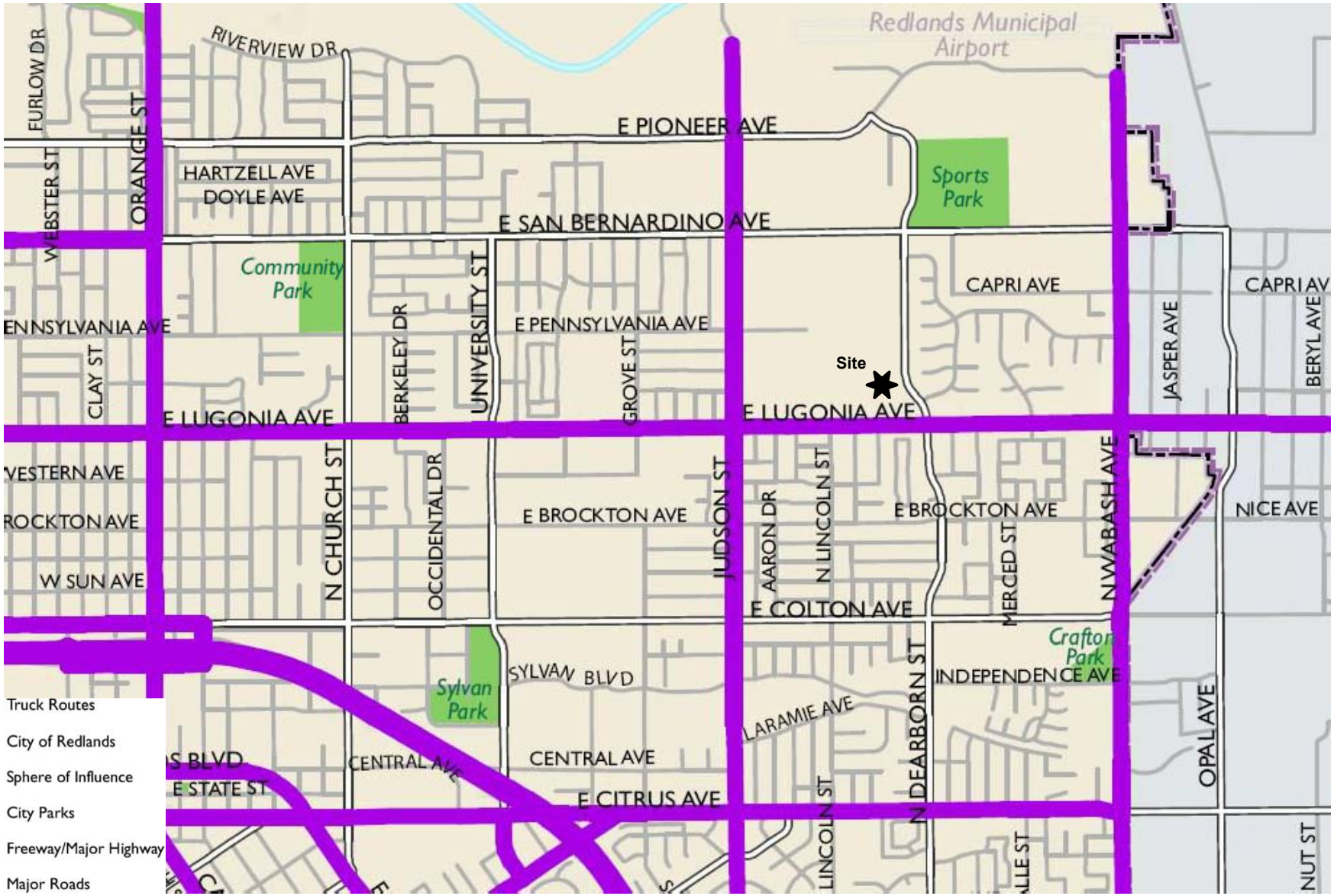
Figure 7
City of Redlands General Plan Roadway Cross-Sections

Source: City of Redlands



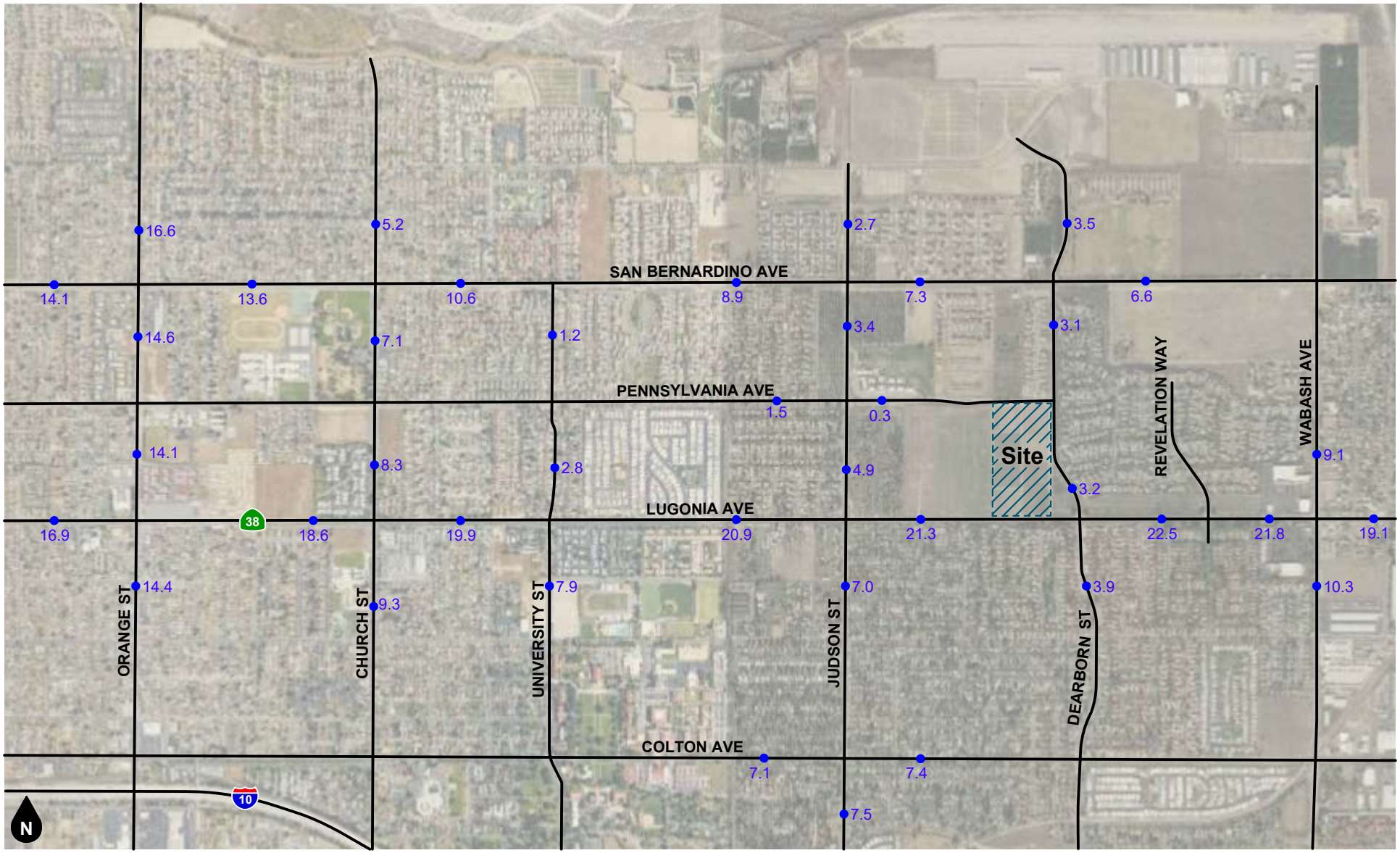
Source: City of Redlands

Figure 8
City of Redlands General Plan Bike Routes



Source: City of Redlands

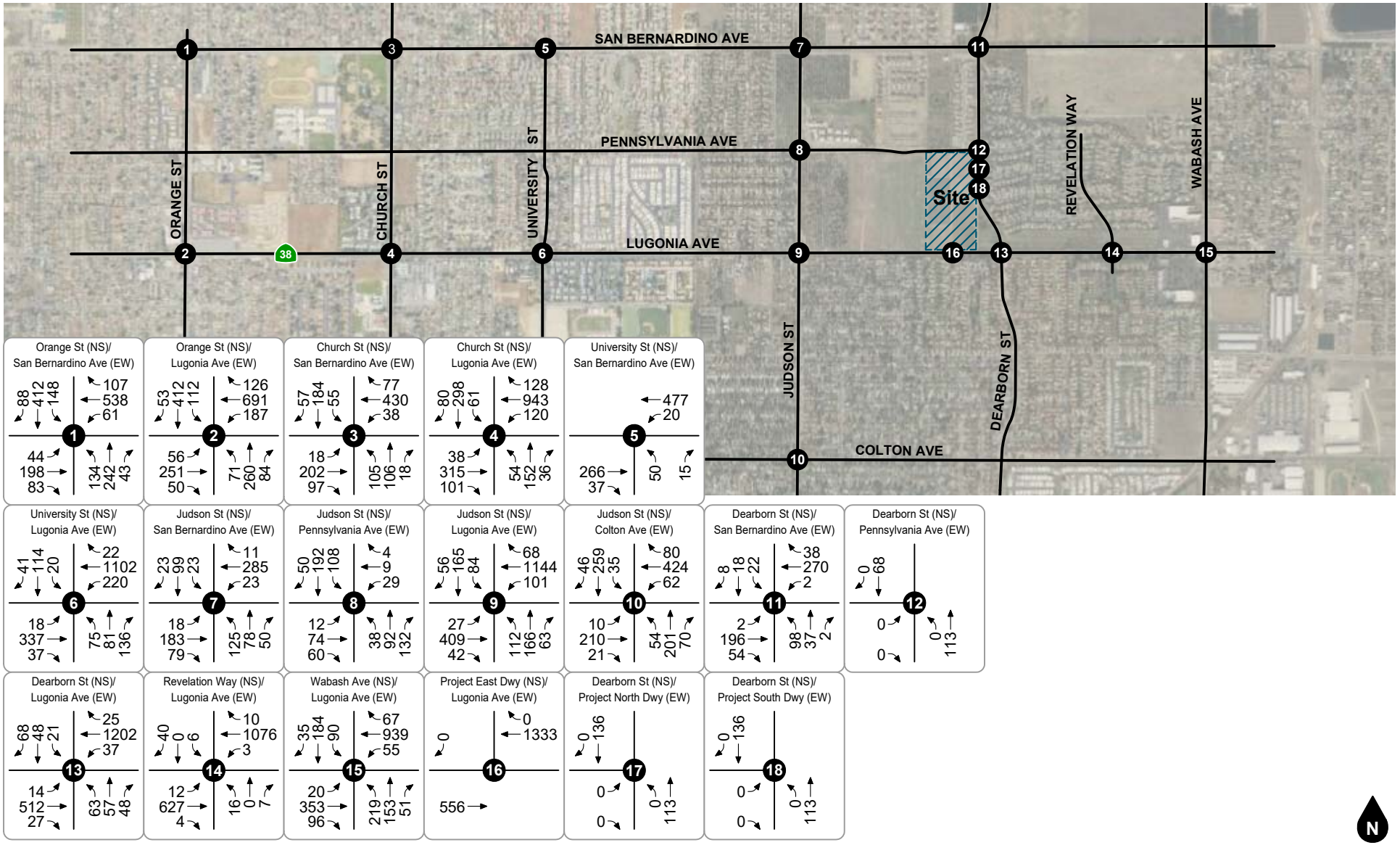
Figure 9
City of Redlands General Plan Roadway Truck Routes



Legend

●## Vehicles Per Day (1,000's)

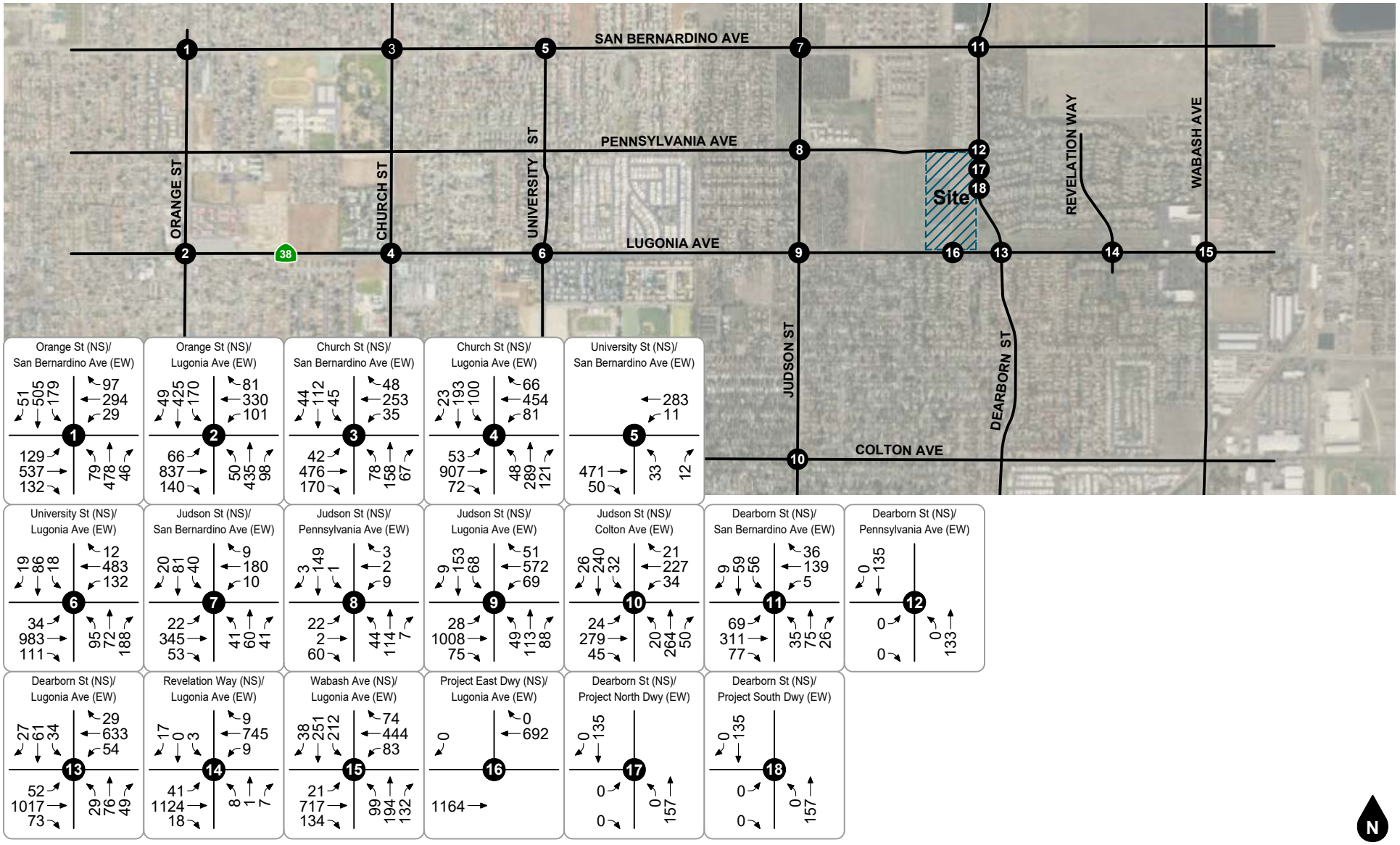
Figure 10
Existing Average Daily Traffic Volumes



Legend

Study Intersection

Figure 11
Existing AM Peak Hour Intersection Turning Movement Volumes



Legend

Study Intersection

Figure 12
Existing PM Peak Hour Intersection Turning Movement Volumes

4. PROJECT TRIP FORECASTS

This section describes how project trip generation, trip distribution, and trip assignment forecasts were developed. The forecast project volumes are illustrated on figures contained in this section.

TRIP GENERATION

Table 2 shows the project trip generation based upon trip generation rates obtained from the Institute of Transportation Engineers, *Trip Generation Manual*, 10th Edition, 2017. Trip generation rates were determined for daily trips, AM peak hour inbound and outbound trips, and PM peak hour inbound and outbound trips for the proposed land use. In accordance with the Institute of Transportation Engineers recommendations, the number of trips forecast to be generated by the proposed use are determined by multiplying the trip generation rates by the land use quantity.

The proposed project consists of a phased construction of a Catholic Church including a Parish Hall and a Sanctuary with a 1,454-seating capacity as well as a 530-student school. As shown in Table 2, full buildout of the proposed project is forecast to generate a weekday total of approximately 2,818 weekday daily trips, including 497 trips during the AM peak hour and 182 trips during the PM peak hour. The Sunday operation of the project is forecast to generate a total of approximately 1,759 Sunday daily trips, including 785 trips during the mid-day peak hour.

TRIP DISTRIBUTION & ASSIGNMENT

Figure 13 and Figure 14 show the forecast outbound and inbound directional distribution patterns for the project generated trips, respectively. The project trip distribution patterns were determined in consultation with City staff based on review of existing traffic data, surrounding land uses, and the local and regional roadway facilities in the project vicinity.

Based on the identified project trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 15. The project AM and PM peak hour intersection turning movement volumes for project occupancy buildout conditions (i.e., church and school completion) are depicted on Figure 16 and Figure 17, respectively.

PROJECT PHASING

Trip Generation

For the purposes of this report, the proposed project is analyzed in three phases 1, 2 and 4. Table 3 shows the project trip generation based upon trip generation rates for each of the construction phases. In Phase 1, the church will be fully operational on Sundays and the proposed project is forecast to generate a weekday total of approximately 640 daily trips, including 15 trips during the AM peak hour and 44 trips during the PM peak hour. Sunday operation of the project is forecast to generate a total of approximately 1,759 daily trips, including 785 trips during the Sunday mid-day peak hour. In Phase 2, the church and partial opening of the school will be operational, and the proposed project is forecast to generate weekday total of approximately 1,873 weekday daily trips, including 288 trips during the AM peak hour and 122 trips during the PM peak hour with Sunday trip generation remaining the same. For Phase 3, the Sanctuary and Lugonia Avenue driveway will be constructed in 2028; however, Phase 3 does not add additional trips, so it is not analyzed. In Phase 4, the church and school are anticipated to be fully operational in year 2031 with access to both the Dearborn Street and Lugonia Avenue driveways. For the purposes of this report, full buildout under Phase 4 is evaluated in the Existing Plus Project conditions and includes the completion of the school and the church with both access driveways.

Trip Distribution

Figure 18 and Figure 19 show the forecast outbound and inbound directional distribution patterns for the project generated trips, respectively for Phases 1 and 2 which has only the Dearborn Street driveway constructed. Based on the identified project trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 20. The project AM and PM peak hour intersection turning movement volumes for project Phase 1 conditions (i.e. church completion) are depicted on Figure 21 and Figure 22, respectively. The project AM and PM peak hour intersection turning movement volumes for project Phase 2 conditions (i.e. church and partial school opening) are depicted on Figure 23 and Figure 24, respectively.

CONSTRUCTION TRIPS

Compared to the project trip generation, trip generation associated with construction of the proposed project is forecast to be temporary and lower than trips generated upon completion. Therefore, traffic impacts associated with construction activity will be minor and temporary. To further lessen the impact of construction traffic, the project will be required to comply with all County of San Bernardino standard conditions pertaining to construction, including work hours, traffic control plan, haul route, access, oversized-vehicle transportation permit, site security, noise, vehicle emissions and dust control. All construction related trips should be restricted to off-peak hours, whenever possible.

Table 2
Project Trip Generation

Trip Generation Rates													
			Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Sunday Mid-Day Peak Hour			Sunday Daily
Land Use	Source[1]	Units[2]	% In	% Out	Rate	% In	% Out	Rate	Rate	% In	% Out	Rate	Rate
Private School (K-8)	ITE 534	Students	55%	45%	0.91	46%	54%	0.26	4.11	0%	0%	0.00	0.00
Church	ITE 560	Seats	50%	50%	0.01	40%	60%	0.03	0.44	49%	51%	0.54	1.21

Trips Generated													
			Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday	Sunday Mid-Day Peak Hour			Sunday
Land Use	Quantity	Units[2]	In	Out	Total	In	Out	Total	Daily	In	Out	Total	Daily
Church	1,454	SEAT	7	8	15	17	27	44	640	385	400	785	1,759
Private School (K-8)	530	ST	265	217	482	63	75	138	2,178	0	0	0	0
TOTAL PROJECT TRIPS GENERATED			**272**	**225**	**497**	**80**	**102**	**182**	**2,818**	**385**	**400**	**785**	**1,759**

Notes:

(1) ITE = Institute of Transportation Engineers *Trip Generation Manual* (10th Edition, 2017); ### = Land Use Code.

(2) SEAT = Seats; ST = Students

Table 3
Project Trip Generation by Phase

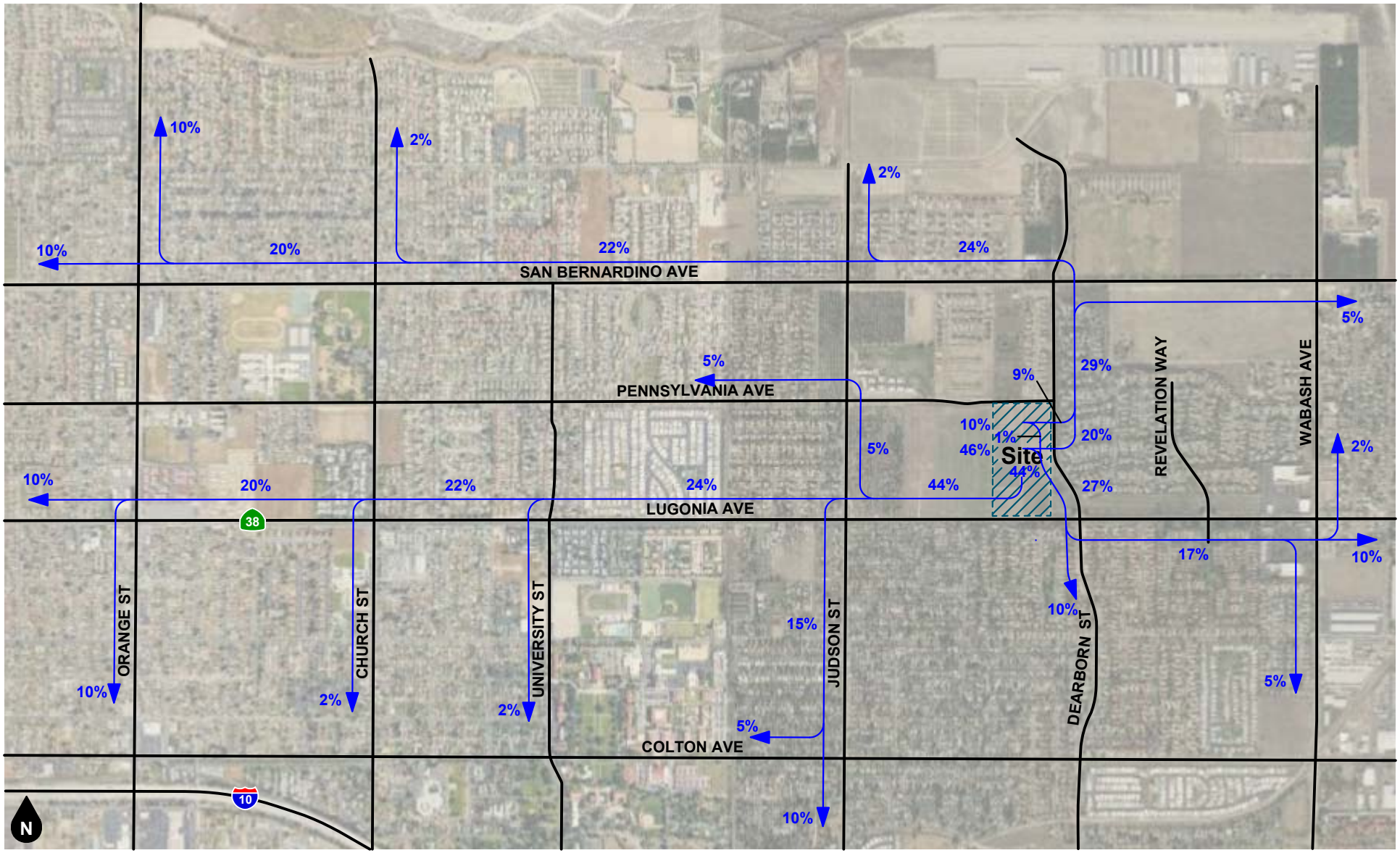
Trip Generation Rates													
			Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Sunday Mid-Day Peak Hour			Sunday Daily
Land Use	Source[1]	Units[2]	% In	% Out	Rate	% In	% Out	Rate	Rate	% In	% Out	Rate	Rate
Private School (K-8)	ITE 534	Students	55%	45%	0.91	46%	54%	0.26	4.11	0%	0%	0.00	0.00
Church	ITE 560	Seats	50%	50%	0.01	40%	60%	0.03	0.44	49%	51%	0.54	1.21

Trips Generated													
			Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday	Sunday Mid-Day Peak Hour			Sunday
Land Use	Quantity	Units[2]	In	Out	Total	In	Out	Total	Daily	In	Out	Total	Daily
Phase 1													
Parish Hall	1,454	SEAT	7	8	15	17	27	44	640	385	400	785	1,759
Phase 2													
Parish Hall	1,454	SEAT	7	8	15	17	27	44	640	385	400	785	1,759
Private School (K-8)	300	ST	150	123	273	36	42	78	1,233	0	0	0	0
Subtotal - Phase 2			157	131	288	53	69	122	1,873	385	400	785	1,759
Phase 3													
Church & Parish Hall	1,454	SEAT	7	8	15	17	27	44	640	385	400	785	1,759
Private School (K-8)	300	ST	150	123	273	36	42	78	1,233	0	0	0	0
Subtotal - Phase 3			157	131	288	53	69	122	1,873	385	400	785	1,759
Phase 4													
Church & Parish Hall	1,454	SEAT	7	8	15	17	27	44	640	385	400	785	1,759
Private School (K-8)	530	ST	265	217	482	63	75	138	2,178	0	0	0	0
TOTAL PROJECT TRIPS GENERATED			**272**	**225**	**497**	**80**	**102**	**182**	**2,818**	**385**	**400**	**785**	**1,759**

Notes:

(1) ITE = Institute of Transportation Engineers *Trip Generation Manual* (10th Edition, 2017); ### = Land Use Code.

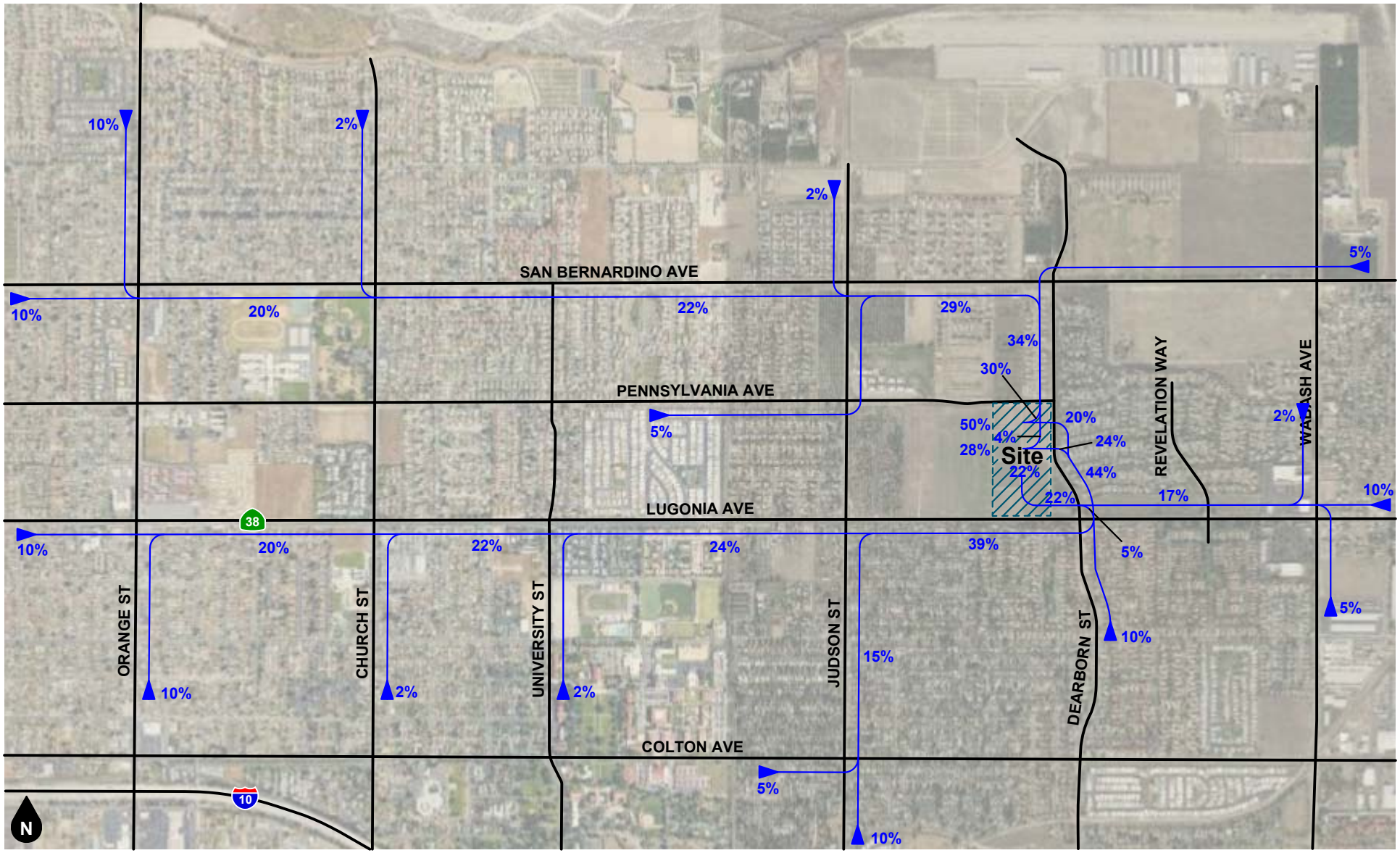
(2) SEAT = Seats; ST = Students



Legend

10% Percent From Project

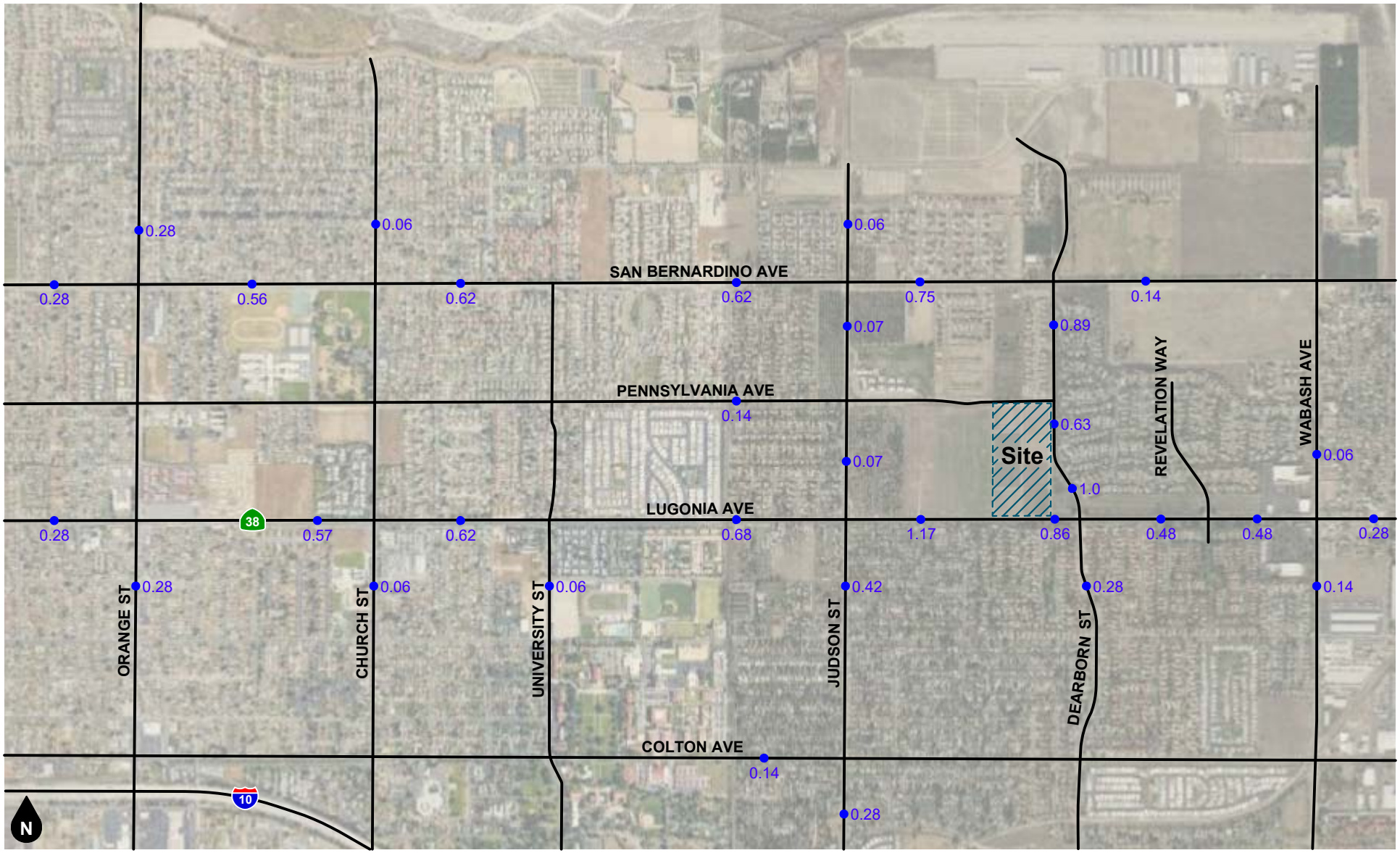
Figure 13
Project Trip Distribution (Outbound)



Legend

10% Percent To Project

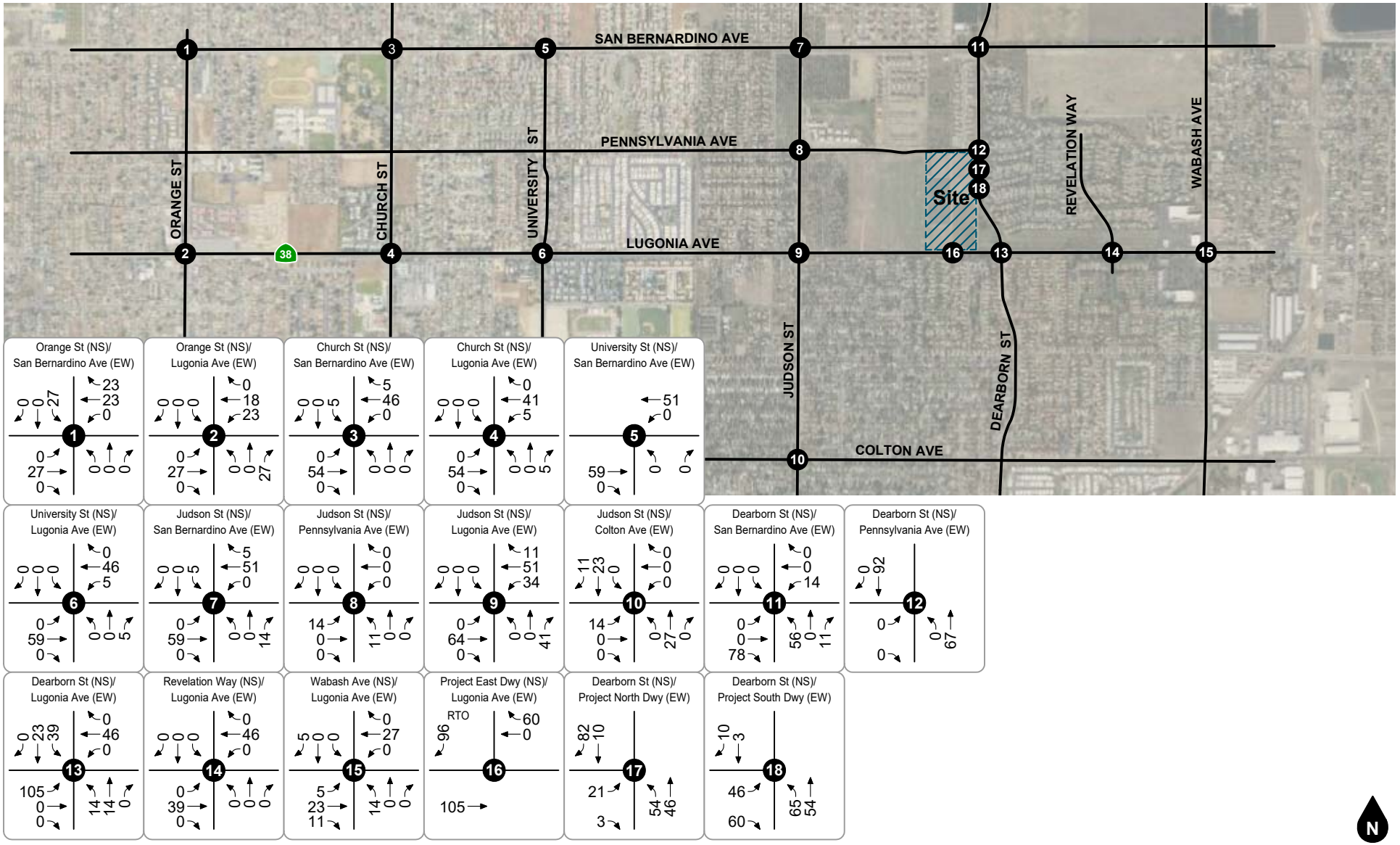
Figure 14
Project Trip Distribution (Inbound)



Legend

●## Vehicles Per Day (1,000's)

Figure 15
Project Average Daily Traffic Volumes



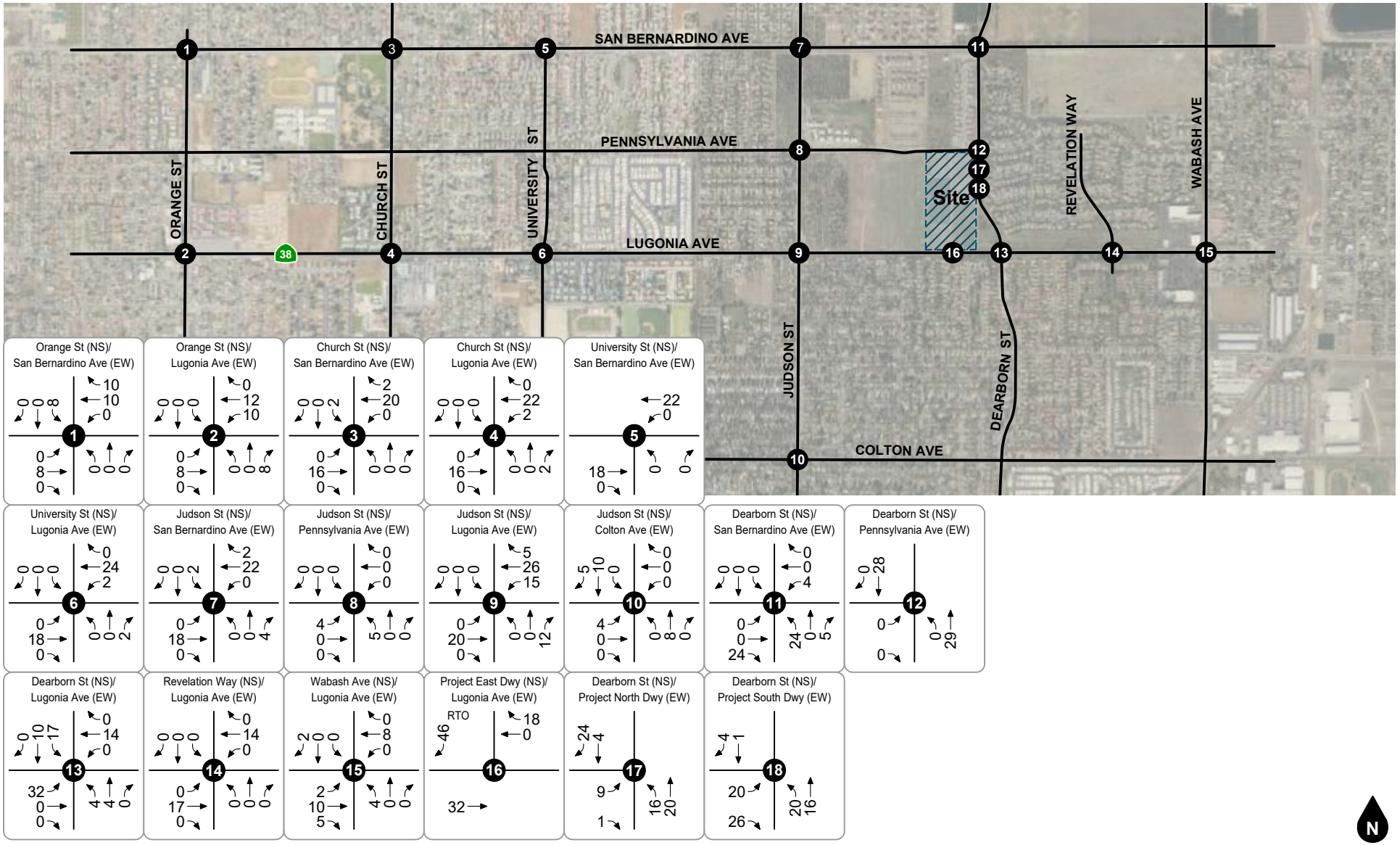
Legend

Study Intersection

RTO Right Turn Only

Figure 16

Project AM Peak Hour Intersection Turning Movement Volumes



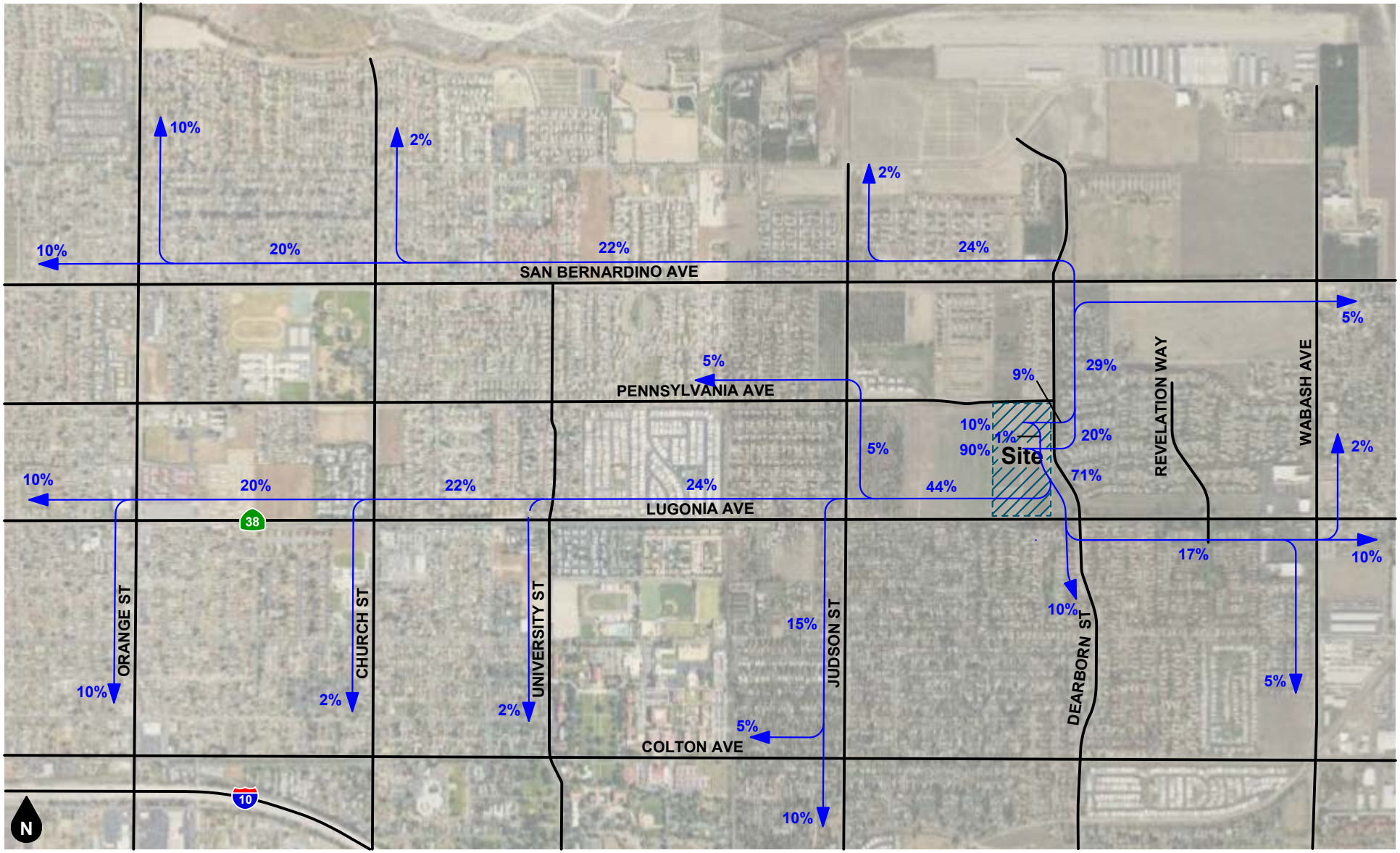
Legend

(#) Study Intersection

RTO Right Turn Only

Figure 17

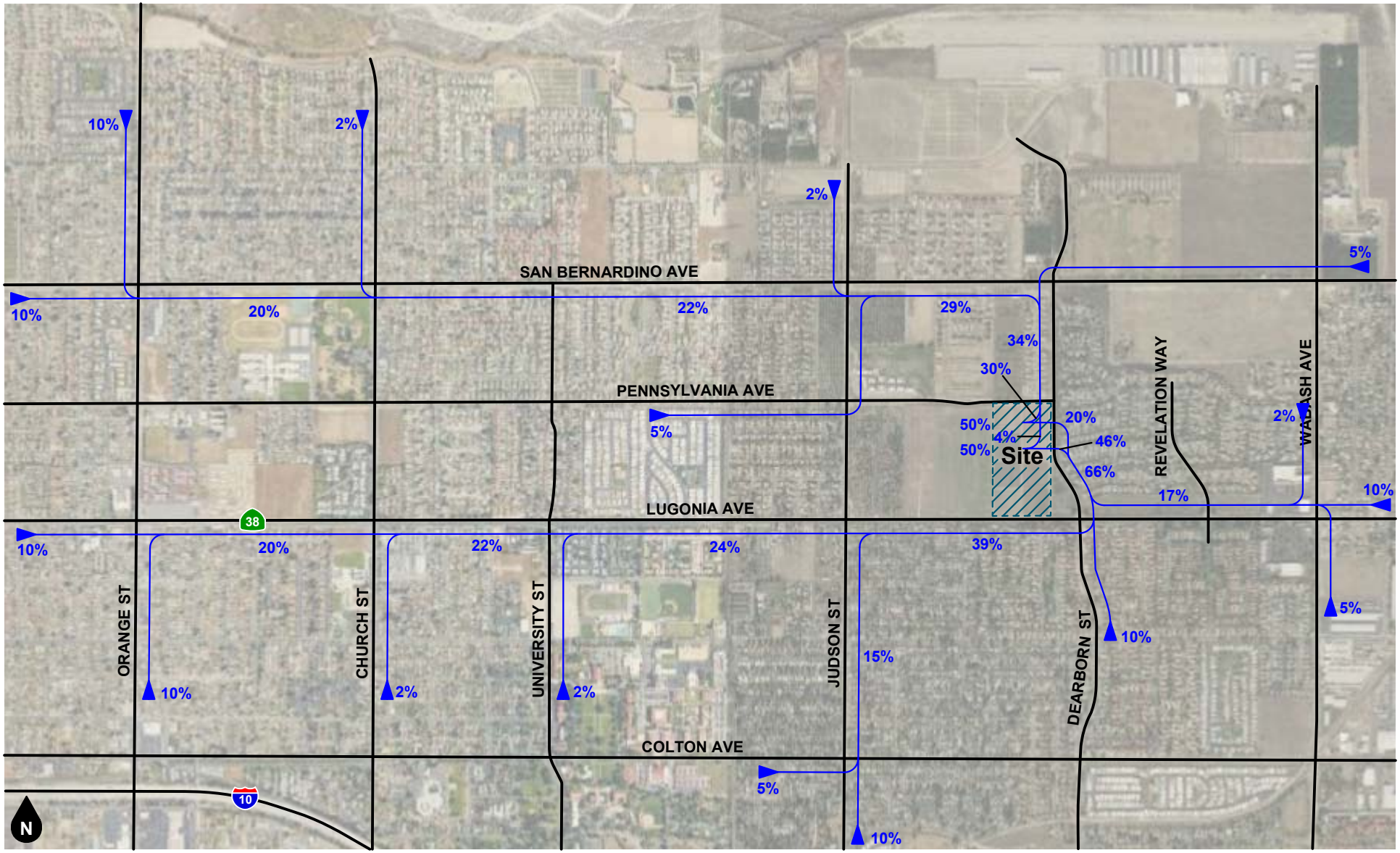
Project PM Peak Hour Intersection Turning Movement Volumes



Legend

10% Percent From Project

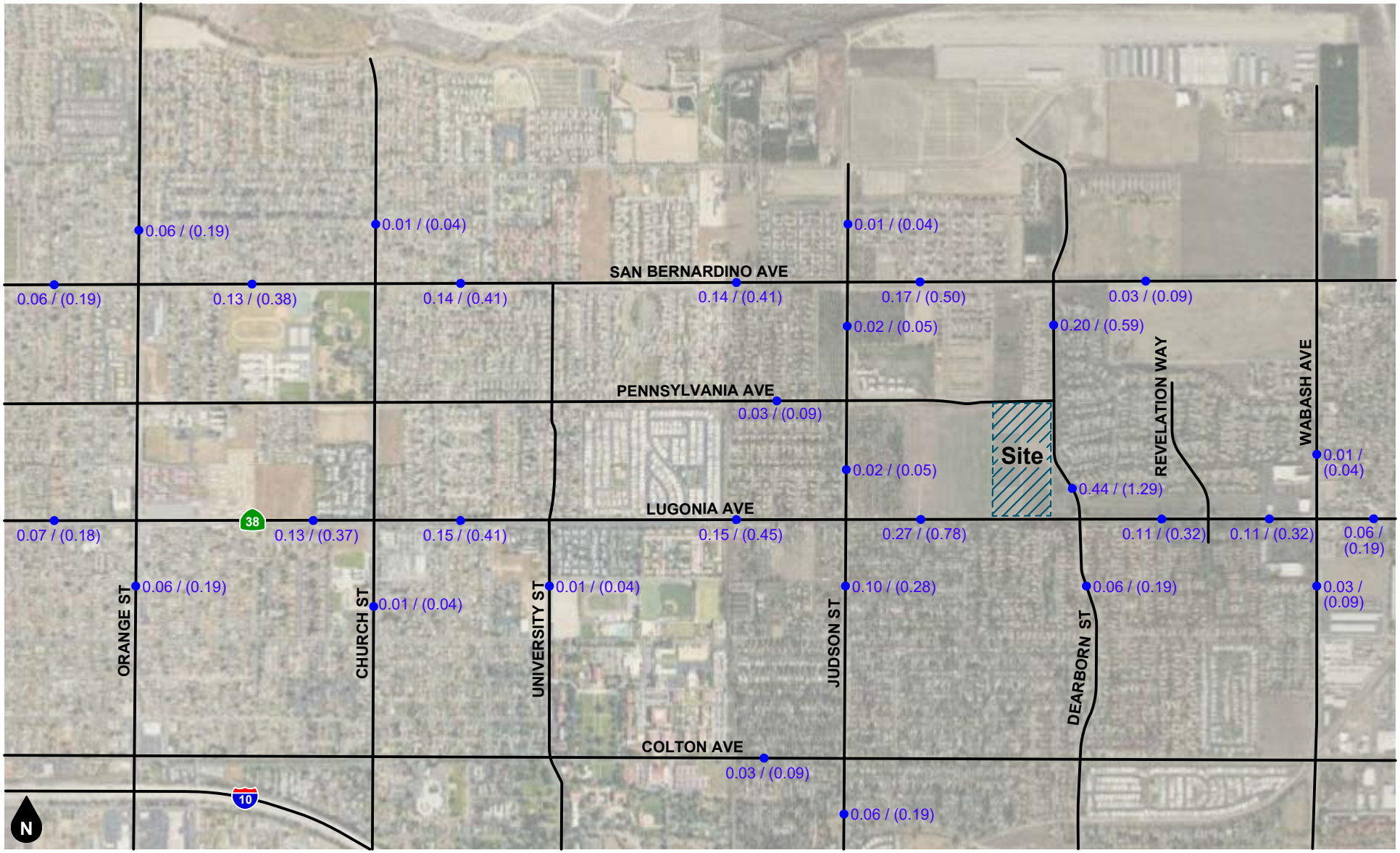
Figure 18
Project Trip Distribution (Outbound) - Phase 1 & 2



Legend

10% Percent To Project

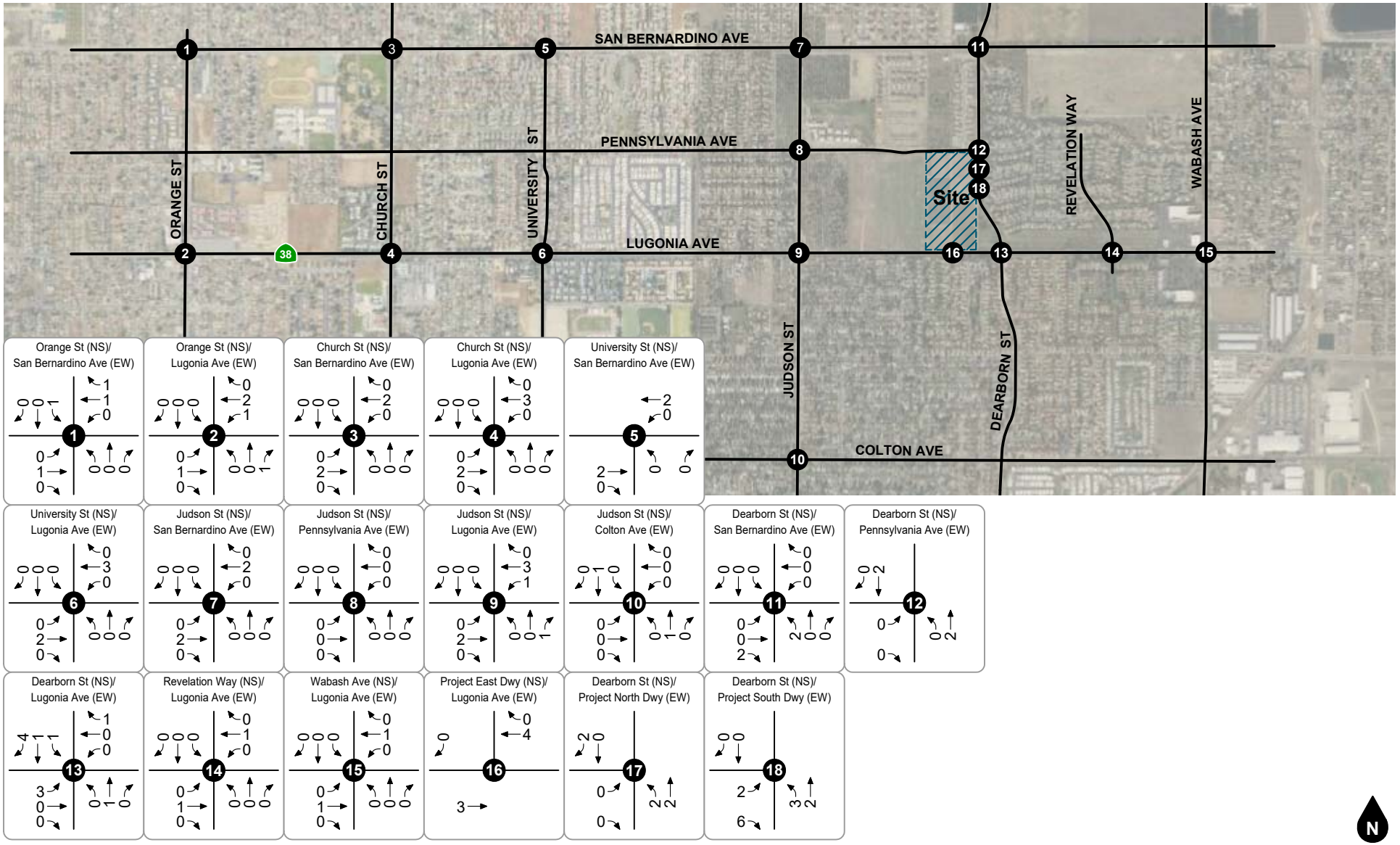
Figure 19
Project Trip Distribution (Inbound) - Phase 1 & 2



Legend

● Phase 1 / (Phase 2) Vehicles Per Day (1,000's)

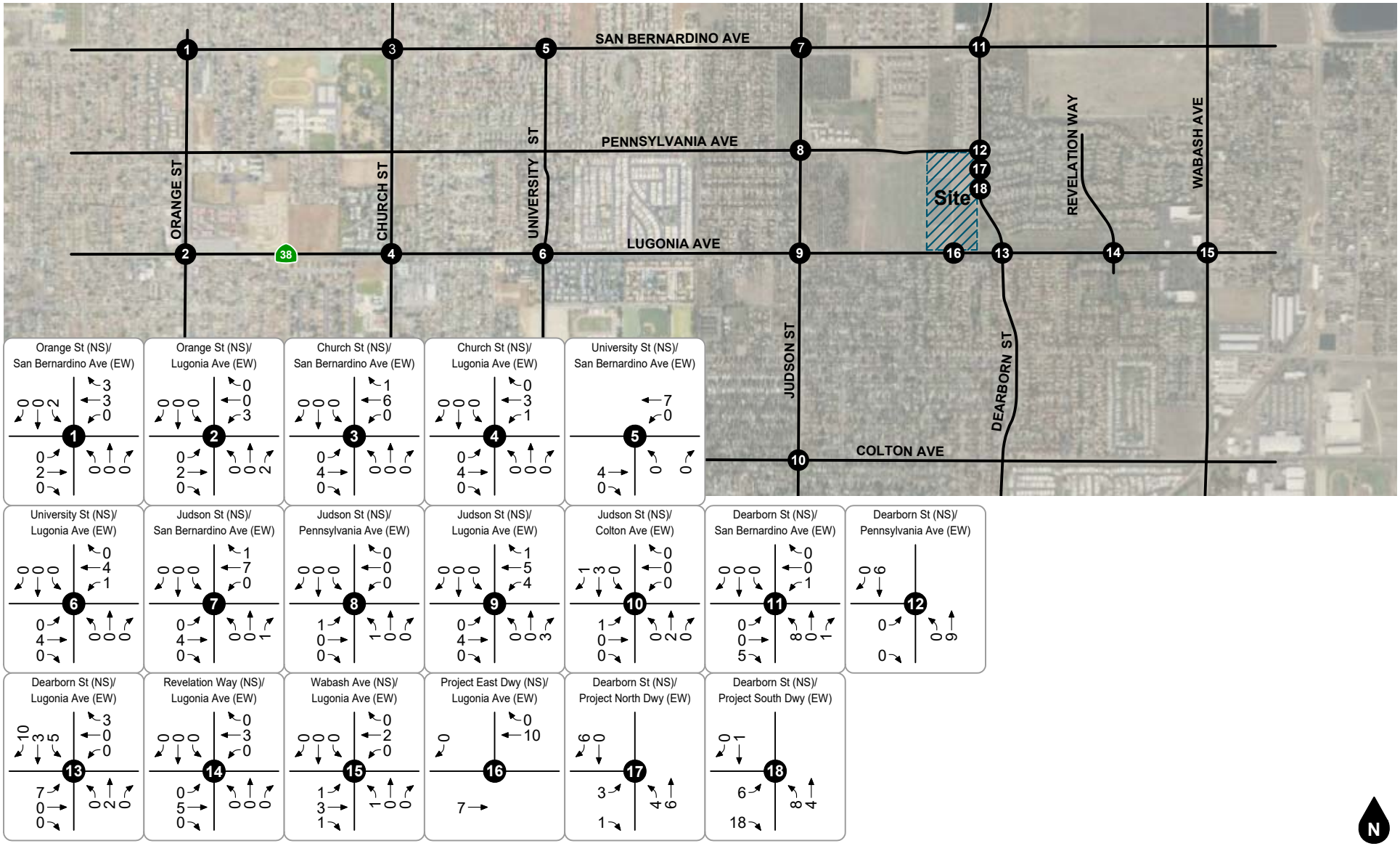
Figure 20
Project Average Daily Traffic Volumes - Phase 1 & 2



Legend

Study Intersection

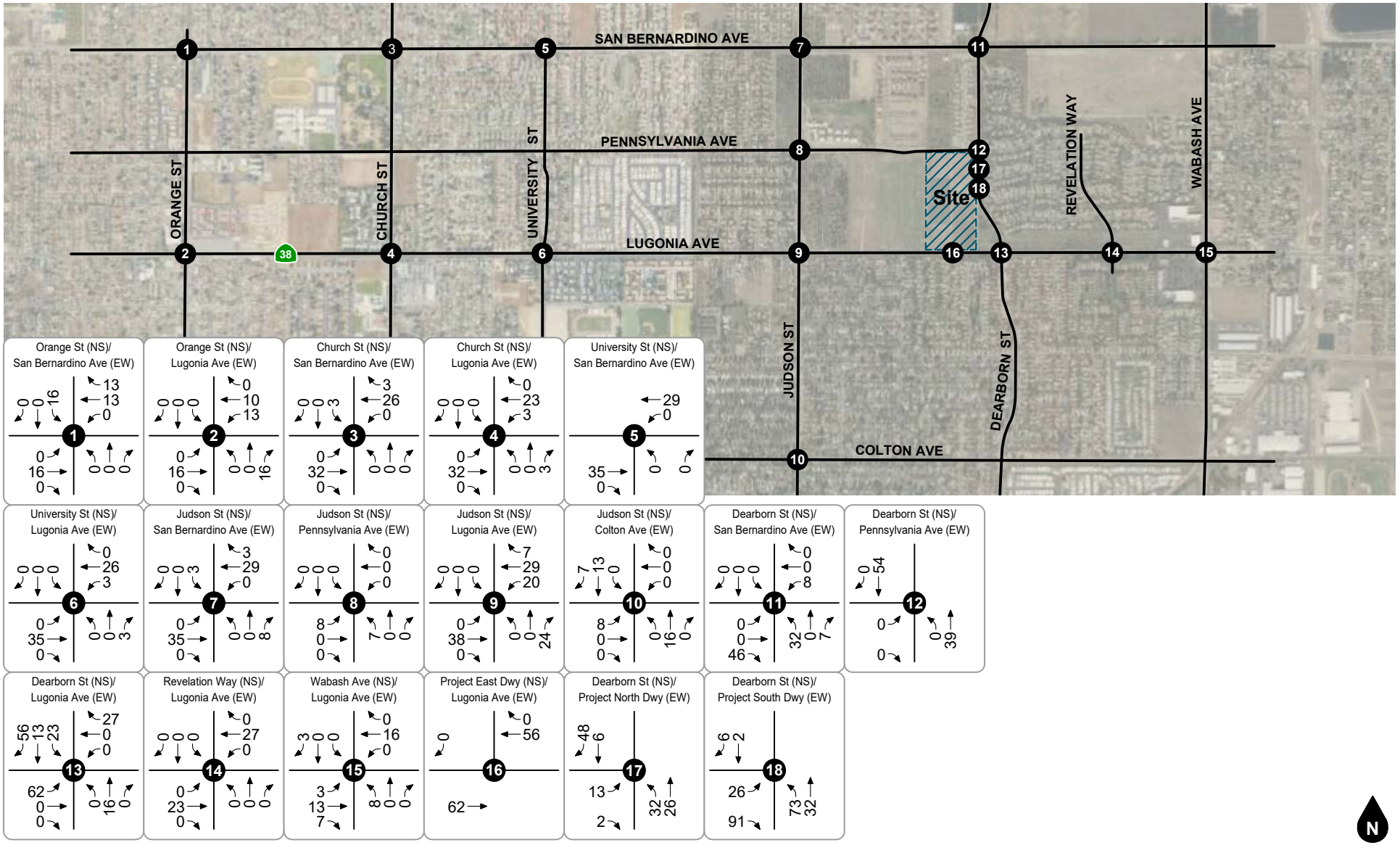
Figure 21
Project AM Peak Hour Intersection Turning Movement Volumes - Phase 1



Legend

(#) Study Intersection

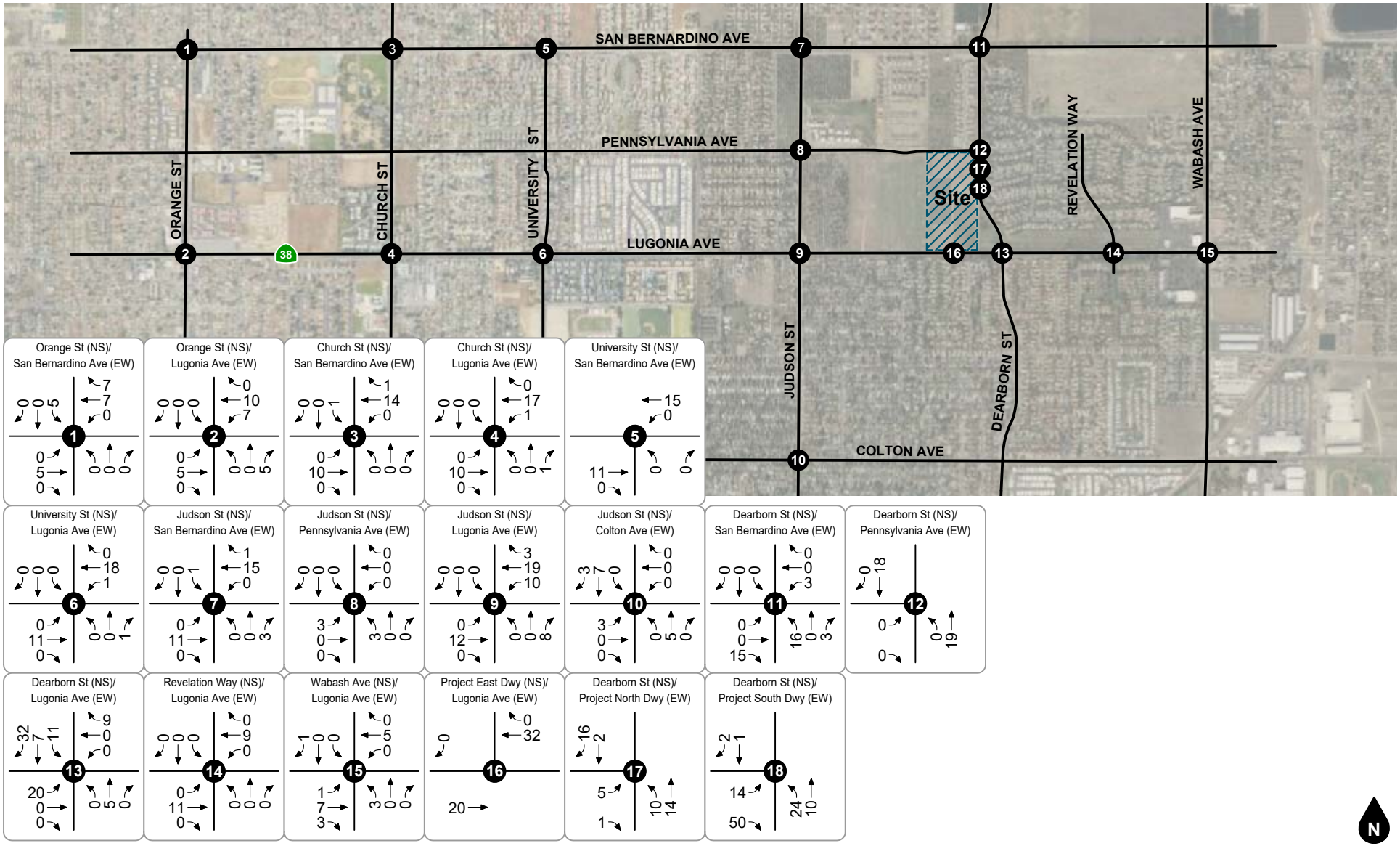
Figure 22
Project PM Peak Hour Intersection Turning Movement Volumes - Phase 1



Legend

Study Intersection

Figure 23
Project AM Peak Hour Intersection Turning Movement Volumes - Phase 2



Legend

Study Intersection

Figure 24
Project PM Peak Hour Intersection Turning Movement Volumes - Phase 2

5. FUTURE VOLUME FORECASTS

This section describes how future volume forecasts for each analysis scenario were developed. Forecast study area volumes are illustrated on figures contained in this section.

METHOD OF PROJECTION

To assess future conditions, existing roadway volumes is combined with project trips.

FUTURE TRAFFIC VOLUMES

Existing Plus Project

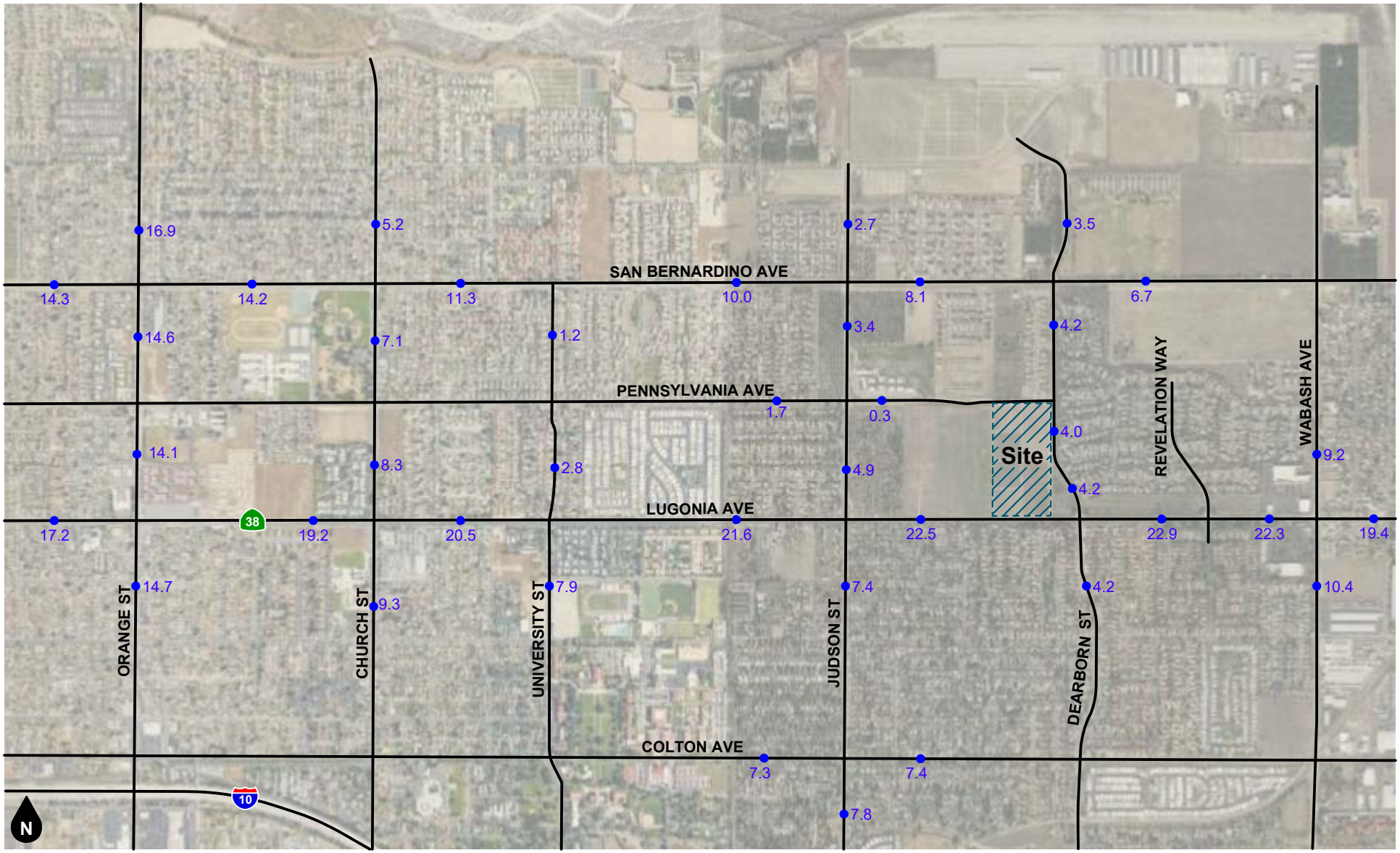
The traffic volumes for existing plus project conditions were developed by adding trips generated by full buildout of the project under Phase 4 (i.e., church and school completion) to existing volumes. Existing plus project average daily traffic volumes are shown on Figure 25. Existing plus project AM and PM peak hour intersection turning movement volumes are shown on Figure 26 and Figure 27, respectively.

Existing Plus Project – Phase 1

The traffic volumes for Existing Plus Project Phase 1 conditions were developed by adding trips generated by Phase 1 (i.e., church completion only) to existing volumes. Existing Plus Project Phase 1 average daily traffic volumes are shown on Figure 28. Existing Plus Project Phase 1 AM and PM peak hour intersection turning movement volumes are shown on Figure 29 and Figure 30, respectively.

Existing Plus Project – Phase 2

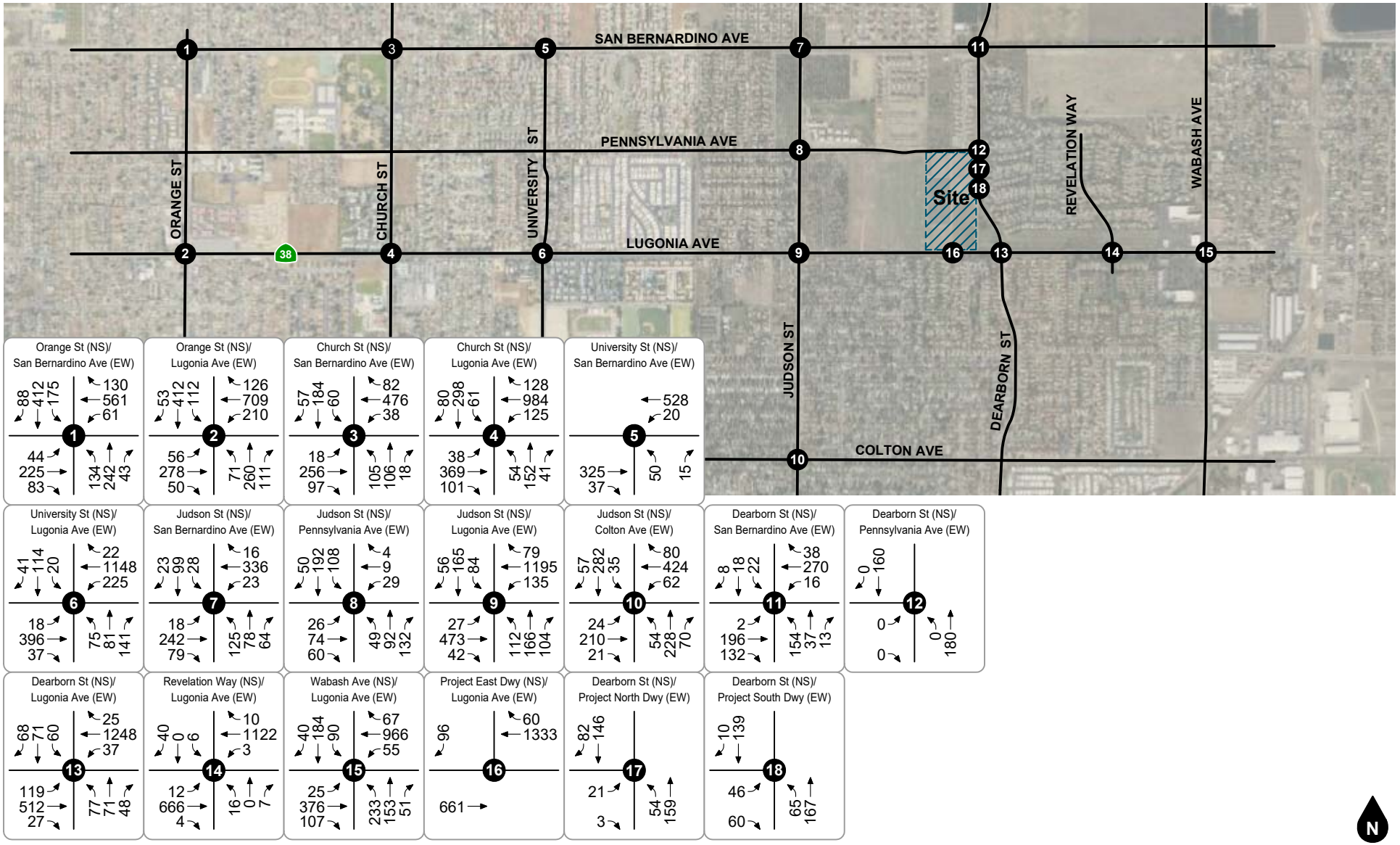
The traffic volumes for Existing Plus Project Phase 2 conditions have been derived by adding trips generated by Phase 2 (i.e., church and partial school opening) to existing volumes. Existing Plus Project Phase 2 average daily traffic volumes are shown on Figure 31. Existing Plus Project Phase 2 AM and PM peak hour intersection turning movement volumes are shown on Figure 32 and Figure 33, respectively.



Legend

●## Vehicles Per Day (1,000's)

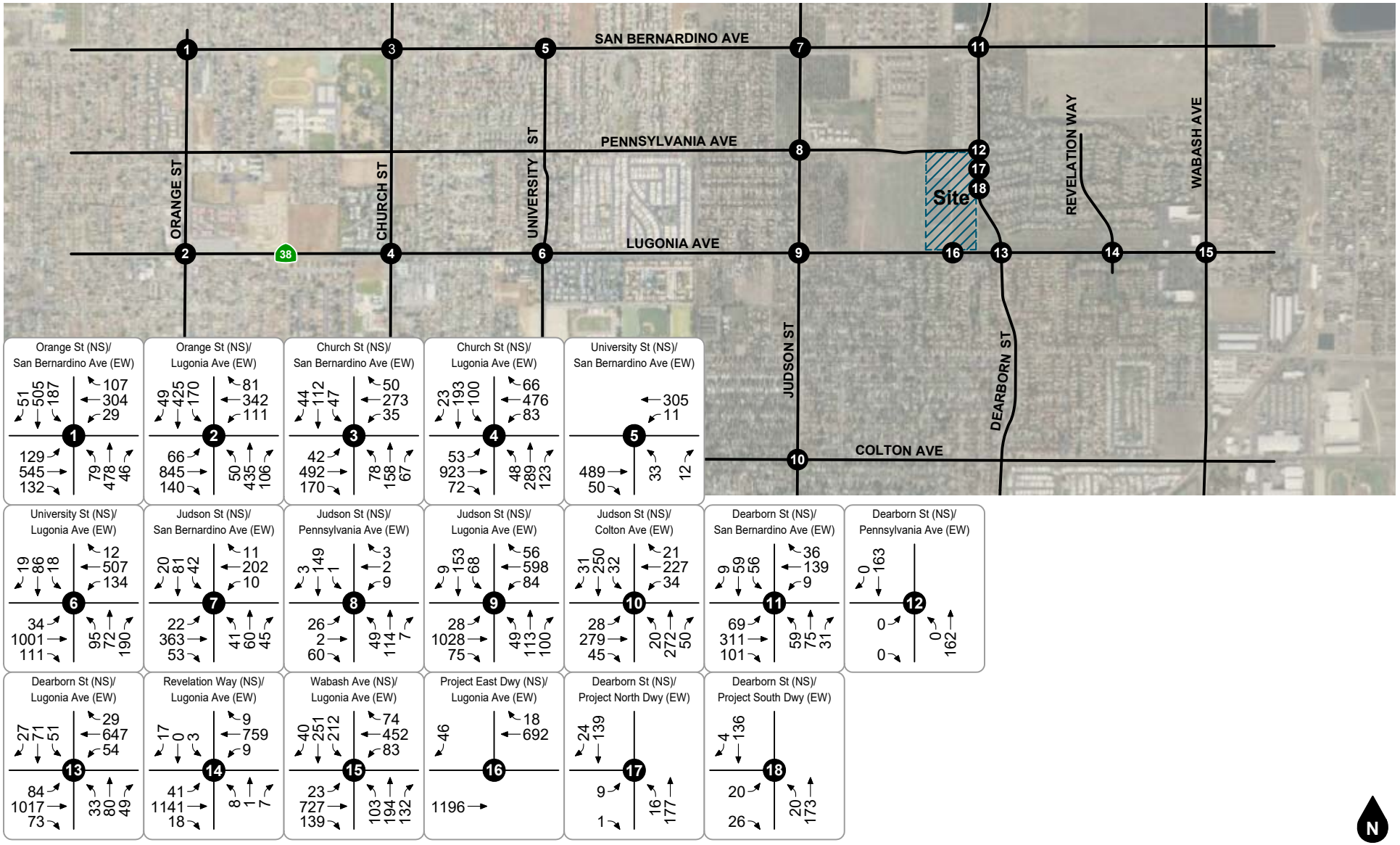
Figure 25
Existing Plus Project Average Daily Traffic Volumes



Legend

Study Intersection

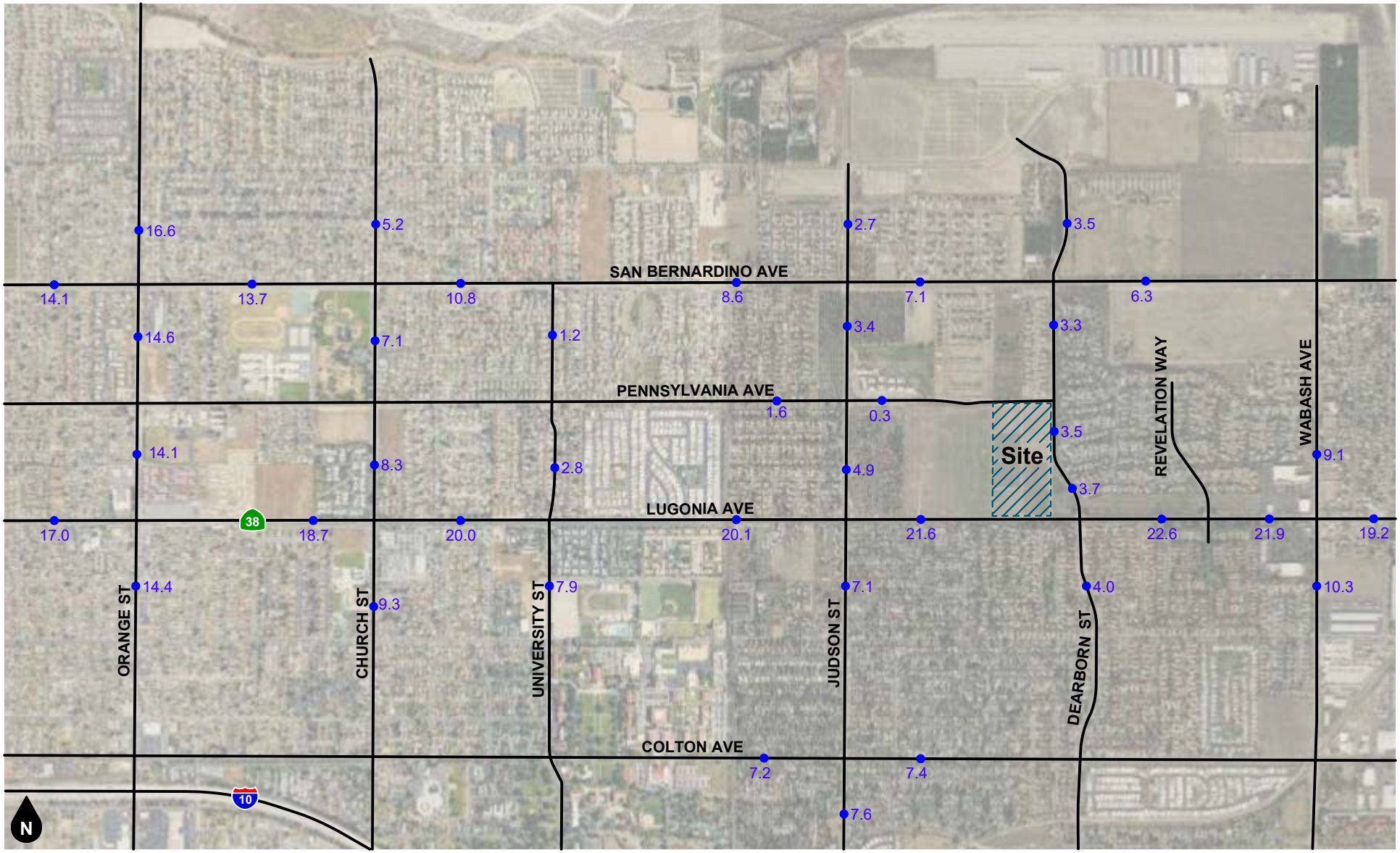
Figure 26
Existing Plus Project
AM Peak Hour Intersection Turning Movement Volumes



Legend

Study Intersection

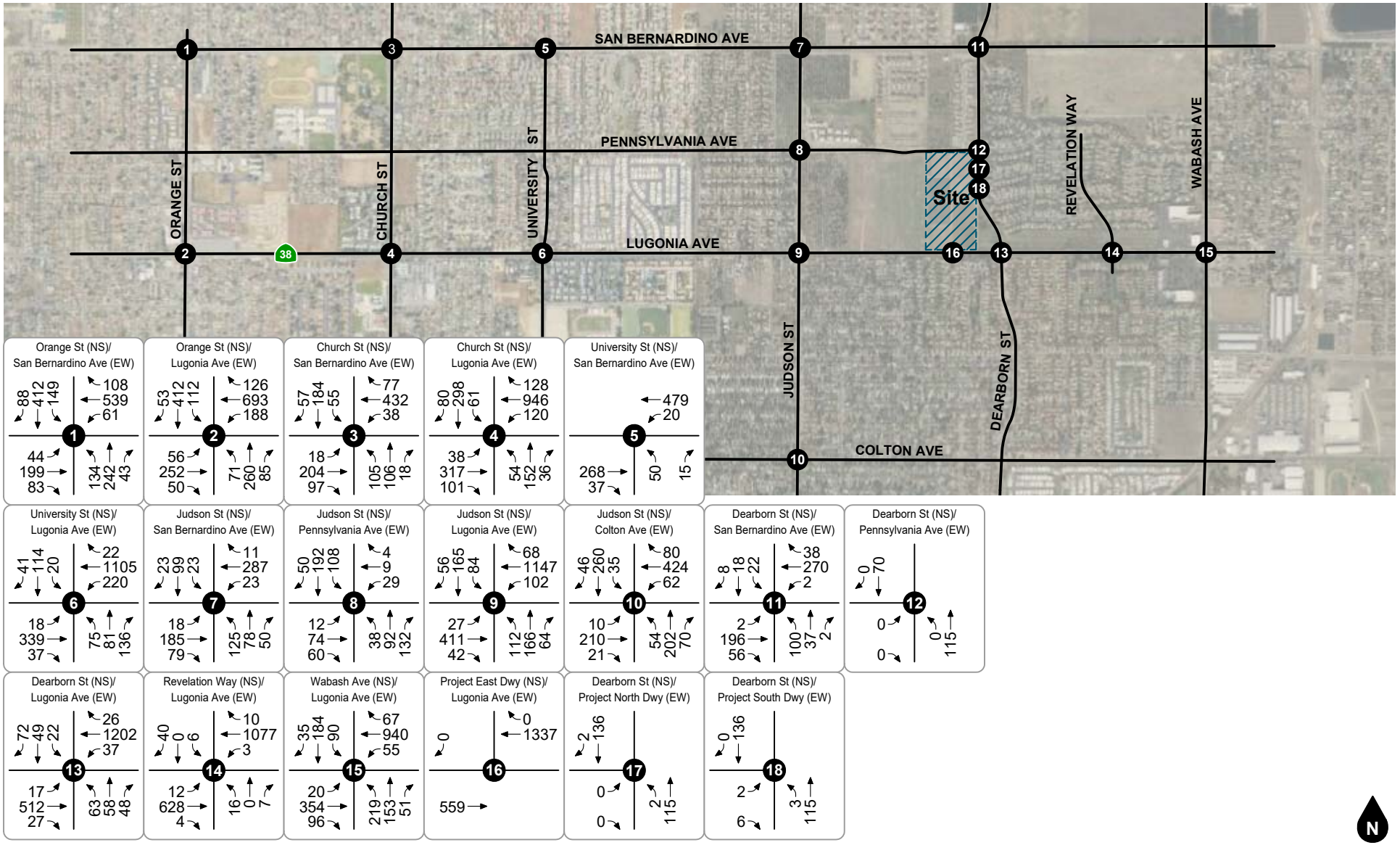
Figure 27
Existing Plus Project
PM Peak Hour Intersection Turning Movement Volumes



Legend

●## Vehicles Per Day (1,000's)

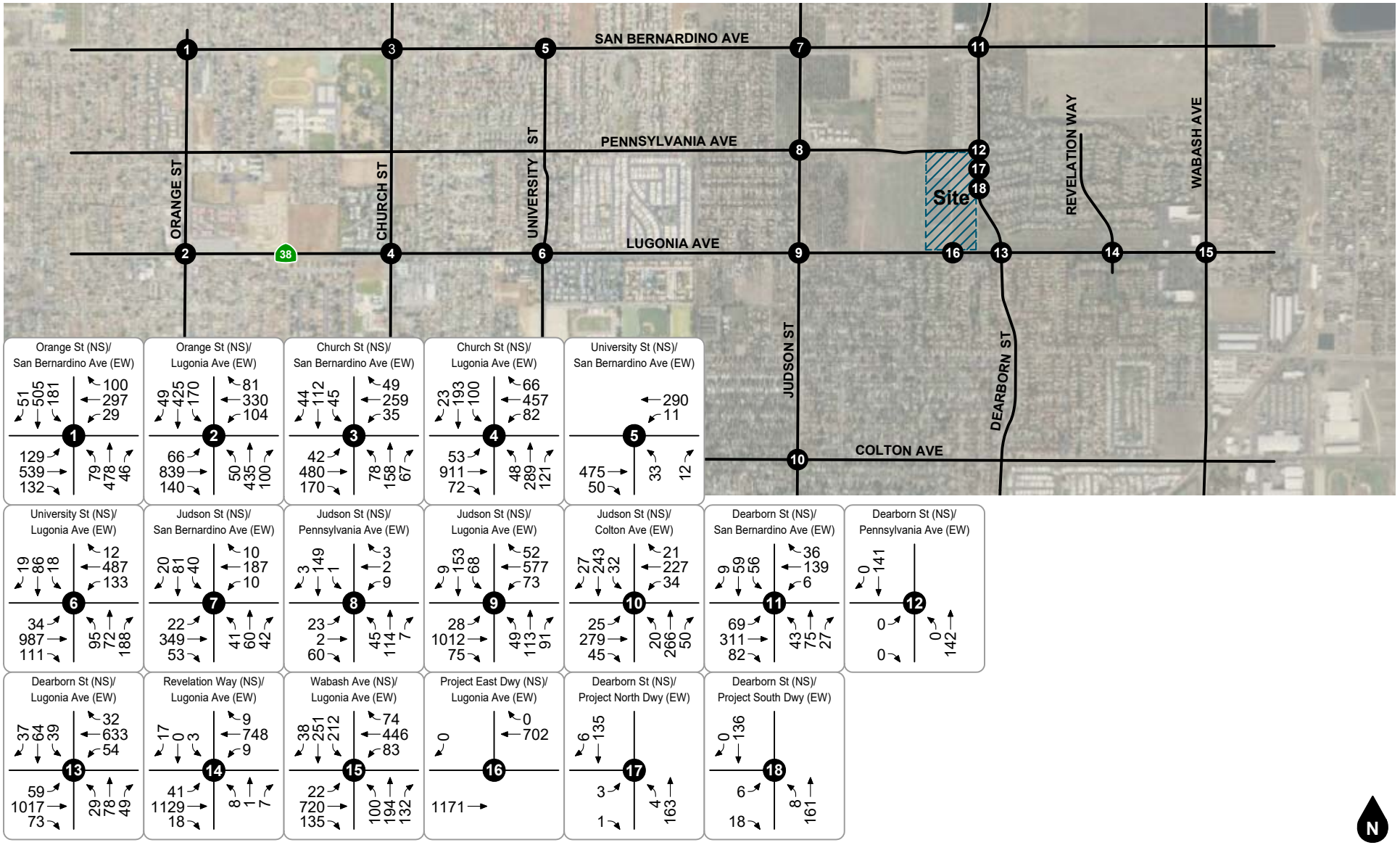
Figure 28
Existing Plus Project Average Daily Traffic Volumes - Phase 1



Legend

Study Intersection

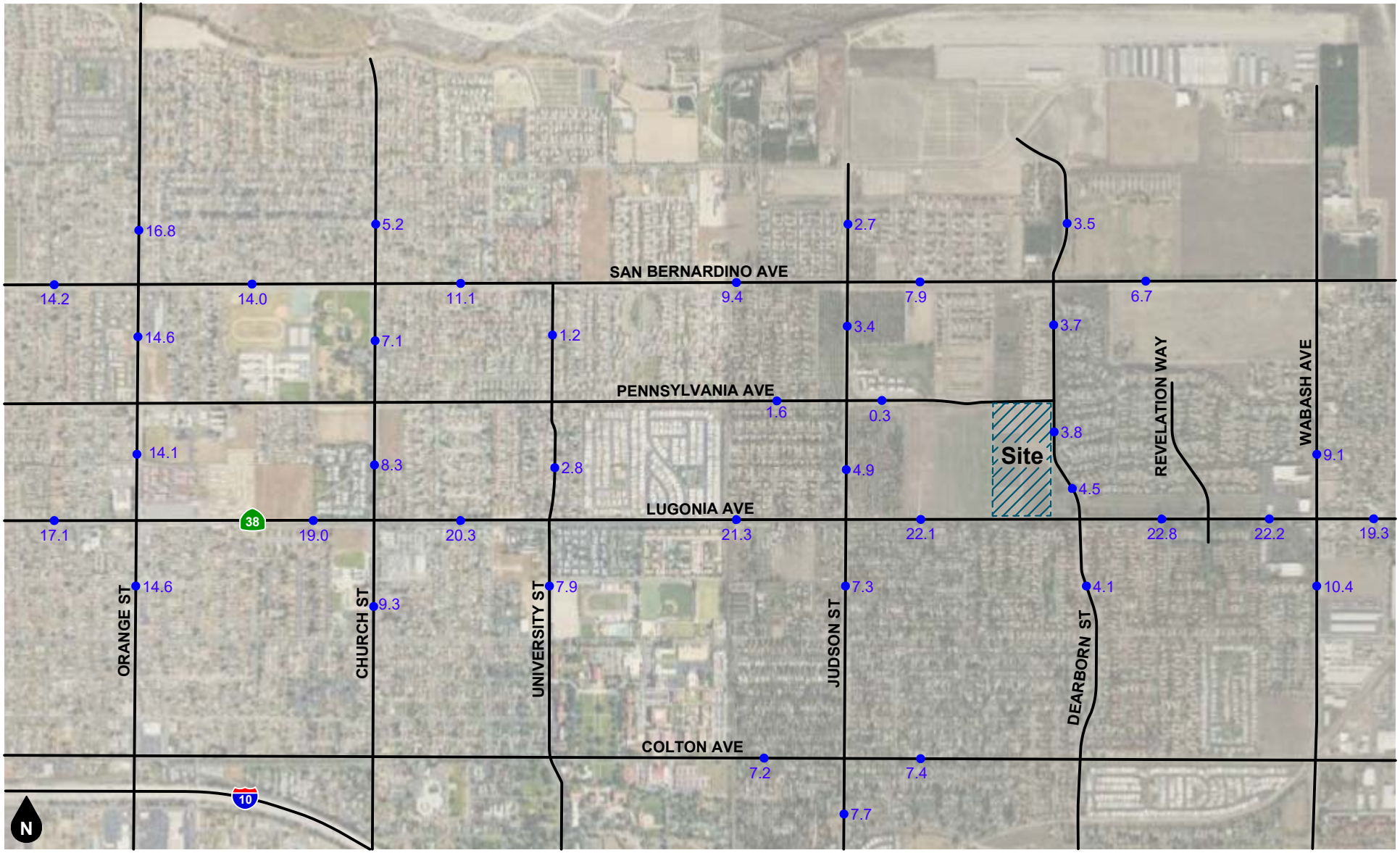
Figure 29
Existing Plus Project
AM Peak Hour Intersection Turning Movement Volumes - Phase 1



Legend

Study Intersection

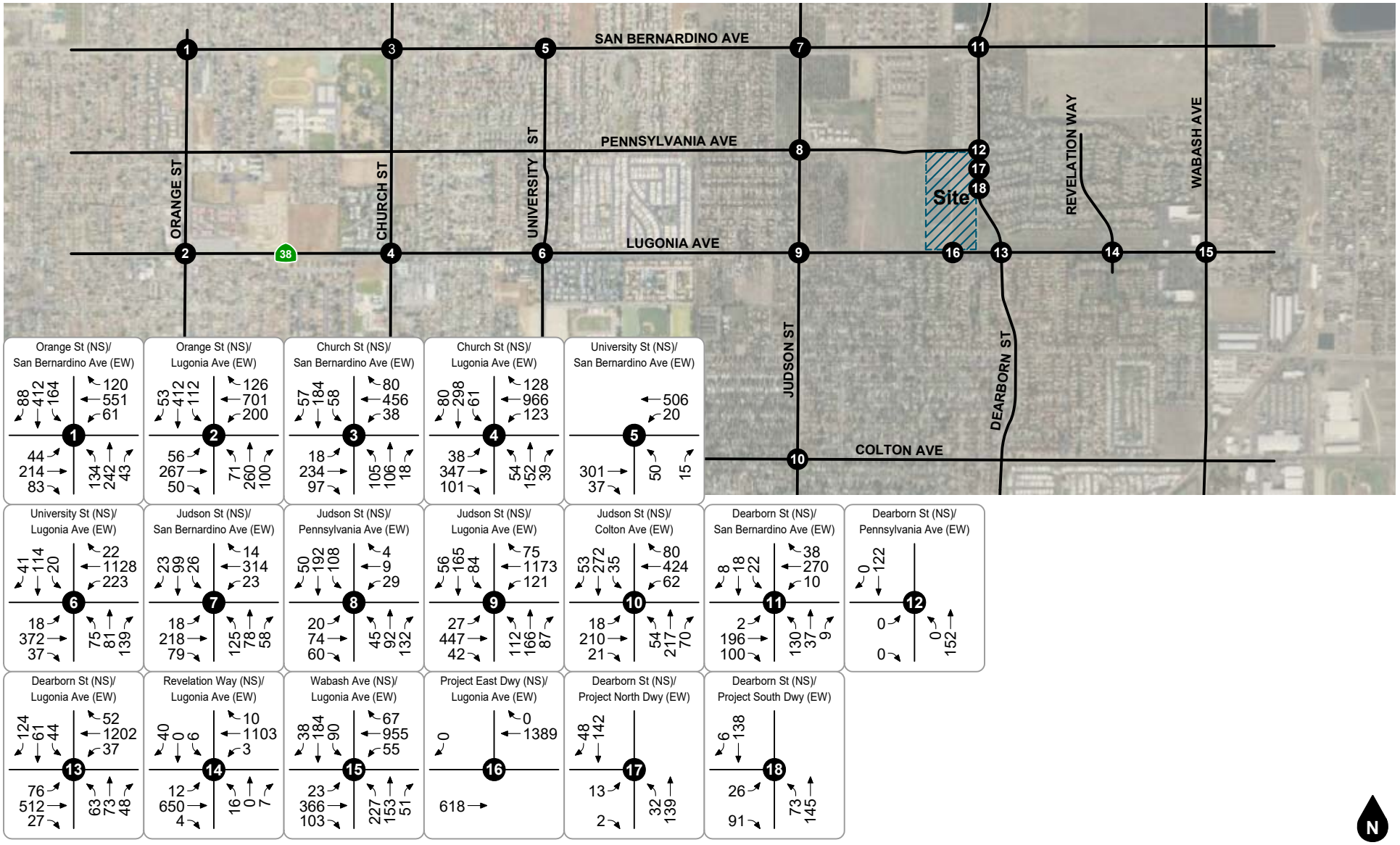
Figure 30
Existing Plus Project
PM Peak Hour Intersection Turning Movement Volumes - Phase 1



Legend

●## Vehicles Per Day (1,000's)

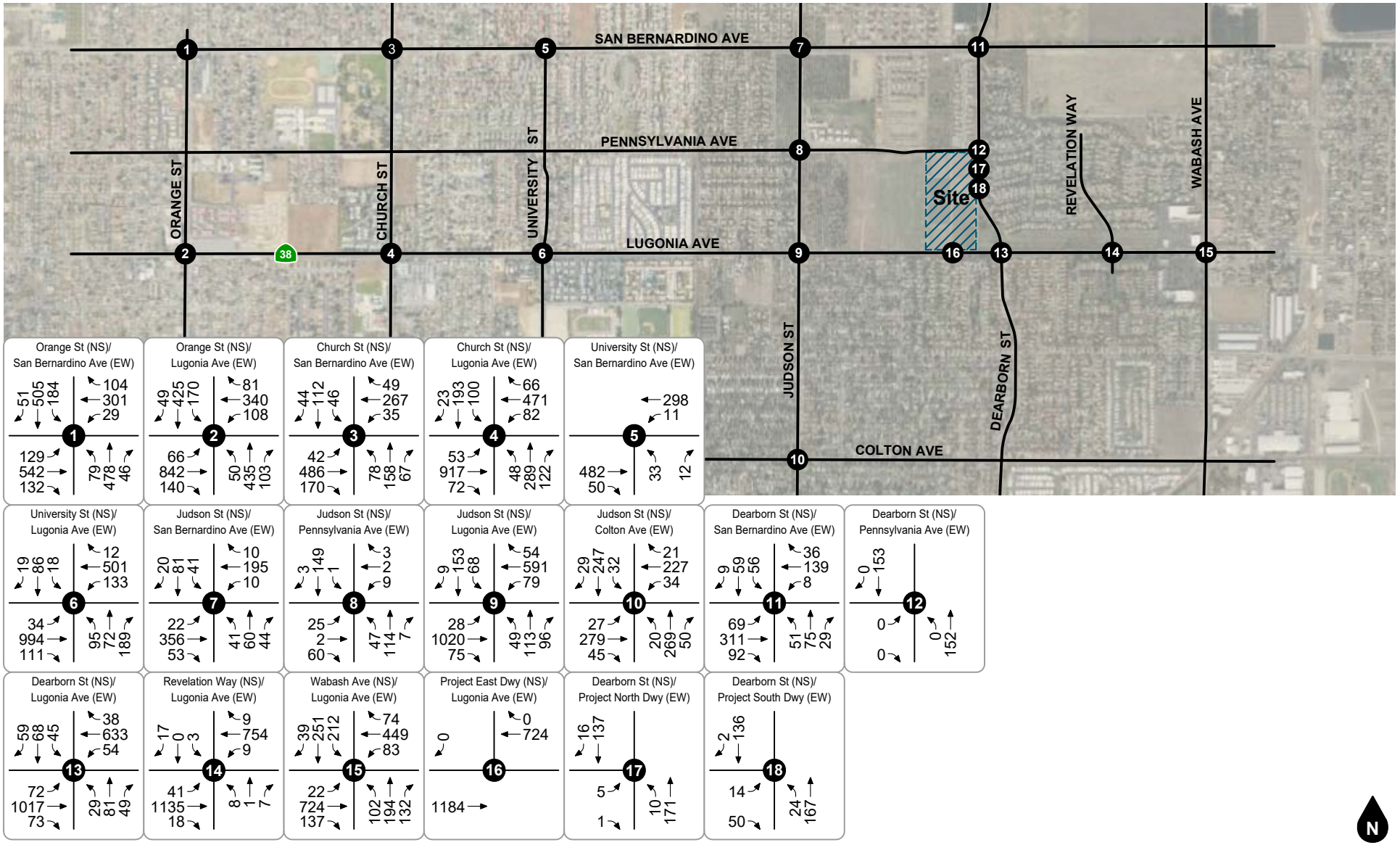
Figure 31
Existing Plus Project Average Daily Traffic Volumes - Phase 2



Legend

Study Intersection

Figure 32
Existing Plus Project
AM Peak Hour Intersection Turning Movement Volumes - Phase 2



Legend

Study Intersection

Figure 33
Existing Plus Project
PM Peak Hour Intersection Turning Movement Volumes - Phase 2

6. FUTURE OPERATIONAL ANALYSIS

Detailed intersection level of service calculation worksheets for each of the following analysis scenarios are provided in Appendix D.

INTERSECTION LEVELS OF SERVICE

Existing Plus Project

The intersection Levels of Service for Existing Plus Project Phase 4 conditions (i.e., church and school completion), without and with improvements, are shown in Table 4. As shown in Table 4, the study intersections are forecast to operate within acceptable Levels of Service (C or better for City of Redlands and D or better for Caltrans) during the peak hours for Existing Plus Project conditions, with the exception of the following study intersections (#3, #10 and #14) which are forecast to continue to operate at Levels of Service D or worse and intersection #7 which is forecast to degrade to LOS E without improvements:

3.	Church Street at San Bernardino Avenue	(F-AM / E-PM peak hour)	LOS degrades in AM
7.	Judson Street at San Bernardino Avenue	(E-AM peak hour)	LOS degrades in AM
10.	Judson Street at Colton Avenue	(F-AM / D-PM peak hour)	no LOS change
14.	Revelation Way at Lugonia Avenue	(E-AM / F-PM peak hour)	LOS degrades in AM

Existing Plus Project – Phase 1

The intersection Levels of Service for Existing Plus Project Phase 1 conditions (i.e., church completion), without and with improvement, are also shown in Table 4. As shown in Table 4, the study intersections are forecast to operate within acceptable Levels of Service, with the exception of the following study intersections (#3, #10 and #14) which are forecast to continue to operate at Levels of Service D or worse and intersection #7 which is forecast to degrade to LOS D without improvements.

Existing Plus Project – Phase 2

The intersection Levels of Service for Existing Plus Project Phase 2 conditions (i.e. church and partial school opening), without and with improvement, are also shown in Table 4. As shown in Table 4, the study intersections are forecast to operate within acceptable Levels of Service, with the exception of the following study intersections (#3, #10 and #14) which are forecast to continue to operate at Levels of Service D or worse and intersection #7 which is forecast to degrade to LOS D without improvements.

LEVELS OF SERVICE ASSESSMENT

Existing Plus Project

Table 5 evaluates the project impact at the study intersections for Existing Plus Project Phase 4 conditions (i.e., church and school completion). As shown in Table 5, the proposed project is forecast to result in a project related traffic deficiency at three (3)study intersections (#3-Church Street at San Bernardino Avenue, #7-Judson Street at San Bernardino Avenue, and #14-Revelation Way at Lugonia Avenue) for Existing Plus Project conditions without improvement based on the established thresholds of significance.

Since three of the intersections (#3-Church Street at San Bernardino Avenue, #10-Judson Street at Colton Avenue, and #14-Revelation Way at Lugonia Avenue) are currently deficient with pre-existing issue, improvement measures to improve intersection delay to the pre-project condition are specified in the section below. Additionally, two of the intersections (#3-Church Street at San Bernardino Avenue and #7-Judson

Street at San Bernardino Avenue) have been identified in the County of San Bernardino Nexus Program to improve acceptable Level of Service.

Level of service improvements are recommended in the section below to address the project-related traffic deficiency for Existing Plus Project Phase 4 conditions (i.e., church and school completion).

Existing Plus Project – Phase 1

Table 6 evaluates the project impact at the study intersections for Existing Plus Project Phase 1 conditions (i.e., church completion). As shown in Table 6, the proposed project is forecast to result in a project related traffic deficiency at one (1) study intersection (#7-Judson Street at San Bernardino Avenue,) for Existing Plus Project Phase 1 conditions without improvement based on the established thresholds of significance.

The Level of service improvements recommended in the section below to address the project-related traffic deficiency for Existing Plus Project Phase 1 conditions (i.e., church completion). conditions will provide adequate improvement for Existing Plus Phase 4 conditions (i.e., church and school completion).

Existing Plus Project – Phase 2

Table 7 evaluates the project impact at the study intersections for Existing Plus Project Phase 2 conditions (i.e., church and partial school opening). As shown in Table 7, the proposed project is forecast to result in a project related traffic deficiency at one (1) study intersection (#7-Judson Street at San Bernardino Avenue) for Existing Plus Project Phase 2 conditions without improvement based on the established thresholds of significance.

The Level of service improvements recommended in the section below to address the project-related traffic deficiency for Existing Plus Project Phase 2 conditions (i.e., church and partial school opening). conditions will provide adequate improvement for Existing Plus Phase 4 conditions (i.e., church and school completion).

Traffic Signal Warrant Analysis

The potential need for installation of a traffic signal at crossroad stop control study intersections was evaluated based on the California Manual on Uniform Traffic Control Devices ("California MUTCD", November 2014), Section 4C-101, peak hour volume warrant (Warrant 3). The California MUTCD states that a traffic control signal should not be installed unless one or more warrants are satisfied. Application of the traffic signal warrants should be based on engineering judgement and satisfaction of one or more traffic signal warrants shall not in itself require the installation of a traffic signal. The #14-Revelation Way at Lugonia Avenue intersection does not appear to warrant a traffic signal based on the specified warrant analysis. Traffic signal warrant worksheets are provided in Appendix E.

LEVEL OF SERVICE IMPROVEMENTS

The following improvements are to be provided by the proposed project for Existing Plus Project conditions to reduce the project related traffic deficiency and maintain acceptable Level of Service in accordance with existing guidelines. The direct impacts for the project are based on the total project trips. The direct impacts will be provided by the project and installed with the completion of the phase of construction which causes the Level of Service to degrade. The direct impact improvements are consistent with City of Redlands Measure U and provide either Level of Service of C (or better), or maintain Level of Service to pre-project conditions where the existing Level of Service is E or F.

Existing Plus Project

Phase 1

Judson Street (NS) at San Bernardino Avenue[3] (EW) - # 7

- Restripe the westbound approach and receiving lanes to accommodate one additional lane such that the interim configuration consists of one shared left turn/through lane and one shared through/right turn lane.
- Restripe the eastbound approach and receiving lanes to provide lateral shift of the centerline to accommodate westbound lanes.

Phase 4

Church Street (NS) at San Bernardino Avenue[3] (EW) - # 3

- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane, one through lane, and one de facto right turn lane.

Judson Street (NS) at Colton Avenue (EW) - # 10

- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane and one shared through/right turn lane.

Revelation Way (NS) at Lugonia Avenue (EW) - # 14

- Install signing and pavement markings on the northbound approach to accommodate right turn only.
- Install signing and pavement markings on the southbound approach to accommodate right turn only.

Conceptual signing and striping layout figures are included in Appendix F for the above off-site intersection improvements necessary to improve the Existing Plus Project significant impacts.

[3] County of San Bernardino Nexus Study specifies San Bernardino Avenue to be improved from 2-lanes to 4-lanes to maintain LOS D.

Table 4
Existing Plus Project Intersection Levels of Service

ID	Study Intersection	Traffic Control[1]	Existing Plus Project (Church & School)				Existing Plus Project (Phase 1: Parish Hall)				Existing Plus Project (Phase 2: Parish Hall & School partial opening)			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]
1.	Orange Street at San Bernardino Ave	TS	15.0	B	15.4	B	14.6	B	15.2	B	14.8	B	15.3	B
2.	Orange Street at Lugonia Avenue	TS	52.2	D	41.7	D	52.9	D	41.0	D	52.2	D	41.4	D
3.	Church Street at San Bernardino Ave	AWS	57.1	F	49.8	E	39.2	E	44.8	E	48.1	E	47.3	E
	With Improvements[4]	AWS	18.5	C	36.8	E	-		-		-		-	
4.	Church Street at Lugonia Avenue	TS	24.0	C	27.2	C	23.8	C	27.0	C	23.8	C	27.1	C
5.	University Street at San Bernardino Ave	CSS	21.1	C	15.8	C	18.1	C	15.4	C	19.7	C	15.6	C
6.	University Street at Lugonia Avenue	TS	17.8	B	17.3	B	16.6	B	14.7	B	17.7	B	16.6	B
7.	Judson Street at San Bernardino Ave	AWS	41.9	E	12.6	B	25.3	D	12.2	B	34.5	D	12.4	B
	With Improvements[4]	AWS	17.4	C	11.5	B	14.9	B	11.2	B	16.2	C	11.4	B
8.	Judson Street at Pennsylvania Ave	AWS	14.0	B	8.8	A	13.6	B	8.7	A	13.8	B	8.7	A
9.	Judson Street at Lugonia Avenue	TS	16.6	B	12.8	B	16.3	B	15.8	B	16.4	B	15.9	B
10.	Judson Street at Colton Avenue	AWS	75.6	F	33.3	D	62.4	F	31.0	D	68.8	F	32.1	D
	With Improvements[4]	AWS	44.8	E	25.1	D	-		-		-		-	
11.	Dearborn Street at San Bernardino Ave	AWS	11.7	B	11.5	B	10.5	B	11.3	B	11.1	B	11.4	B
12.	Dearborn Street at Pennsylvania Ave	CSS	10.1	B	9.9	A	9.2	A	9.6	A	9.7	A	9.8	A
13.	Dearborn Street at Lugonia Avenue	TS	36.5	D	30.3	C	22.6	C	30.1	C	24.4	C	30.0	C
14.	Revelation Way at Lugonia Avenue	CSS	36.5	E	62.7	F	32.6	D	60.4	F	34.7	D	61.6	F
	With Improvements[4]	CSS	13.8	B	13.7	B	-		-		-		-	
15.	Wabash Street at Lugonia Avenue	TS	53.0	D	31.3	C	46.3	D	31.2	C	50.4	D	31.3	C
16.	Project East Driveway at Lugonia Avenue	CSS	19.3	C	11.3	B	-		-		-		-	
17.	Dearborn Street at Project North Driveway	CSS	12.1	B	10.8	B	9.5	A	10.1	B	11.0	B	10.5	B
18.	Dearborn Street at Project South Driveway	CSS	10.8	B	10.0	A	9.3	A	9.5	A	10.1	B	9.6	A

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service

(4) See Appendix for Signing and Striping Improvements Concept Plans.

Table 5
Existing Plus Project Intersection Levels of Service Assessment

ID	Study Intersection	Traffic Control[1]	Existing				Existing Plus Project (Church & School)				AM Peak Hour		PM Peak Hour	
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay Change	Project Deficiency?	Delay Change	Project Deficiency?
1.	Orange Street at San Bernardino Ave	TS	14.6	B	15.2	B	15.0	B	15.4	B	+0.4	NO	+0.2	NO
2.	Orange Street at Lugonia Avenue	TS	49.5	D	40.7	D	52.2	D	41.7	D	+2.7	*NO* [4]	+1.0	*NO* [4]
3.	Church Street at San Bernardino Ave	AWS	38.6	E	43.2	E	57.1	F	49.8	E	+18.5	YES	+6.6	*NO* [5]
	With Improvements[6]	AWS	-		-		18.5	C	36.8	E	-20.1	NO	-6.4	*NO* [6]
4.	Church Street at Lugonia Avenue	TS	23.7	C	26.5	C	24.0	C	27.2	C	+0.3	NO	+0.7	NO
5.	University Street at San Bernardino Ave	CSS	18.0	C	15.2	C	21.1	C	15.8	C	+3.1	NO	+0.6	NO
6.	University Street at Lugonia Avenue	TS	16.6	B	14.7	B	17.8	B	17.3	B	+1.2	NO	+2.6	NO
7.	Judson Street at San Bernardino Ave	AWS	25.0	C	12.0	B	41.9	E	12.6	B	+16.9	YES	+0.6	NO
	With Improvements[6]	AWS	-		-		17.4	C	11.5	B	-7.6	NO	-0.5	NO
8.	Judson Street at Pennsylvania Ave	AWS	13.6	B	8.7	A	14.0	B	8.8	A	+0.4	NO	+0.1	NO
9.	Judson Street at Lugonia Avenue	TS	16.3	B	15.7	B	16.6	B	12.8	B	+0.3	NO	-2.9	NO
10.	Judson Street at Colton Avenue	AWS	62.1	F	30.3	D	75.6	F	33.3	D	+13.5	*NO* [5]	+3.0	*NO* [5]
	With Improvements[6]	AWS	-		-		44.8	E	25.1	D	-17.3	*NO* [7]	-5.2	*NO* [7]
11.	Dearborn Street at San Bernardino Ave	AWS	10.5	B	11.2	B	11.7	B	11.5	B	+1.2	NO	+0.3	NO
12.	Dearborn Street at Pennsylvania Ave	CSS	9.2	A	9.6	A	10.1	B	9.9	A	+0.9	NO	+0.3	NO
13.	Dearborn Street at Lugonia Avenue	TS	20.6	C	27.1	C	36.5	D	30.3	C	+15.9	*NO* [4]	+3.2	NO
14.	Revelation Way at Lugonia Avenue	CSS	32.5	D	59.6	F	36.5	E	62.7	F	+4.0	YES	+3.1	*NO* [5]
	With Improvements[6]	CSS	-		-		13.8	B	13.7	B	-18.7	NO	-45.9	NO
15.	Wabash Street at Lugonia Avenue	TS	46.2	D	31.2	C	53.0	D	31.3	C	+6.8	*NO* [4]	+0.1	NO
16.	Project East Driveway at Lugonia Avenue	CSS	-		-		19.3	C	11.3	B	+19.3	NO	+11.3	NO
17.	Dearborn Street at Project North Driveway	CSS	-		-		12.1	B	10.8	B	+12.1	NO	+10.8	NO
18.	Dearborn Street at Project South Driveway	CSS	-		-		10.8	B	10.0	A	+10.8	NO	+10.0	NO

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn movement.

(3) LOS = Level of Service

(4) Caltrans Level of Service D acceptable for SR-38 Lugonia Avenue.

(5) Existing plus project Level of Service D, E or F not degraded to a leaser LOS than existing.

(6) See Appendix for Signing and Striping Improvements Concept Plans.

(7) Redlands existing Level of Service D, E or F. Improvement to LOS with less delay than existing.

Table 6
Existing Plus Project Intersection Levels of Service Assessment - Phase 1

ID	Study Intersection	Traffic Control[1]	Existing				Existing Plus Project (Phase 1: Parish Hall)				AM Peak Hour		PM Peak Hour	
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
			Delay[2]	LOS[3]	Delay[2]	LOS	Delay[2]	LOS[3]	Delay[2]	LOS	Delay Change	Project Deficiency?	Delay Change	Project Deficiency?
1.	Orange Street at San Bernardino Ave	TS	14.6	B	15.2	B	14.6	B	15.2	B	+0.0	NO	+0.0	NO
2.	Orange Street at Lugonia Avenue	TS	49.5	D	40.7	D	52.9	D	41.0	D	+3.4	*NO*[4]	+0.3	*NO*[4]
3.	Church Street at San Bernardino Ave	AWS	38.6	E	43.2	E	39.2	E	44.8	E	+0.6	*NO*[5]	+1.6	*NO*[5]
4.	Church Street at Lugonia Avenue	TS	23.7	C	26.5	C	23.8	C	27.0	C	+0.1	NO	+0.5	NO
5.	University Street at San Bernardino Ave	CSS	18.0	C	15.2	C	18.1	C	15.4	C	+0.1	NO	+0.2	NO
6.	University Street at Lugonia Avenue	TS	16.6	B	14.7	B	16.6	B	14.7	B	+0.0	NO	+0.0	NO
7.	Judson Street at San Bernardino Ave	AWS	25.0	C	12.0	B	25.3	D	12.2	B	+0.3	YES	+0.2	NO
	With Improvements[6]	AWS	-		-		14.9	B	11.2	B	-10.1	NO	-0.8	NO
8.	Judson Street at Pennsylvania Ave	AWS	13.6	B	8.7	A	13.6	B	8.7	A	+0.0	NO	+0.0	NO
9.	Judson Street at Lugonia Avenue	TS	16.3	B	15.7	B	16.3	B	15.8	B	+0.0	NO	+0.1	NO
10.	Judson Street at Colton Avenue	AWS	62.1	F	30.3	D	62.4	F	31.0	D	+0.3	*NO*[5]	+0.7	*NO*[5]
11.	Dearborn Street at San Bernardino Ave	AWS	10.5	B	11.2	B	10.5	B	11.3	B	+0.0	NO	+0.1	NO
12.	Dearborn Street at Pennsylvania Ave	CSS	9.2	A	9.6	A	9.2	A	9.6	A	+0.0	NO	+0.0	NO
13.	Dearborn Street at Lugonia Avenue	TS	20.6	C	27.1	C	22.6	C	30.1	C	+2.0	NO	+3.0	NO
14.	Revelation Way at Lugonia Avenue	CSS	32.5	D	59.6	F	32.6	D	60.4	F	+0.1	*NO*[4]	+0.8	*NO*[5]
15.	Wabash Street at Lugonia Avenue	TS	46.2	D	31.2	C	46.3	D	31.2	C	+0.1	*NO*[4]	+0.0	NO
17.	Dearborn Street at Project North Driveway	CSS	-		-		9.5	A	10.1	B	+9.5	NO	+10.1	NO
18.	Dearborn Street at Project South Driveway	CSS	-		-		9.3	A	9.5	A	+9.3	NO	+9.5	NO

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn movement.

(3) LOS = Level of Service

(4) Caltrans Level of Service D acceptable for SR-38 Lugonia Avenue.

(5) Existing plus project Level of Service D, E or F not degraded to a leaser LOS than existing.

(6) See Appendix for Signing and Striping Improvements Concept Plans.

Table 7
Existing Plus Project Intersection Levels of Service Assessment - Phase 2

ID	Study Intersection	Traffic Control[1]	Existing				Existing Plus Project (Phase 2: Parish Hall & School-partial opening)				AM Peak Hour		PM Peak Hour	
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
			Delay[2]	LOS[3]	Delay[2]	LOS	Delay[2]	LOS[3]	Delay[2]	LOS	Delay Change	Project Deficiency?	Delay Change	Project Deficiency?
1.	Orange Street at San Bernardino Ave	TS	14.6	B	15.2	B	14.8	B	15.3	B	+0.2	NO	+0.1	NO
2.	Orange Street at Lugonia Avenue	TS	49.5	D	40.7	D	52.2	D	41.4	D	+2.7	*NO* [4]	+0.7	*NO* [4]
3.	Church Street at San Bernardino Ave	AWS	38.6	E	43.2	E	48.1	E	47.3	E	+9.5	*NO* [5]	+4.1	*NO* [5]
4.	Church Street at Lugonia Avenue	TS	23.7	C	26.5	C	23.8	C	27.1	C	+0.1	NO	+0.6	NO
5.	University Street at San Bernardino Ave	CSS	18.0	C	15.2	C	19.7	C	15.6	C	+1.7	NO	+0.4	NO
6.	University Street at Lugonia Avenue	TS	16.6	B	14.7	B	17.7	B	16.6	B	+1.1	NO	+1.9	NO
7.	Judson Street at San Bernardino Ave	AWS	25.0	C	12.0	B	34.5	D	12.4	B	+9.5	YES	+0.4	NO
	With Improvements[6]	AWS	-		-		16.2	C	11.4	B	-8.8	NO	-0.6	*NO*
8.	Judson Street at Pennsylvania Ave	AWS	13.6	B	8.7	A	13.8	B	8.7	A	+0.2	NO	+0.0	NO
9.	Judson Street at Lugonia Avenue	TS	16.3	B	15.7	B	16.4	B	15.9	B	+0.1	NO	+0.2	NO
10.	Judson Street at Colton Avenue	AWS	62.1	F	30.3	D	68.8	F	32.1	D	+6.7	*NO* [5]	+1.8	*NO* [5]
11.	Dearborn Street at San Bernardino Ave	AWS	10.5	B	11.2	B	11.1	B	11.4	B	+0.6	NO	+0.2	NO
12.	Dearborn Street at Pennsylvania Ave	CSS	9.2	A	9.6	A	9.7	A	9.8	A	+0.5	NO	+0.2	NO
13.	Dearborn Street at Lugonia Avenue	TS	20.6	C	27.1	C	24.4	C	30.0	C	+3.8	NO	+2.9	NO
14.	Revelation Way at Lugonia Avenue	CSS	32.5	D	59.6	F	34.7	D	61.6	F	+2.2	*NO* [4]	+2.0	*NO* [5]
15.	Wabash Street at Lugonia Avenue	TS	46.2	D	31.2	C	50.4	D	31.3	C	+4.2	*NO* [4]	+0.1	NO
17.	Dearborn Street at Project North Driveway	CSS	-		-		11.0	B	10.5	B	+11.0	NO	+10.5	NO
18.	Dearborn Street at Project South Driveway	CSS	-		-		10.1	B	9.6	A	+10.1	NO	+9.6	NO

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn movement.

(3) LOS = Level of Service

(4) Caltrans Level of Service D acceptable for SR-38 Lugonia Avenue.

(5) Existing plus project Level of Service D, E or F not degraded to a leaser LOS than existing.

(6) See Appendix for Signing and Striping Improvements Concept Plans.

7. SUNDAY MID-DAY OPERATIONAL ANALYSIS

Detailed intersection level of service calculation worksheets for the Sunday mid-day operational analysis scenarios are provided in Appendix G.

EXISTING ROADWAY VOLUMES

Sunday mid-day peak hour counts (10:00 AM to 2:00 PM) were conducted adjacent to the project site to determine typical Sunday conditions. The existing counts have been classified into passenger cars and trucks by number of axles. The truck volumes have been converted to Passenger Car Equivalent (PCE) trips based on PCE factors recommended by the County of San Bernardino Congestion Management Program.

Figure 34 shows the Existing Sunday daily traffic and Sunday mid-day peak hour intersection turning movement volumes. Traffic volumes are shown in PCEs.

PROJECT PHASING

For the project Sunday conditions, phases 1 and 4 were analyzed. In Phase 4, the church and school will be fully operational in year 2031 with access to both the Dearborn Street and Lugonia Avenue driveways. For the purposes of this report, Existing Plus Project conditions will include the completion of the school and the church with both access driveways. In Phase 1, the church will be fully operational for Sunday and mid-week services in year 2022 with access to the Dearborn Street driveway only.

TRIP GENERATION & DISTRIBUTION

As previously stated in Section 4 Project Trip Forecasts, Table 2 shows the project trip generation based upon trip generation rates obtained from the Institute of Transportation Engineers, *Trip Generation Manual*, 10th Edition, 2017. Trip generation rates were determined for daily trips and Sunday mid-day peak hour inbound and outbound trips for the proposed land use.

Based on the identified project trip generation and distributions, project Sunday daily traffic volumes and project Sunday mid-day peak hour intersection turning movement are depicted on Figure 35 volumes for Project Phase 4 conditions (i.e., church and school completion). For the Phase 1 conditions (i.e., church completion) with one driveway, the project Sunday daily traffic volumes and project Sunday mid-day peak hour intersection turning movement volumes are depicted on Figure 36.

FUTURE VOLUME FORECAST

Existing Plus Project

To assess Existing Plus Project Sunday mid-day conditions, for the Phase 3 and 4 conditions (i.e., church completion) with two driveways, existing roadway volumes were combined with project-generated trips. Existing Plus Project Sunday daily traffic and Sunday mid-day peak hour intersection turning movement volumes are shown on Figure 37. Traffic volumes are shown in PCE trips.

Existing Plus Project – Phase 1 and 2

To assess Existing Plus Project Sunday mid-day conditions, for the Phase 1 and 2 conditions (i.e., church completion) with one driveway, existing roadway volumes were combined with project-generated trips. Existing Plus Project Sunday daily traffic and Sunday mid-day peak hour intersection turning movement volumes are shown on Figure 38. Traffic volumes are shown in PCE trips.

INTERSECTION LEVELS OF SERVICE

Existing Plus Project

As shown in Table 8, the study intersections are forecast to operate within acceptable Levels of Service (C or better for City of Redlands and D or better for Caltrans) during the Sunday mid-day peak hour for Existing without and with Project conditions for both phased conditions 1 and 4.

Table 8
Focused Sunday Mid-day Peak Hour Intersection Levels of Service Analysis Summary

ID	Study Intersection	Traffic Control[1]	Existing Sunday Mid-day Peak Hour		Existing Plus Project (Church & School) Sunday Mid-day Peak Hour		Sunday Mid-day Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay Change	Project Deficiency?
12.	Dearborn Street at Pennsylvania Ave	CSS	8.9	A	10.1	B	+1.2	NO
13.	Dearborn Street at Lugonia Avenue	TS	24.3	C	26.6	C	+2.3	NO
16.	Project East Driveyway at Lugonia Avenue	CSS	-		17.3	C	+17.3	NO
17.	Dearborn Street at Project North Driveway	CSS	-		12.4	B	+12.4	NO
18.	Dearborn Street at Project South Driveway	CSS	-		10.9	B	+10.9	NO
17.	Dearborn Street at Project North Driveway	CSS	-		12.4	B	+12.4	NO

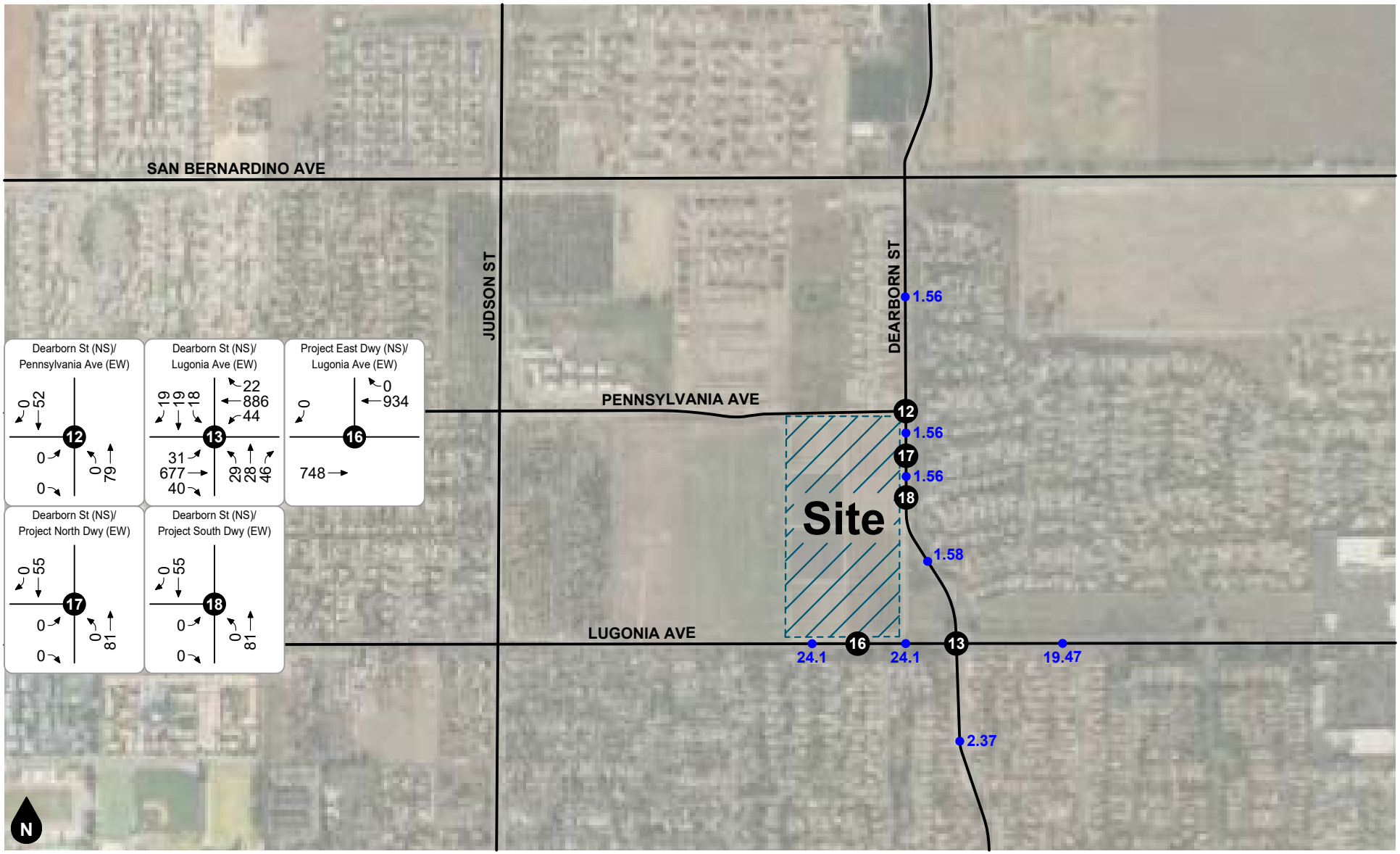
ID	Study Intersection	Traffic Control[1]	Existing Sunday Mid-day Peak Hour		Existing Plus Project (Phase 1: Parish Hall) Sunday Mid-day Peak Hour		Sunday Mid-day Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Change	Project Deficiency?
12.	Dearborn Street at Pennsylvania Ave	CSS	8.9	A	10.1	B	+1.2	NO
13.	Dearborn Street at Lugonia Avenue	TS	24.3	C	27.9	C	+3.6	NO
17.	Dearborn Street at Project North Driveway	CSS	-		12.4	B	+12.4	NO
18.	Dearborn Street at Project South Driveway	CSS	-		11.8	B	+11.8	NO

Notes:

(1) TS = Traffic Signal; CSS = Cross Street Stop; AWS = All Way Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn movement.

(3) LOS = Level of Service

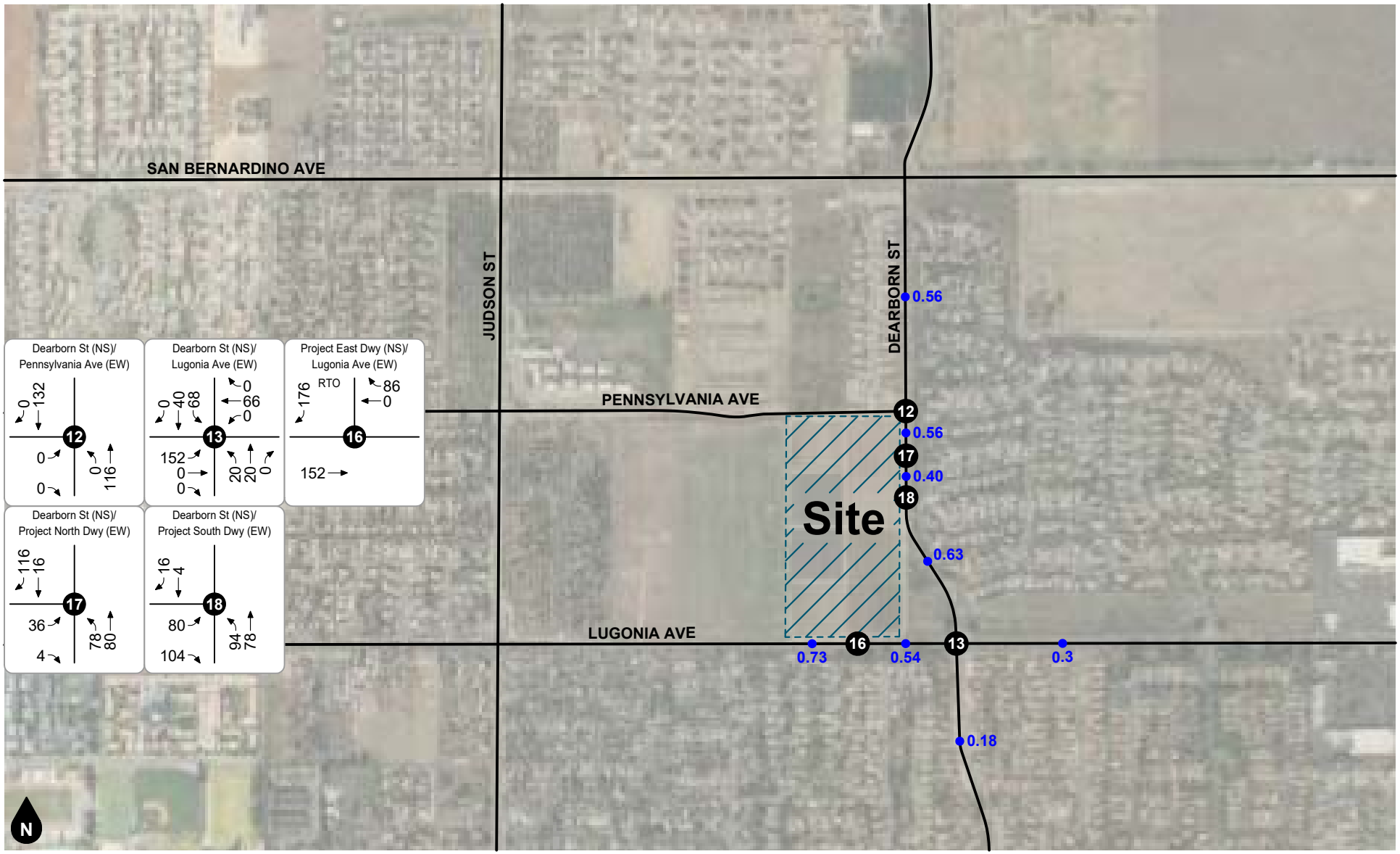


Legend

Study Intersection

●## Vehicles Per Day (1,000's)

Figure 34
Existing Sunday Daily Traffic Volumes and Mid-day Peak Hour Intersection Turning Movement Volumes



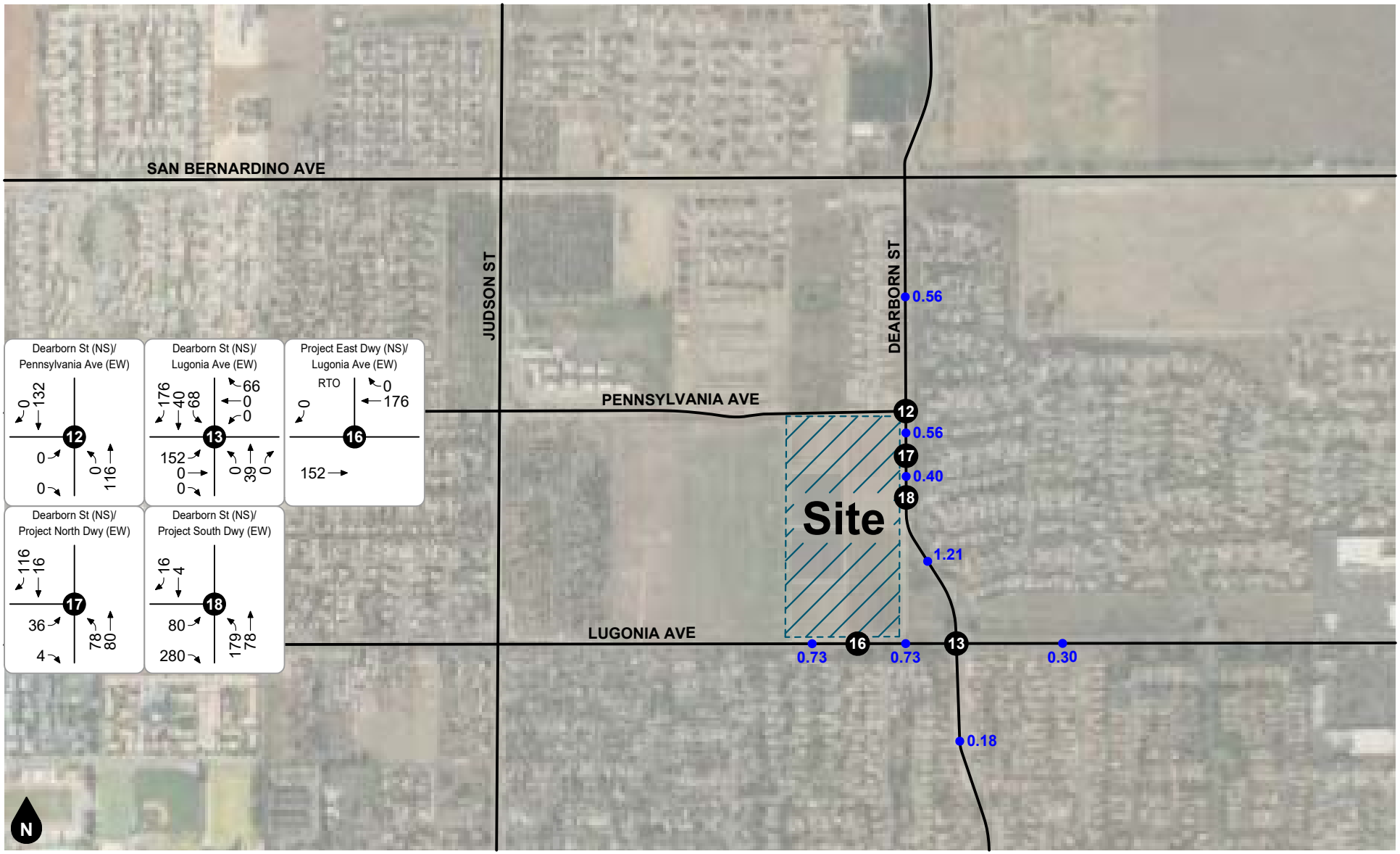
Legend

Study Intersection

●## Vehicles Per Day (1,000's)

RTO Right Turn Only

Figure 35
Project Sunday Daily Traffic Volumes and Mid-day Peak Hour Intersection Turning Movement Volumes



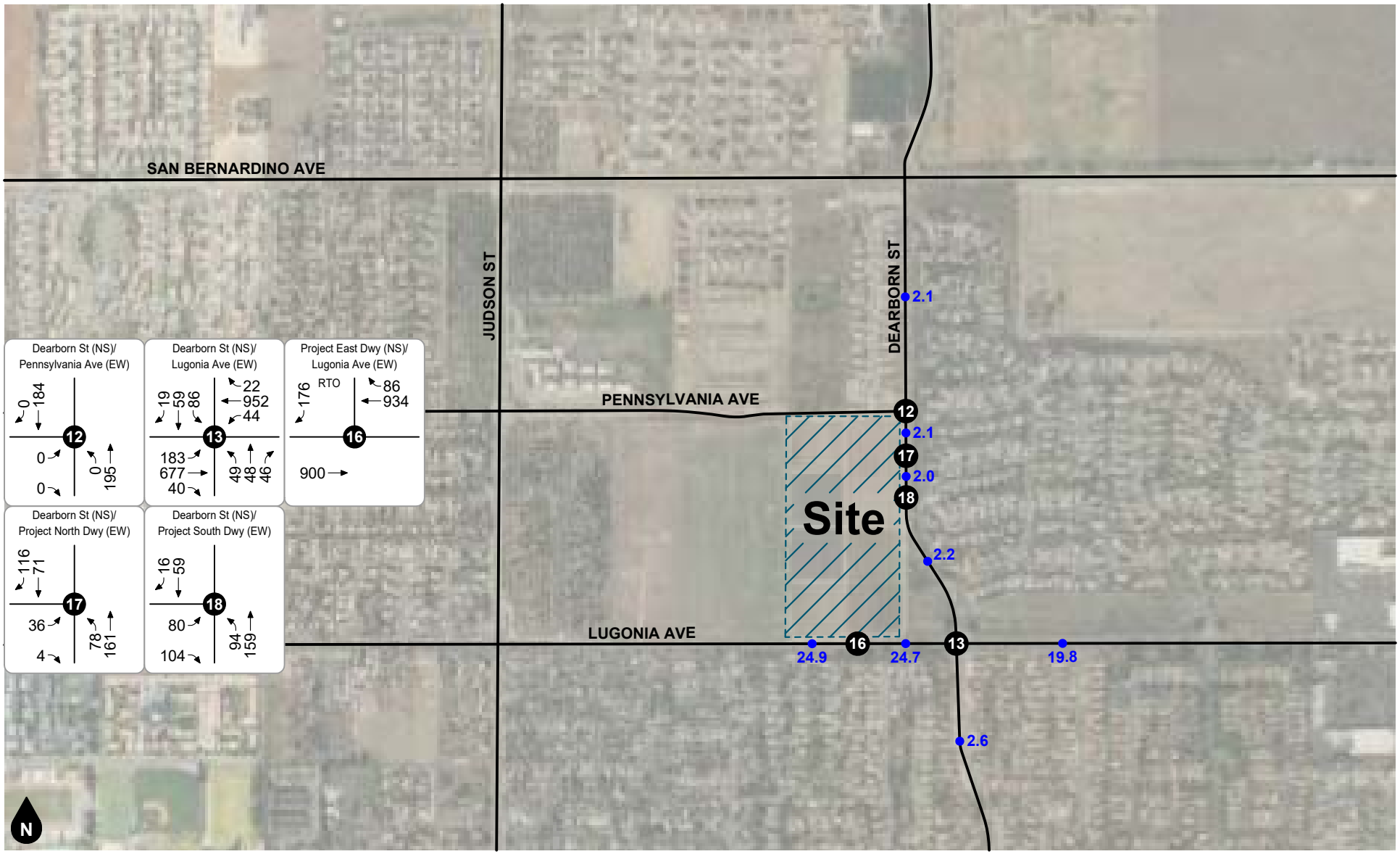
Legend

Study Intersection

●## Vehicles Per Day (1,000's)

RTO Right Turn Only

Figure 36
Project Sunday Daily Traffic Volumes and Mid-day Peak Hour Intersection Turning Movement Volumes - Phase 1 & 2



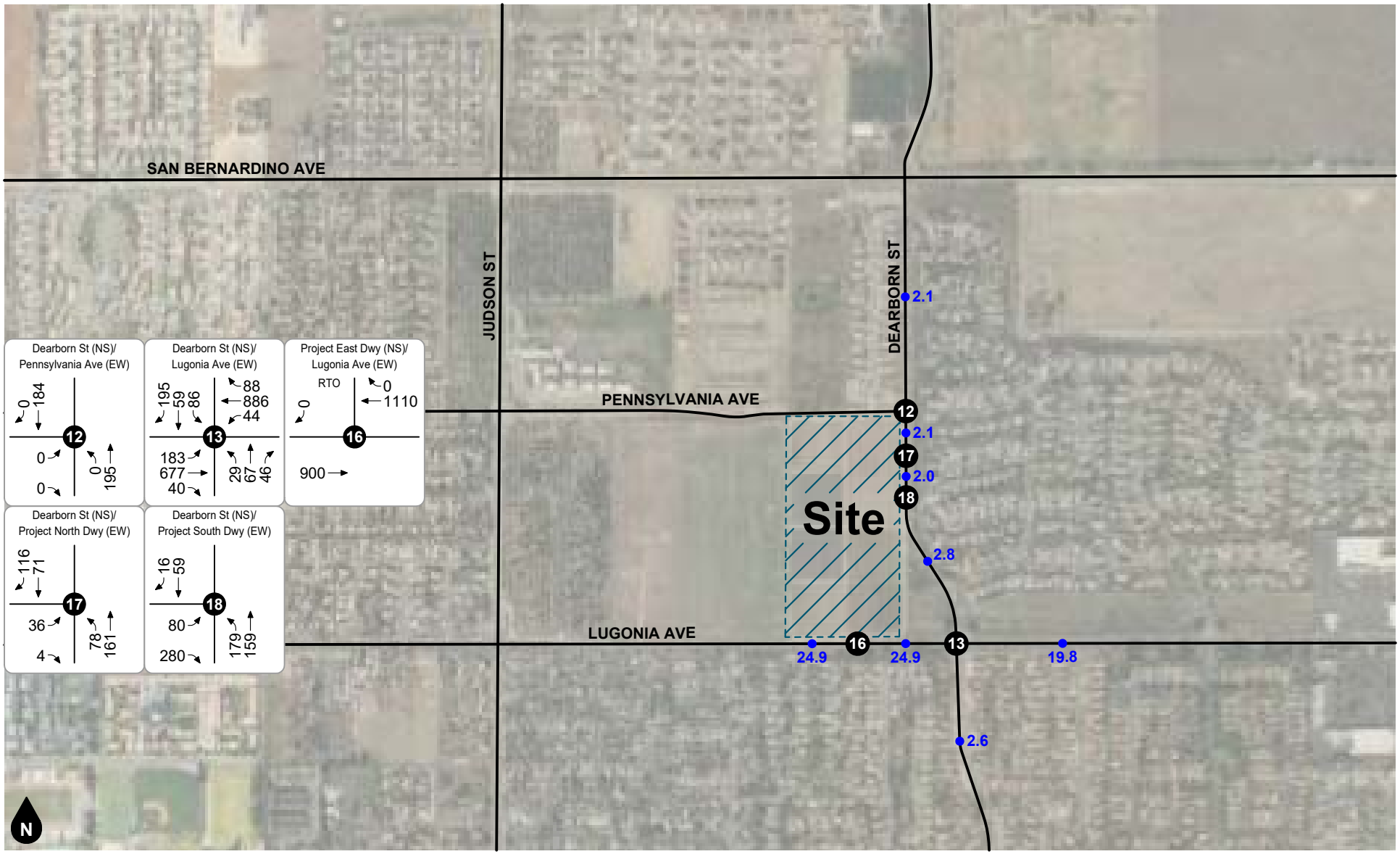
Legend

Study Intersection

●## Vehicles Per Day (1,000's)

RTO Right Turn Only

Figure 37
Existing Plus Project Sunday Daily Traffic Volumes and Mid-day Peak Hour Intersection Turning Movement Volumes



Legend

(#) Study Intersection

●## Vehicles Per Day (1,000's)

RTO Right Turn Only

Figure 38
Existing Plus Project Sunday Daily Traffic Volumes and Mid-day Peak Hour Intersection Turning Movement Volumes - Phase 1 & 2

8. OTHER TRAFFIC CONSIDERATIONS

Additional traffic concerns which may affect the operational characteristics of the study roadway facilities or which may require improvement are discussed below.

PROJECT DESIGN FEATURES

This analysis assumes the following improvements will be constructed by the project to provide project site access:

Phase 1

Dearborn Street (NS) at Project North Driveway (EW) - # 17

- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one shared left-right turn lane.

Dearborn Street (NS) at Project South Driveway (EW) - # 18

- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one left turn lane and one right turn lane.

Phase 3

Project East Driveway (NS) at Lugonia Avenue (EW) - # 16

- Install southbound stop control.
- Construct the southbound approach to provide restricted access to consist of one right turn only lane.
- Construct additional westbound lane adjacent to project south frontage to provide one through lane and one shared through/right turn lane.
- Construct raised median in the existing two-way left turn lane on Lugonia

Dearborn Street (NS) at Lugonia Avenue (EW) - # 13

- Revise striping for westbound lanes to include a right-turn only lane at intersection approach.

SITE ACCESS QUEUEING

Table 9 summarizes the results of a queue analysis for left turn, right turn, or shared through/turn lanes at project driveways based on the forecast 95th-percentile queue lengths[4] shown in the delay calculation worksheets (Appendix D). Additionally, the recommended storage length is provided for turn lanes that are forecast to exceed the existing storage.

Adequate storage length is forecast to be provided for the left turn lanes and the shared-turn lanes at the project driveways and the adjacent intersection, with the exception of study intersection (#13) which is forecast to require additional eastbound left lane storage during the Sunday mid-day peak hour. Based on the queueing analysis, the eastbound left turn lane for #13-Dearborn Street at Lugonia Avenue intersection should be restriping the storage lane will achieve the additional storage length.

[4] For a more conservative analysis, the forecast 95th-percentile queue lengths shown in the delay calculation worksheets have been rounded up to nearest 5-foot increment.

Phase 1

- Dearborn Street at Lugonia Avenue - #13
  - Restripe eastbound left turn storage lane lengthened from 130 to 200 feet.

SIGHT DISTANCE EVALUATION

Sight distance at the project driveways shall comply with standard existing/California Department of Transportation requirements. Sight distance is the continuous length of roadway visible to the driver traveling at a given speed. Two types of sight distance are considered for this driveway: (1) stopping sight distance and (2) corner sight distance (Appendix H).

The stopping sight distance for a driver approaching on the major roadway to see a vehicle exiting from the minor roadway at the prevailing speed is determined in accordance with Table 201.1 in the *Highway Design Manual*. The stopping sight distance is measured from the driver's eye, which is located 3.5 feet above the pavement and right of the centerline of the travel lane to an object that is 6 inches above the pavement. Per Table 201.1, the minimum required line of sight for a vehicle approaching on the local roadway to see a vehicle exiting from the project access, stopping sight distance, for the prevailing speed on a roadway at 40 miles per hour (MPH) is 300 feet

The minimum corner sight distance requirement is determined in accordance with Table 405.1A in the *Highway Design Manual*. Corner sight distance accounts for the distance needed for the driver to exit the minor roadway from a stopped position and cross or enter the major roadway without requiring approaching vehicles to substantially slow down.

Based on the posted speed limit of 40 MPH, vehicles on Dearborn Street and Lugonia Avenue require 300 feet of stopping sight distance. Based on the posted speed limit of 40 MPH, passenger cars exiting the Lugonia right-turn only access project driveway require 381 feet of right-turn corner sight distance and California legal semi-tractor trailer trucks require up to 616 feet of line of sight for right-turn corner sight distance. Given the relatively straight horizontal and vertical alignment of Lugonia Avenue, there does not appear to be any physical roadway geometrics which would cause substantial obstructions to the required sight distances.

Based on the posted speed limit of 40 MPH, passenger cars exiting the Dearborne full access project driveway require 440 feet of corner sight distance and single-unit trucks require up to 557 feet of line of sight for corner sight distance. Given the relatively straight horizontal and vertical alignment of Dearborn Street north of the project driveway, there does not appear to be any physical roadway geometrics which would cause substantial obstructions to the required sight distances. However, given the horizontal curve alignment of Dearborn Street[5] south of the project southern driveway, there appears to be approximately 525 feet of sight distance. Based on the sight distance evaluation, the eastbound left turn lane for #18-Dearborn Street at Project South Driveway intersection should be restricted to prohibit left turns for trucks.

- Dearborn Street at Project South Driveway - #18
  - Left turn prohibited for trucks; post R3-2 (modified – FOR TRUCKS)

It is recommended that the landscape plan for the site should utilize the sight distance principals to avoid placing obstructions (such as dense trees or monument signs) within the limited use area on either side of the proposed project access driveways. The area between the line of sight and the centerline of the nearest approaching lane is defined as the limited use area. The limited use area should be kept clear of obstructions, including landscaping over 18 inches to allow better visibility. It is recommended that trees within 50 feet of the driveway be outside of the limited-use area or as far back as reasonably possible. Ultimately, the final

[5] Large trucks leaving the site are not recommended to make a left turn exit onto Dearborn Street as the clear line of sight of the driveway for a distance of 557 feet needs visual confirmation.

grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met in accordance with applicable existing/California Department of Transportation sight distance standards.

TRANSIT ASSESSMENT

The project site is adjacent to the Omnitrans Route 8 (approximately 350 feet to bus stops on Lugonia Avenue), is located approximately two miles of the Redlands Mall transfer center and is within one mile of the proposed Redland Passenger Rail Project (Arrow) University Station transit center. This location is outside of a Transit Priority Area,[6] but has walkable assess to a bus route with connections to a transfer center.

CONSTRUCTION TRAFFIC VOLUMES

Compared to the project trip generation, construction traffic for the proposed project is expected to generate significantly less trips. The traffic impacts of construction activity will be minor and temporary. To further lessen the impact of construction trips, the project will be required to comply with all standard conditions pertaining to construction including work hours, traffic control plan, haul route, access, oversized-vehicle transportation permit, site security, noise, vehicle emissions and dust control. All construction related trips should be restricted to off-peak hours, whenever possible.

A construction work site traffic control plan shall be submitted to the City for review and approval prior to the start of any construction work. The plans shall show the location of any roadway, sidewalk, bike route, bus stop or driveway closures, traffic detours, haul routes, hours of operation, protective devices, warning signs and access to abutting properties. Temporary traffic controls used around the construction area should adhere to the standards set forth in the *California Manual of Uniform Traffic Control Devices* (2014) and construction activities should adhere to applicable local ordinances.

Site development would require the use of haul trucks during site clearing and excavation and the use of a variety of other construction vehicles throughout the construction work at the site. Transportation of heavy construction equipment and or materials, which requires the use of oversized vehicles, will require the appropriate transportation permit.

[6] Transit Priority Area is within one-half mile of a major transit stop or a stop along a high-quality transit corridor. A major transit stop contains an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the AM and PM peak commute periods.

Table 9
Project Driveway Queuing Analysis Summary

ID	Intersection	Approach	Lane	Storage Length (Feet)[2]	95th-Percentile Queue Length (Feet)[1]						Adequate Storage Provided
					Existing			Existing Plus Project (Church & School)			
					AM	PM	Sunday	AM	PM	Sunday	Existing
Phase 4											
12.	Dearborn Street at Pennsylvania Ave	Northbound	Left	435	<20	<20	<20	<20	<20	<20	YES
		Southbound	Left	560	<20	<20	<20	<20	<20	<20	YES
		Eastbound	Left	170	<20	<20	<20	<20	<20	<20	YES
13	Dearborn Street at Lugonia Avenue	Northbound	Left-thru	635	65	55	30	90	65	65	YES
		Southbound	Left-thru	265	40	50	<20	80	70	105	YES
		Eastbound	Left[3]	130	<20	50	30	125	85	200	NO-200
		Westbound	Left	150	35	50	45	40	55	50	YES
16.	Project East Driveyway at Lugonia Avenue	Southbound	Left-Right	60	-	-	-	30	<20	50	YES
		Eastbound	Left	305	-	-	-	<20	<20	<20	YES
		Westbound	Thru-Right	540	-	-	-	<20	<20	<20	YES
17.	Dearborn Street at Project North Driveway	Northbound	Left-thru	50	-	-	-	<20	<20	<20	YES
		Southbound	Thru-Right		-	-	-	<20	<20	<20	YES
		Eastbound	Left-Right	960	-	-	-	<20	<20	<20	YES
18.	Dearborn Street at Project South Driveway	Northbound	Left-thru	600	-	-	-	<20	<20	<20	YES
		Southbound	Thru-Right	220	-	-	-	<20	<20	<20	YES
		Eastbound	left	45	-	-	-	<20	<20	<20	YES
		Eastbound	Right	45	-	-	-	<20	<20	<20	YES
Phase 2											
13	Dearborn Street at Lugonia Avenue	Northbound	Left-thru	635	-	-	-	85	60	55	YES
		Southbound	Left-thru	265	-	-	-	65	65	<20	YES
		Eastbound	Left[3]	130	-	-	-	80	75	125	YES
		Westbound	Left	150	-	-	-	40	55	45	YES
17.	Dearborn Street at Project North Driveway	Northbound	Left-thru	220	-	-	-	<20	<20	<20	YES
		Southbound	Thru-Right	215	-	-	-	<20	<20	<20	YES
		Eastbound	Left-Right	65	-	-	-	<20	<20	<20	YES
18.	Dearborn Street at Project South Driveway	Northbound	Left-thru	600	-	-	-	<20	<20	<20	YES
		Southbound	Thru-Right	220	-	-	-	<20	<20	<20	YES
		Eastbound	left	45	-	-	-	<20	<20	25	YES
		Eastbound	Right	45	-	-	-	<20	<20	35	YES

Notes:

(1) For a more conservative analysis, the forecast 95th-percentile queue lengths shown in the delay calculation worksheets have been rounded up to nearest 5-foot increment.

(2) Distance to the adjacent driveway (existing or proposed future development).

(3) Recommended improvement to lengthen storage lane for additional storage capacity. 200 ft Recommended.

9. STATE HIGHWAY ANALYSIS

This section describes the prescribed methodology used to assess whether Freeway mainline or ramp analysis is required and definition of deficiency and project related traffic deficiency are discussed.

CALIFORNIA DEPARTMENT OF TRANSPORTATION REGIONAL SYSTEM

The closest state route to the proposed site is SR-38 Lugonia Avenue which is currently 1 to 2 lanes in each direction and located adjacent to the south boundary of the project site.

Based on the state route average daily traffic volumes (14,500-16,800 vehicles per day) and the capacity of a 2-lane and 4-lane State Highway as specified in the Caltrans Transportation Concept Report (State Route 38), the state route currently operates at Levels of Service E and D.

TRIP CONTRIBUTION

The project trip distributions depict the project trip contribution during the peak hours to the roadway segment closest to the freeway as shown on Figure 39.

The project does contribute greater than the state route link threshold volume of 100 two-way peak hour trips or (1% of mainline capacity) to SR-38 Lugonia Avenue from Orange Street to east of Dearborn Street. The project does contribute trips greater than 50 two-way trips peak hours at SR-38 Lugonia Avenue and classified arterials.

STATE HIGHWAY ANALYSIS METHODOLOGIES

Vehicle Miles Traveled Assessment

For consistency with local requirements, the VMT assessment will follow the local lead agency specified guidelines prepared in accordance to state standards. Additional information and a detailed project assessment are provided in the Vehicle Miles Traveled section presented later in this report.

Levels of Service Assessment

Caltrans endeavors to maintain a target LOS (Level of Service) "D" using *Highway Capacity Manual* (HCM) intersection delay methodology on State highway facilities.

Safety Assessment

Accident data obtained from the *Statewide Integrated Traffic Records System* (SWITRS) database, used to provide local accident factors for *Highway Safety Manual* (HSM) predictive safety analysis.

LEVELS OF SERVICE ASSESSMENT

The intersection Levels of Service for State Highway SR-38 (Lugonia Avenue) Existing Plus Project conditions, without and with improvement, are shown in Table 10. As shown in Table 10, the State highway study intersections are forecast to operate at Level of Service D or better for Caltrans during the peak hours traffic conditions, except for the following study intersection that is forecast to operate at Level of Service (E or F), without improvements:

14. Revelation Way at Lugonia Avenue (D-AM / F-PM peak hour)

Since the #14-Revelation Way at Lugonia Avenue intersection is currently deficient with pre-existing issue, improvement measures to improve intersection delay to the pre-project condition are specified in the section below.

Level of service improvements are recommended in the section below to address the project-related traffic deficiency for Existing Plus Project Phase 4 conditions (i.e. church and school completion).

LEVEL OF SERVICE IMPROVEMENTS

The following improvements are to be provided by the proposed project for Existing Plus Project conditions to reduce the project related traffic deficiency and maintain acceptable Level of Service in accordance with existing guidelines.

Revelation Way (NS) at Lugonia Avenue (EW) - # 14

- Install signing and pavement markings on the northbound approach to accommodate right turn only.
- Install signing and pavement markings on the southbound approach to accommodate right turn only.

The direct impacts for the project are based on the total project trips. The direct impact improvements will be provided by the project and installed with the completion of the first phase of construction. The direct impact improvements are consistent with City of Redlands Measure U and provide either Level of Service of C (or better), or maintain Level of Service to pre-project conditions where the existing Level of Service is E or F.

Conceptual signing and striping layout figures are included in Appendix F for the above off-site intersection improvements necessary to improve the Existing Plus Project significant impacts. Figure 40 graphically illustrates the identified improvements.

SITE ACCESS IMPROVEMENTS

The proposed project shall construct the following improvements to provide project site access:

Phase 3

Project East Driveway (NS) at Lugonia Avenue (EW) - # 16

- Install southbound stop control.
- Construct the southbound approach to provide restricted access to consist of one right turn only lane.
- Construct additional westbound lane adjacent to project south frontage to provide one through lane and one shared through/right turn lane.

SITE ACCESS QUEUEING ANALYSIS

Table 9 summarizes the results of a queue analysis for left turn, right turn, or shared through/turn lanes at project driveways based on the forecast 95th-percentile queue lengths[7] shown in the delay calculation worksheets (Appendix D). Additionally, the recommended storage length is provided for turn lanes that are forecast to exceed the existing storage.

Adequate storage length is forecast to be provided for the left turn lanes and the shared-turn lanes at the project driveways and the adjacent intersection, with the exception of study intersection (#13) which is forecast to require additional eastbound left lane storage during the Sunday mid-day peak hour. Based on the

[7] For a more conservative analysis, the forecast 95th-percentile queue lengths shown in the delay calculation worksheets have been rounded up to nearest 5-foot increment.

queueing analysis, the eastbound left turn lane for #13-Dearborn Street at Lugonia Avenue intersection should be restriping the storage lane will achieve the additional storage length.

- Dearborn Street at Lugonia Avenue - #13
  - Restripe eastbound left turn storage lane lengthened from 130 to 200 feet.

SIGHT DISTANCE EVALUATION

Based on the posted speed limit of 40 MPH, vehicles on Dearborn Street and Lugonia Avenue require 300 feet of stopping sight distance. Based on the posted speed limit of 40 MPH, passenger cars exiting the Lugonia right-turn only access project driveway require 381 feet of right-turn corner sight distance and California legal semi-tractor trailer trucks require up to 616 feet of line of sight for right-turn corner sight distance. Given the relatively straight horizontal and vertical alignment of Lugonia Avenue, there does not appear to be any physical roadway geometrics which would cause substantial obstructions to the required sight distances.

TRANSIT ASSESSMENT

The project site is adjacent to the Omnitracs Route 8 (~ 350 feet to bus stops on Lugonia Avenue), is located approximately two miles of the Redlands Mall transfer center and is within one mile of the proposed Redland Passenger Rail Project (Arrow) University Station transit center. This location is outside of a Transit Priority Area [8]; but has walkable assess to a bus route with connections to a transfer center.

VMT ASSESSMENT

The proposed project satisfies the low VMT area and project type screening criteria established by the City of Redlands (lead agency) and therefore can be presumed to result in a less than significant VMT impact.

ACCIDENT DATA

Accident data has been obtained from the Statewide Integrated Traffic Records System (SWITRS) database for the City of Redlands from 2016 through 2021. This six (6) year data set has been sorted to refine the data for only accidents that occurred at or near the Lugonia Avenue and Dearborn Street intersection. In the past six (6) years, the majority of the accidents have resulted in property damage only and there were no accidents with fatalities reported at or near the Lugonia Avenue and Dearborn Street intersection. As shown in Table 11, the number of accidents in the section of Lugonia Avenue is trending down from four per year to two per year with the primary collision factor being unsafe speed.

Based on review of the current accident data indicating unsafe speed as a primary collision factor and the school component of the proposed project, establishment of a school speed limit zone and installation of applicable reduced school zone speed limit signs are recommended adjacent to the project site on both Lugonia Avenue and Dearborn Street. As noted in the California MUTCD, school speed limit sign assemblies may be posted up to 500 feet in advance of the school boundary.

TRAFFIC SAFETY AND ACCIDENT REVIEW

The Federal Highway Administration (FHWA) has developed an interactive crash prediction module, using the *Highway Safety Manual* (HSM) predictive methodology for estimating the expected average crash frequency of individual sites. Based on the traffic volume and roadway characteristics, the HSM predictive crash forecast has been determined. The HSM predictive crash forecast is compared to the city-wide accident rate

[8] Transit Priority Area is within one-half mile of a major transit stop or a stop along a high-quality transit corridor. A major transit stop contains an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the AM and PM peak commute periods.

determined by the Statewide Integrated Traffic Records System (SWITRS) database and California Office of Traffic Safety (OTS) Crash Rankings Results.

Crash Severity	Roadway Segment		Intersection		Difference
	Without Project	With Project	Without Project	With Project	
Total	1.1	1.1	3.2	3.3	None / 0.1
Fatal & Injury	0.3	0.3	1.1	1.1	None
Property Damage only	0.8	0.8	2.1	2.1	None

Source: *Interactive Highway Safety Design Model* (IHSDM) crash prediction module based on *Highway Safety Manual* (HSM) methodology.

For both the roadway segment with the driveway and the intersection of Lugonia Avenue and Dearborn Street the predictive annual accident rate for injury and property damage are the same for with and without project. The roadway segment changes include roadside lighting and a divided median for the right turn in and out project driveway. The intersection does have a slightly higher traffic volume; however, it is not enough to change the individual accident type predictive rate and has a slightly higher cumulative rate of 0.1 accident per year. HSM predictive safety analysis worksheets included in Appendix I.

The city-wide accident rate determined by the Statewide Integrated Traffic Records System (SWITRS) database and California Office of Traffic Safety (OTS) Crash Rankings Results equates to 181.66 accidents per 100 million vehicle miles traveled; however, this is not location based but accidents per 100,000 population and accidents per 100 million vehicle miles traveled which does not provide a relative comparison to the HSM predictive rate.

Table 10
State Highway Intersection Levels of Service Analysis Summary

ID	Study Intersection	Traffic Control[1]	Existing				Existing Plus Project (Church & School)				AM Peak Hour		PM Peak Hour	
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay Change	Project Deficiency?	Delay Change	Project Deficiency?
2.	Orange Street at Lugonia Avenue	TS	49.5	D	40.7	D	52.2	D	41.7	D	+2.7	*NO*[4]	+1.0	*NO*[4]
4.	Church Street at Lugonia Avenue	TS	23.7	C	26.5	C	24.0	C	27.2	C	+0.3	NO	+0.7	NO
6.	University Street at Lugonia Avenue	TS	16.6	B	14.7	B	17.8	B	17.3	B	+1.2	NO	+2.6	NO
9.	Judson Street at Lugonia Avenue	TS	16.3	B	15.7	B	16.6	B	12.8	B	+0.3	NO	-2.9	NO
13.	Dearborn Street at Lugonia Avenue	TS	20.6	C	27.1	C	36.5	D	30.3	C	+15.9	NO[4]	+3.2	NO
14.	Revelation Way at Lugonia Avenue	CSS	32.5	D	59.6	F	36.5	E	62.7	F	+4.0	*YES*	+3.1	*NO*[5]
	With Improvements[6]	CSS	-		-		13.8	B	13.7	B	-18.7	NO	-45.9	NO
15.	Wabash Street at Lugonia Avenue	TS	46.2	D	31.2	C	53.0	D	31.3	C	+6.8	*NO*[4]	+0.1	NO
16.	Project East Driveway at Lugonia Avenue	CSS	-		-		19.3	C	11.3	B	+19.3	NO	+11.3	NO

Notes:

(1) TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst minor street approach or major street left turn

(3) LOS = Level of Service

(4) Caltrans Level of Service D acceptable for SR-38 Lugonia Avenue.

(5) Existing plus project Level of Service D, E or F not degraded to a leaser LOS than existing.

(6) See Appendix for Signing and Striping Improvements Concept Plans.

Table 11
Accident Data Summary

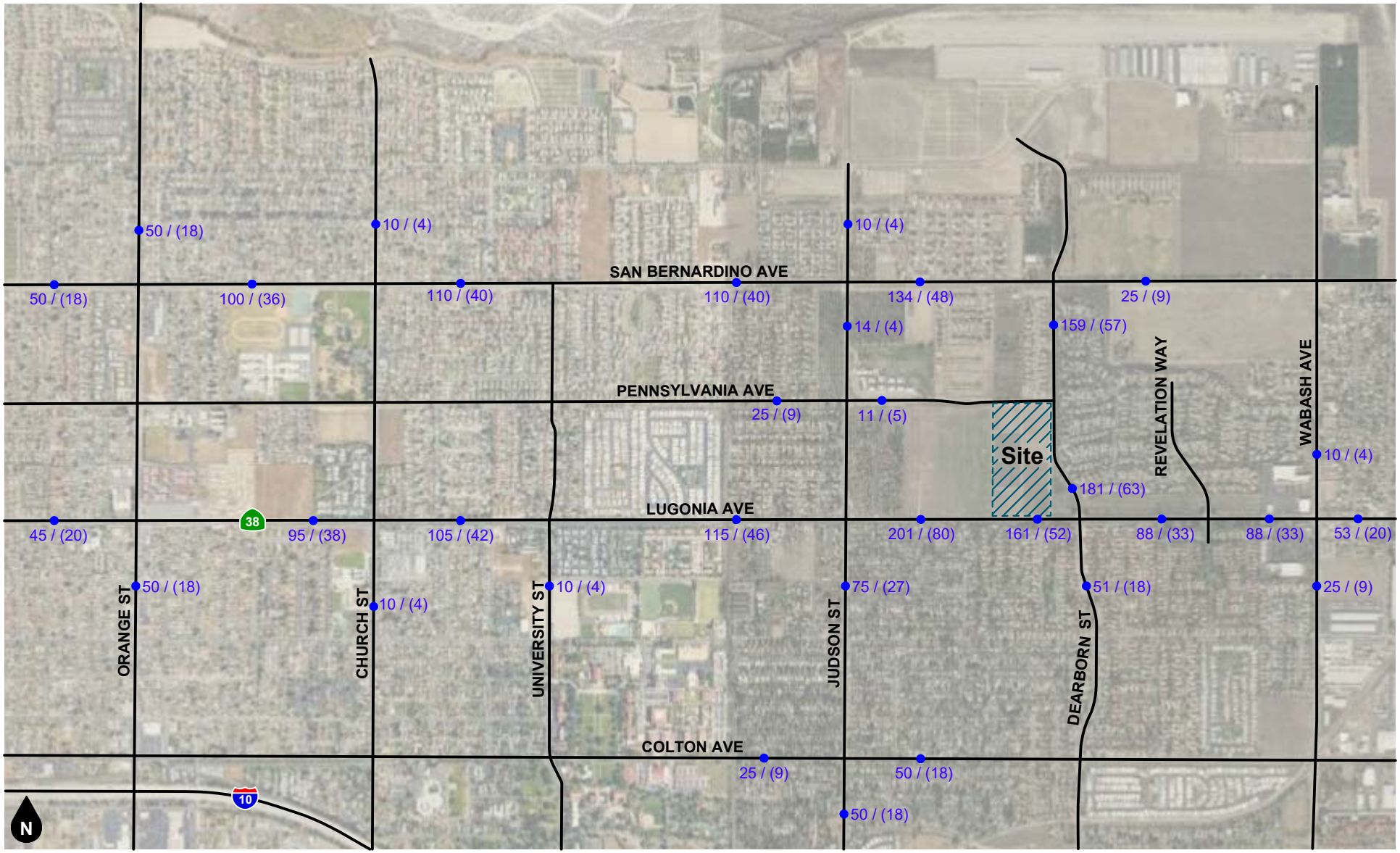
YEAR	Date	Time	Day of Week	Primary Roadway	Secondary Roadway	Mile Post	Side of Road	Distance	Direction (N S E W)	Inter-section (Y N)	Fatality	Injury	Towed Away (Y N)	Collision Type	Primary Collision Factor	Collided With
2021	20210304	10:46	Thursday	LUGONIA AV	DEARBORN	2.5	-	985	W	N	-	1	Y	Hit Object	Unsafe Speed	Fixed Object
2021	20210824	7:18	Tuesday	LUGONIA AV	DEARBORN ST	-	-	-	-	Y	-	1	Y	Rear-end	Unsafe Speed	Vehicle
2020	20200220	12:16	Thursday	LUGONIA AV	DEARBORN ST	-	-	312	W	N	-	-	N	Sideswipe	Unsafe Lane Change	Vehicle
2020	20201220	4:12	Sunday	LUGONIA AV	DEARBORN ST	2.64	-	400	-	N	-	-	Y	Hit Object	Unsafe Speed	#N/A
2019	20190825	2:42	Sunday	E LUGONIA AV	DEARBORN ST	2.52	-	-	-	-	-	-	Y	Hit Object	Improper Turning	Fixed Object
2019	20190218	6:40	Monday	E LUGONIA AV	DEARBORN ST	2.6	-	-	-	-	-	1	Y	Head-on	Improper Turning	Vehicle
2019	20191105	22:46	Tuesday	E LUGONIA AV	N DEARBORN ST	2.62	-	324	E	N	-	-	N	Hit Object	Unsafe Speed	#N/A
2018	20180212	12:59	Monday	E LUGONIA AV	DEARBORN ST	2.549	-	-	-	Y	-	-	N	Broadside	Traffic Signal/ Stop Sign	Vehicle
2018	20180621	7:21	Thursday	DEARBORN ST	LUGONIA AV	-	-	-	-	Y	-	-	Y	Hit Object	Unsafe Speed	Fixed Object
2018	20181128	14:12	Wednesday	E LUGONIA AV	DEARBORN ST	2.51	-	208	W	N	-	1	Y	Rear-end	Unsafe Speed	MV on other Road
2018	20181207	19:13	Friday	LUGONIA AV	DEARBORN ST	2.56	-	192	E	N	-	2	Y	Rear-end	Unsafe Speed	Vehicle
2017	20170425	21:10	Tuesday	LUGONIA AV	DEARBORN ST	-	-	-	-	Y	-	-	Y	Broadside	Traffic Signal/ Stop Sign	Vehicle
2017	20170713	15:06	Thursday	LUGONIA AV	DEARBORN ST	2.549	-	-	-	Y	-	-	Y	Broadside	Traffic Signal/ Stop Sign	Vehicle
2017	20171201	17:10	Friday	DEARBORN ST	LUGONIA AV	-	-	-	-	Y	-	2	Y	Broadside	Traffic Signal/ Stop Sign	Vehicle
2016	20160228	2:20	Sunday	E LUGONIA AV	DEARBORN ST	-	-	261	E	N	-	-	Y	Hit Object	Improper Turning	Fixed Object
2016	20160417	10:46	Sunday	LUGONIA AV	DEARBORN AV	-	-	8	W	N	-	1	N	-	Traffic Signal/ Stop Sign	Bicycle
2016	20160701	22:02	Friday	LUGONIA AV	DEARBORN ST	2.49	-	300	W	N	-	1	Y	Rear-end	Under Influence	Vehicle
2016	20161102	10:31	Wednesday	LUGONIA AV	DEARBORN ST	-	-	500	W	N	-	-	Y	Sideswipe	Improper Turning	Fixed Object

Collision Type		
Broadside	4	22.2%
Rear-end	4	22.2%
Hit Object	6	33.3%
Sideswipe	2	11.1%
Head-on	1	5.6%
Overturned	0	0.0%
Pedestrian Involved	0	0.0%
Bicycle Involved	1	5.6%
Total	18	100.0%

Primary Factor		
Unsafe Speed	7	38.9%
Unsafe Lane Change	1	5.6%
Improper Turning	4	22.2%
Under Influence	1	5.6%
Traffic Signal/ Stop Sign	4	22.2%
Wrong Side of Road	0	0.0%
Pedestrian Right-of-Way	0	0.0%
Bicycle Involved	1	5.6%
Total	18	100.1%

Severity			Average Annual
Roadway Total	9	100.0%	Roadway Segment
Fatal	0	0.0%	0.0
Fatal Plus Injury	4	44.4%	0.7
Property Damage Only	5	55.6%	0.8
Intersection Total	9	100.0%	Intersection
Fatal	0	0.0%	0.0
Fatal Plus Injury	4	44.4%	0.7
Property Damage Only	5	55.6%	0.8

Notes:
(1) Source: *Statewide Integrated Traffic Records System* (SWITRS) database for the City of Redlands from 2016 through 2021.



Legend

●## Peak Hour Volumes AM / (PM)

Figure 39
Project Trip Contribution

10. VEHICLE MILES TRAVELED

This section presents the Vehicle Miles Travelled (VMT) assessment for the project for compliance with SB 743 and current CEQA requirements.

BACKGROUND

California Senate Bill 743 (SB 743) directs the State Office of Planning and Research (OPR) to amend the California Environmental Quality Act (CEQA) Guidelines for evaluating transportation impacts to provide alternatives to Level of Service that "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." In December 2018, the California Natural Resources Agency certified and adopted the updated CEQA Guidelines package. The amended CEQA Guidelines, specifically Section 15064.3, recommend the use of Vehicle Miles Traveled (VMT) as the primary metric for the evaluation of transportation impacts associated with land use and transportation projects. In general terms, VMT quantifies the amount and distance of automobile travel attributable to a project or region. Agencies may currently opt-in to applying the updated CEQA guidelines for VMT analysis and implementation is required State-wide by July 1, 2020.

The updated CEQA Guidelines allow for lead agency discretion in establishing methodologies and thresholds provided there is substantial evidence to demonstrate that the established procedures promote the intended goals of the legislation. Where quantitative models or methods are unavailable, Section 15064.3 allows agencies to assess VMT qualitatively using factors such as availability of transit and proximity to other destinations. The *Technical Advisory on Evaluating Transportation Impacts in CEQA* (State of California, December 2018) ["Technical Advisory"] provides technical considerations regarding methodologies and thresholds with a focus on office, residential, and retail developments as these projects tend to have the greatest influence on VMT.

The VMT analysis has been prepared in accordance with the City of Redlands's *CEQA Assessment VMT Analysis Guidelines*. These guidelines establish the VMT methodology and thresholds of significance for assessing VMT impacts in the City of Redlands.

PROJECT SCREENING

The City of Redlands VMT guidelines identify three types of screening criteria that lead agencies can apply to effectively screen projects from project-level assessment. They are as follows:

Transit Priority Area (TPA) Screening

Projects located within a TPA[9] may be presumed to have a less than significant impact absent evidence to the contrary. The presumption may not be appropriate if the project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate or high-income residential units.

The proposed development does not satisfy this screening criteria.

[9] A TPA is defined as a half mile area around an existing major transit stop or an existing stop along a high-quality transit corridor.

Low VMT Area Screening

Residential and office projects located within a low VMT generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per resident, per worker, or per service population that is similar to the existing land uses in the low VMT area.

For this screening in the SBCTA area, the SBTAM travel forecasting model was used to measure VMT performance for individual jurisdictions and for individual traffic analysis zones (TAZs). TAZs are geographic polygons similar to census block groups used to represent areas of homogenous travel behavior. Total daily VMT per service population (population plus employment) was estimated for each TAZ. This presumption may not be appropriate if the project land uses would alter the existing built environment in such a way as to increase the rate or length of vehicle trips.

To identify if the project is in a low VMT generating area, the analyst may review the SBCTA screening tool and apply the appropriate threshold (identified later in this chapter) within the tool. Additionally, as noted above, the analyst must identify if the project is consistent with the existing land use within that TAZ and use professional judgement that there is nothing unique about the project that would otherwise be misrepresented utilizing the data from the travel demand model.

Based on the City of Redlands guidelines, low VMT screening analysis was performed for the project using the SBCTA Screening Tool for origin-destination VMT per service population, a 2020 baseline year, and a threshold of 15 percent below the San Bernardino County regional average VMT per service population. The project is located in APN 16816102 and 16816103, which produce a VMT per service population that is below the San Bernardino County regional average VMT per service population. The proposed project is estimated to generate approximately 29.6 VMT per service population. The project VMT does not exceed the screening threshold based on jurisdictional average, and is less than the 15% threshold of 30.5. Therefore, the proposed project satisfies the criteria for low VMT area screening and the project may be presumed to result in a less than significant VMT impact.

Metric	Project	Thresholds	
	(TAZ 53841103)	Jurisdictional VMT (SBCTA)	15% Below Jurisdictional Average
Total VMT / SP	29.6	35.9	30.5
Project VMT ≤ threshold?	--	*Yes (Pass)*	*Yes (Pass)*

Notes:
Source: SBCTA VMT Screening Tool
VMT = Vehicle Miles Traveled; SP = Service Population

Project Type Screening

Local serving retail projects with stores less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel. Additional screening for retail projects is discussed below.

In addition to local serving retail, the following uses can also be presumed to have a less than significant impact absent substantial evidence to the contrary as their uses are local serving in nature:

- Local-serving K-12 schools
- Local Parks
- Day care centers
- Local-serving gas stations
- Local-serving banks
- Local-serving hotels (e.g. non-destination hotels)
- Student housing projects on or adjacent to a college campus
- Local-serving assembly uses (places of worship, community organizations)
- Community institutions (public libraries, fires stations, local government)
- Local-serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Affordable or supportive housing
- Assisted living facilities
- Senior housing (as defined by HUD)

Projects which generate less than 3,000 MT CO2e per year can be presumed to have a less than significant impact on VMT. Projects which generate less than 3,000 MT CO2e per year include the following:

- Single-family residential – 167 dwelling units or fewer
- Multi-family residential (1-2 stories) – 232 dwelling units or fewer
- Multi-family residential (3+ stories) – 299 dwelling units or fewer
- Office – 59,100 square feet or less
- Local-serving retail center – 112,400 square feet or less (no stores larger than 50,000 square feet)
- Warehousing – 463,400 square feet or less
- Light industrial – 74,600 square feet or less

The proposed project consists of church and school uses. Since both of these land uses are local serving in nature, the proposed project satisfies the project type screening criteria established by the City of Redlands and the project can be presumed to result in a less than significant impact.

VMT ASSESSMENT

The proposed project satisfies the low VMT area and project type screening criteria established by the City of Redlands and therefore can be presumed to result in a less than significant VMT impact.

11. CONCLUSIONS

This section summarizes the findings and recommended improvements or mitigation measures (if any) identified in previous sections of this study.

PROJECT TRIP GENERATION

The proposed project is forecast to generate a weekday total of approximately 2,818 weekday daily trips, including 497 trips during the weekday AM peak hour and 182 trips during the weekday PM peak hour. The Sunday operation of the project is forecast to generate a Sunday total of approximately 1,759 Sunday daily trips, including 785 trips during the Sunday mid-day peak hour.

LEVEL OF SERVICE ANALYSIS

The study intersections are forecast to operate within acceptable Levels of Service (C or better for City of Redlands and D or better for Caltrans) during the peak hours for Existing Plus Project conditions, with the exception of the following study intersections that are forecast to operate at Levels of Service D or worse during peak hours:

Existing Plus Project (Phase 4)

3. Church Street at San Bernardino Avenue	(F-AM / E-PM peak hour)	LOS degrades in AM
7. Judson Street at San Bernardino Avenue	(E-AM peak hour)	LOS degrades in AM
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)	no LOS change
14. Revelation Way at Lugonia Avenue	(E-AM / F-PM peak hour)	LOS degrades in AM

The proposed project is forecast to result in project related traffic deficiency at three (3) study intersections for Existing Plus Project conditions without improvement based on the established thresholds of significance (see Table 5).

Phase 1 and 2

3. Church Street at San Bernardino Avenue	(E-AM / E-PM peak hour)	no LOS change
7. Judson Street at San Bernardino Avenue	(D-AM peak hour)	LOS degrades in AM
10. Judson Street at Colton Avenue	(F-AM / D-PM peak hour)	no LOS change
14. Revelation Way at Lugonia Avenue	(D-AM / F-PM peak hour)	no LOS change

The proposed project is forecast to result in project related traffic deficiency at one (1) study intersection for Existing Plus Project (Phase 1 and 2) conditions without improvement based on the established thresholds of significance (see Table 6 and Table 7).

Since three of the intersections (#3-Church Street at San Bernardino Avenue, #10-Judson Street at Colton Avenue, and #14-Revelation Way at Lugonia Avenue) are currently deficient with pre-existing issue, improvement measures to improve intersection delay to the pre-project condition are specified below. Additionally, two of the intersections (#3-Church Street at San Bernardino Avenue and #7-Judson Street at San Bernardino Avenue) have been identified in the County of San Bernardino Nexus Program to improve acceptable Level of Service.

LEVEL OF SERVICE IMPROVEMENTS

The following improvements are to be provided by the proposed project for Existing Plus Project conditions to reduce the project related traffic deficiency and maintain acceptable Level of Service in accordance with

existing guidelines. The direct impacts for the project are based on the total project trips. The direct impacts will be provided by the project and installed with the completion of the phase of construction which causes the Level of Service to degrade. The direct impact improvements are consistent with City of Redlands Measure U and provide either Level of Service of C (or better), or maintain Level of Service to pre-project conditions where the existing Level of Service is E or F.

Phase 1

Judson Street (NS) at San Bernardino Avenue (EW) - # 7

- Restripe the westbound approach and receiving lanes to accommodate one additional lane such that the interim configuration consists of one shared left turn/through lane and one shared through/right turn lane.
- Restripe the eastbound approach and receiving lanes to provide lateral shift of the centerline to accommodate westbound lanes.

Phase 4

Church Street (NS) at San Bernardino Avenue[10] (EW) - # 3

- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane, one through lane, and one de facto right turn lane.

Judson Street (NS) at Colton Avenue (EW) - # 10

- Restripe the westbound approach and receiving lanes to accommodate one shared left turn/through lane and one shared through/right turn lane.

Revelation Way (NS) at Lugonia Avenue (EW) - # 14

- Install signing and pavement markings on the northbound approach to accommodate right turn only.
- Install signing and pavement markings on the southbound approach to accommodate right turn only.

Conceptual signing and striping layout figures are included in Appendix F for the above off-site intersection improvements necessary to improve the Existing Plus Project significant impacts. Figure 40 graphically illustrates the identified improvements.

SITE ACCESS IMPROVEMENTS

The proposed project shall construct the following improvements to provide project site access:

Phase 1

Dearborn Street (NS) at Project North Driveway (EW) - # 17

- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one shared left-right turn lane.

Dearborn Street (NS) at Project South Driveway (EW) - # 18

- Install eastbound stop control.
- Construct the eastbound approach to provide full access and consist of one left turn lane and one right turn lane.

[10] County of San Bernardino Nexus specifies San Bernardino Avenue to be improved from 2-lanes to 4-lanes to maintain LOS D.

Phase 3

Project East Driveway (NS) at Lugonia Avenue (EW) - # 16

- Install southbound stop control.
- Construct the southbound approach to provide restricted access to consist of one right turn only lane.
- Construct additional westbound lane adjacent to project south frontage to provide one through lane and one shared through/right turn lane.
- Construct raised median in the existing two-way left turn lane on Lugonia Avenue

Dearborn Street (NS) at Lugonia Avenue (EW) - # 13

- Revise striping for westbound lanes to include a right-turn only lane at intersection approach.

SITE ACCESS QUEUEING ANALYSIS

Adequate storage length is forecast to be provided for the left turn lanes and the shared-turn lanes at the project driveways and the adjacent intersection, with the exception of study intersection (#13) which is forecast to require additional eastbound left lane storage during the Sunday mid-day peak hour. Based on the queueing analysis, the eastbound left turn lane for #13-Dearborn Street at Lugonia Avenue intersection should be restriping the storage lane will achieve the additional storage length.

Phase 1

- Dearborn Street at Lugonia Avenue - #13
  - Restripe eastbound left turn storage lane lengthened from 130 to 200 feet.

SIGHT DISTANCE EVALUATION

Given the relatively straight horizontal and vertical alignment of Lugonia Avenue and Dearborn Street north of the project driveway, there does not appear to be any physical roadway geometrics which would cause substantial obstructions to the required sight distances. However, given the horizontal curve alignment of Dearborn Street[11] south of the project southern driveway, there appears to be approximately 525 feet of sight distance. Based on the sight distance evaluation, the eastbound left turn lane for #18-Dearborn Street at Project South Driveway intersection should restricted to prohibit left turns for trucks which require approximately 557 feet of line of sight for corner sight distance at the prevailing speed.

- Dearborn Street at Project South Driveway - #18
  - Left turn prohibited for trucks, post sign R3-2 (modified – FOR TRUCKS).

GENERAL RECOMMENDATIONS

Improvements at the project driveways are project design features which shall be constructed by the project. Site-adjacent roadway improvements shall be constructed in conjunction with the project.

On-site and site-adjacent improvements including project driveways, roadway design, traffic signing and striping, and traffic control improvements relating to the proposed project should be constructed in accordance with applicable engineering standards and to the satisfaction of the City of Redlands.

[11] Large trucks leaving the site are not recommended to make a left turn exit onto Dearborn Street as the clear line of sight of the driveway for a distance of 557 feet needs visual confirmation.

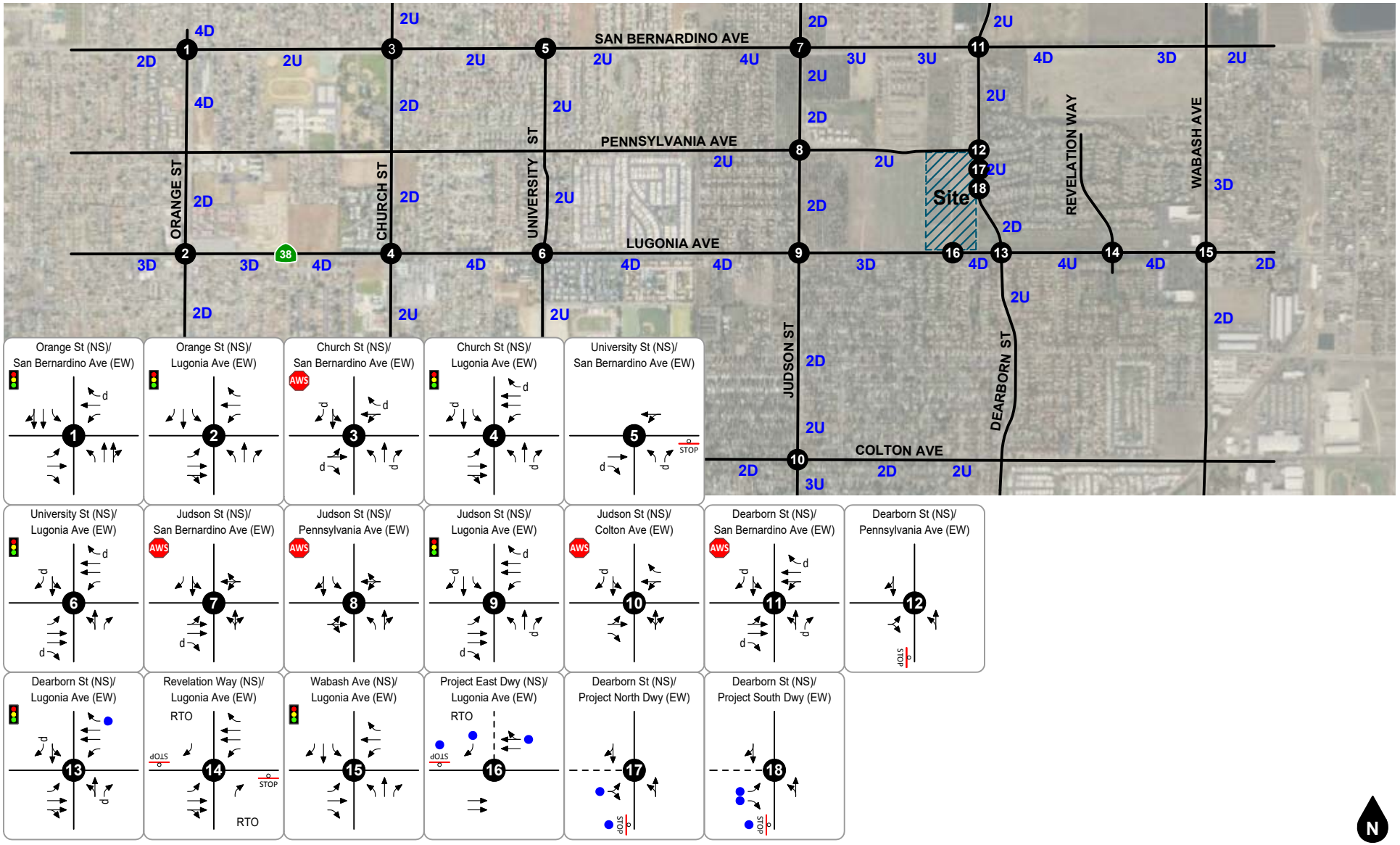
Sight distance at project access points should comply with applicable City of Redlands/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met.

Off-street parking should be provided to meet the City of Redlands Municipal Code requirements.

As is the case for any roadway design, the City of Redlands should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

VEHICLE MILES TRAVELED ASSESSMENT

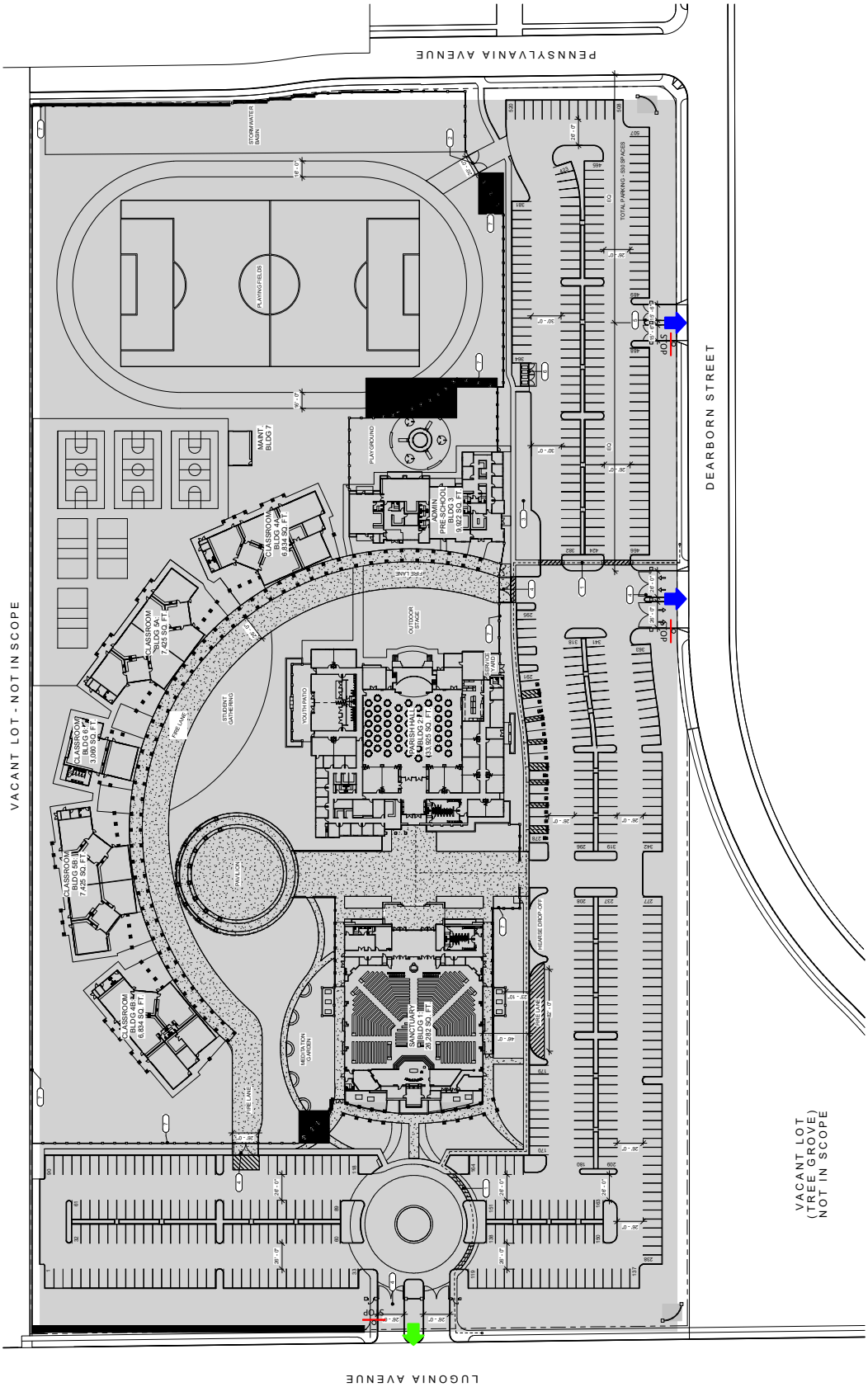
The proposed project satisfies the low VMT area and project type screening criteria established by the City of Redlands and therefore can be presumed to result in a less than significant VMT impact.



Legend

- Traffic Signal
- AWS All Way Stop
- STOP Stop Sign
- #D #-Lane Divided Roadway
- #U #-Lane Undivided Roadway
- Existing Lane
- d De Facto Right Turn Lane
- Project Driveway
- RTO Right Turn Only
- Improvements

Figure 40
Summary of Improvements



Legend

- STOP Stop Sign
- Full Access Driveway
- Right Turns In/Out Only Access Driveway

Figure 41
Circulation Recommendations