# The Park @ Live Oak

## TRAFFIC IMPACT ANALYSIS

### CITY OF IRWINDALE


PREPARED BY:

Aric Evatt, PTP
aevatt@urbanxroads.com
(949) 660-1994 x204

Charlene So, P.E.
cso@urbanxroads.com
(949) 660-1994 x222

Connor Paquin
cpaquin@urbanxroads.com
(949) 660-1994


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# TABLE OF CONTENTS

# APPENDICES

# LIST OF EXHIBITS

# LIST OF TABLES

# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ADT | Average Daily Traffic |
| CA MUTCD | California Manual on Uniform Traffic Control Devices |
| Caltrans | California Department of Transportation |
| CEQA | California Environmental Quality Act |
| CMP | Congestion Management Program |
| DIF | Development Impact Fee |
| E+P | Existing Plus Project |
| HCM | Highway Capacity Manual |
| ICU | Intersection Capacity Utilization |
| ITE | Institute of Transportation Engineers |
| LA | Los Angeles |
| LOS | Level of Service |
| METRO | Metropolitan Transportation Authority |
| mph | Miles per hour |
| MUTCD | Manual on Uniform Traffic Control Devices |
| N/A | Not Applicable |
| PA | Planning Area |
| PCE | Passenger Car Equivalents |
| PeMS | Performance Measurement System |
| PHF | Peak Hour Factor |
| Project | The Park @ Live Oak |
| RSA | Regional Statistical Area |
| RTPA | Regional Transportation Planning Agency |
| SBCTA | San Bernardino County Transportation Authority |
| SCAG | Southern California Association of Governments |
| sf | Square Feet |
| SHS | State Highway System |
| TIA | Traffic Impact Analysis |
| tsf | Thousand Square Feet |
| V/C | Volume to Capacity |

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# 1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed The Park @ Live Oak ("Project"), which is located west of the I-605 Freeway between Arrow Highway and Live Oak Avenue in the City of Irwindale as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential impacts to traffic and circulation associated with the development of the proposed Project, and to recommend improvements to mitigate impacts considered significant in comparison to established City thresholds of significance. The study follows the City of Irwindale's Policy Guidelines for Traffic Impact Reports and the California Department of Transportation's (Caltrans) Guide for the Preparation of Traffic Impact Studies. [1] [2]

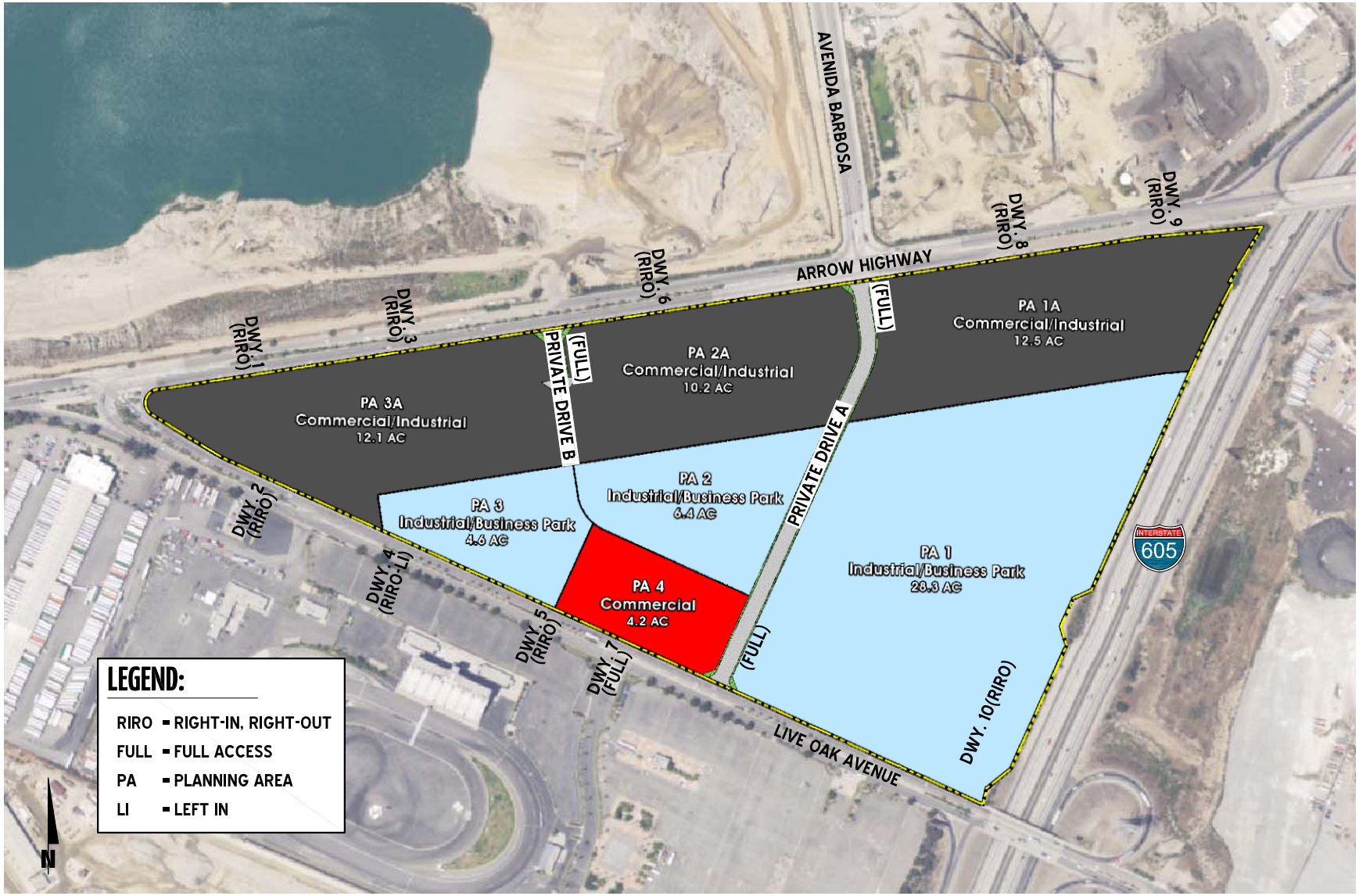
## 1.1 PROJECT OVERVIEW

The Project is entitling a Specific Plan for the proposed Project, which identifies allowable uses for each Planning Area (PA). The listed land use assumptions are intended to be reflective of future market conditions. For purposes of this TIA, the Project has assumed the following mix of land uses based on the allowable uses and intensities identified in the Specific Plan in order to conservatively estimate future Project traffic:

- PA 1: 412,500 square feet High-Cube Fulfillment Center Warehouse[1]
- PA 1: 412,500 square feet of High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)
- PA 1A: 8,700 square feet of Fast Food Restaurant with Drive-through Window
- PA 1A: 12,000 square feet of Fast Food Restaurant without Drive-through Window
- PA 1A: 12,000 square feet of Shopping Center use
- PA 1A: 8 vehicle fueling position Gas Station with Convenience Market
- PA 2/PA 2A: 218,400 square feet of High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)
- PA 2/PA 2A: 54,600 square feet of General Light Industrial
- PA 2/PA 2A: 60,000 square feet of Warehousing
- PA 3: 102,000 square feet of Manufacturing
- PA 3: 191,400 square feet of Warehousing
- PA 3A: 3,000 square feet of Coffee-shop with Drive-Through Window
- PA 3A: 7,000 square feet of Fast Food Restaurant without Drive-through Window
- PA 3A: 10,500 square feet of Shopping Center use
- PA 4: 47,000 square feet of Shopping Center use

[1] It should be noted that up to 387,500 square feet of High-Cube Warehouse (With Cold Storage) may be developed in lieu of 387,500 square feet of High-Cube Fulfillment Center Warehouse use or a combination of High-Cube Fulfillment Center Warehouse, Warehousing, and/or Manufacturing uses. The uses identified above have been evaluated for the purposes of this TIA.

## EXHIBIT 1-1: PRELIMINARY LAND USE








URBAN CROSSROADS

The land use assumptions are based on the list of permitted uses specified for each PA by the Specific Plan. This TIA is focused on the evaluation of potential traffic impacts based on trip generation estimates that were developed to be conservative and provide flexibility for the placement, sizing, and design of specific buildings that will be developed in the Specific Plan area. Actual development proposals for the Project may differ slightly from that listed here, but would be required to adhere to the overall trip generation cap identified and evaluated by this TIA. Land use assumptions evaluated for the purposes of this TIA are conservative in nature in order to evaluate the maximum potential impacts. It should be noted that although for the purposes of this TIA the total commercial retail square footage totals 53,200 square feet, the Specific Plan identifies a maximum square footage of 51,600 square feet within PA 1A, PA 2A, and PA 3A. The land use plan showing the various planning areas is shown on Exhibit 1-1. The anticipated Opening Year for the Project is 2020.

Trips calculated to be generated by the Project have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) as presented in ITE's most current edition of Trip Generation Manual (10th Edition, 2017). [3] The Project is calculated to generate a net total of approximately 15,867 passenger car equivalent (PCE) trip-ends per day with 1,280 PCE AM peak hour trips and 1,644 PCE PM peak hour trips. The assumptions and methods used to estimate the Project's and each development phase's trip generation characteristics are discussed in detail in Section 4.1 *Project Trip Generation* of this report.

## 1.2 ANALYSIS SCENARIOS

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

- Existing (2017)
- Existing plus Project
- Opening Year Cumulative (2020), Without and With Project
- Horizon Year (2040), Without and With Project

### 1.2.1 EXISTING (2017) CONDITIONS

Information for Existing conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

### 1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) analysis determines whether or not significant traffic impacts would occur on the existing roadway system with the addition of Project traffic. The E+P analysis is intended to identify the Project-specific impacts and mitigation associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing conditions.

### 1.2.3 OPENING YEAR CUMULATIVE (2020) CONDITIONS

The Opening Year Cumulative conditions analysis determines the Project's contribution to near-term cumulative traffic impacts based on a comparison of the "with Project" traffic scenario to

the "without Project" traffic scenario. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth from Existing (2018) conditions of 6.12% (2.0% per year, compounded over three years) is included for Opening Year Cumulative, as well as traffic generated by cumulative projects that could affect the study intersections.

The generalized growth factors provided in 2010 Los Angeles (LA) County Congestion Management Program (CMP) indicates a growth factor of 1.046 for ten years (2010 to 2020) or 0.45% per year for the Regional Statistical Area (RSA) 26 (West Covina) in which the Project is located. [4] As such, the analysis is in excess of the CMP guidelines and consistent with the City's traffic study guidelines.

### 1.2.4 Horizon Year (2040) Conditions

The Horizon Year conditions analysis is utilized to determine if improvements funded through local and regional transportation mitigation fee programs, or other approved funding mechanism can accommodate long-term cumulative traffic growth at the target level of service (LOS) identified by the City of Irwindale and surrounding jurisdictions.

Horizon Year Without Project traffic conditions include an ambient traffic growth factor of 12.78% (0.524% / year over 23 years) based on the growth factors provided in LA County CMP for RSA 26. A growth factor of 1.106 was estimated for 25 years (from 2010 to 2035) in LA County CMP, which is equivalent to 0.404% per year growth. This annual growth was compounded over 5 years and added to the 1.106 from the LA County CMP to determine the growth factor for Horizon Year (2040) traffic conditions. Lastly, traffic generated by cumulative projects that could affect the study intersections was added on top of the ambient growth.

## 1.3 STUDY AREA

### 1.3.1 INTERSECTIONS

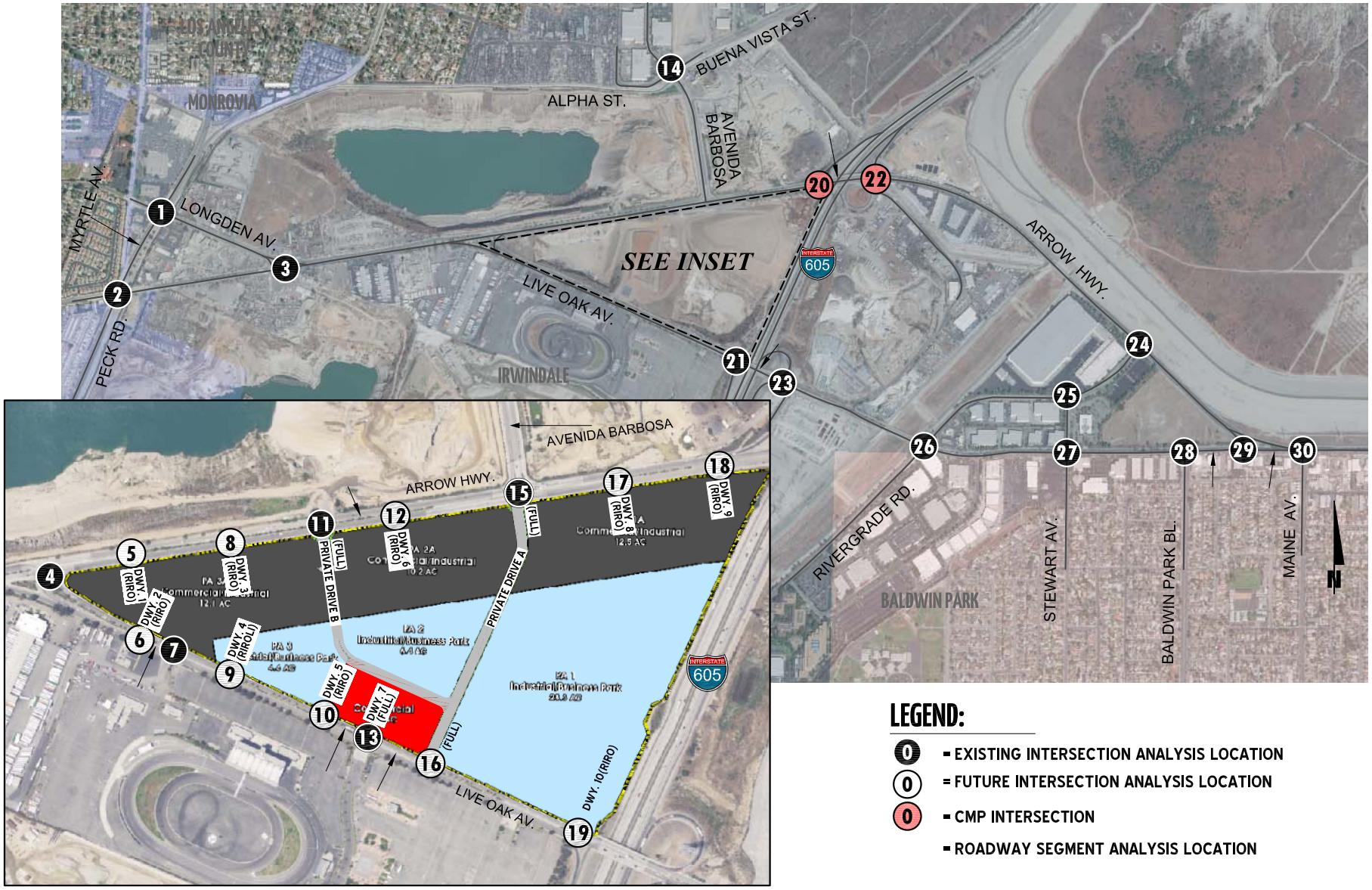
The potential impact study area was defined in conformance with the requirements of the City of Irwindale and Caltrans traffic study guidelines. Based on these guidelines, the area to be studied shall include any intersections at which the proposed project will add 50 or more peak hour trips. A scoping agreement summarizing the study area, trip generation, trip distribution and analysis methodology was provided to the City of Irwindale for review. The agreement approved by the City of Irwindale is included in Appendix 1.1.

30 study area intersection locations shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on the City of Irwindale's traffic study requirements that require analysis of intersection locations in which a proposed Project is anticipated to contribute 50 or more peak-hour trips. It should be noted that only 2 of the study area intersections are CMP locations.

**TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS**

| ID | Intersection Location | Jurisdiction |
|---|---|---|
| 1 | Myrtle Avenue & Longden Avenue | Irwindale |
| 2 | Myrtle Avenue/Peck Road & Live Oak Avenue | Irwindale, Monrovia, County of LA |
| 3 | Longden Avenue & Live Oak Avenue/Driveway | Irwindale |
| 4 | Live Oak Avenue & Arrow Highway (West) | Irwindale |
| 5 | Driveway 1 & Arrow Highway – Future Intersection | Irwindale |
| 6 | Driveway 2 & Live Oak Avenue – Future Intersection | Irwindale |
| 7 | Speedway Driveway & Live Oak Avenue | Irwindale |
| 8 | Driveway 3 & Arrow Highway – Future Intersection | Irwindale |
| 9 | Driveway 4 & Live Oak Avenue – Future Intersection | Irwindale |
| 10 | Driveway 5 & Live Oak Avenue – Future Intersection | Irwindale |
| 11 | Driveway/Private Drive B & Arrow Highway | Irwindale |
| 12 | Driveway 6 & Arrow Highway – Future Intersection | Irwindale |
| 13 | Driveway 7/Speedway Drive & Live Oak Avenue | Irwindale |
| 14 | Avenida Barbosa & Alpha Street/Buena Vista Street | Irwindale |
| 15 | Avenida Barbosa/Private Drive A & Arrow Highway | Irwindale |
| 16 | Private Drive A & Live Oak Avenue – Future Intersection | Irwindale |
| 17 | Driveway 8 & Arrow Highway – Future Intersection | Irwindale |
| 18 | Driveway 9 & Arrow Highway – Future Intersection | Irwindale |
| 19 | Driveway 10 & Live Oak Avenue – Future Intersection | Irwindale |
| 20 | I-605 Southbound Ramps & Arrow Highway | Irwindale, Caltrans |
| 21 | I-605 Southbound On-Ramp & Live Oak Avenue | Irwindale, Caltrans |
| 22 | I-605 Northbound On-Ramp/Live Oak Lane & Arrow Highway | Irwindale, Caltrans |
| 23 | I-605 Northbound Off-Ramp & Live Oak Avenue | Irwindale, Caltrans |
| 24 | Rivergrade Road & Arrow Highway | Irwindale |
| 25 | Stewart Avenue/Driveway & Rivergrade Road | Irwindale |
| 26 | Rivergrade Road & Live Oak Avenue | Irwindale, Baldwin Park |
| 27 | Stewart Avenue & Live Oak Avenue | Irwindale, Baldwin Park |
| 28 | Baldwin Park Boulevard & Live Oak Avenue | Irwindale, Baldwin Park |
| 29 | Arrow Highway & Live Oak Avenue (East) | Irwindale |
| 30 | Maine Avenue & Arrow Highway | Irwindale, Baldwin Park |

## EXHIBIT 1-2: LOCATION MAP



### 1.3.2 ROADWAY SEGMENTS

As shown on Table 1-2, the following roadway segments were also evaluated as the Project is anticipated to contribute 50 or more peak hour trips to these locations.

**TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS**

| ID | Roadway | Segment Limits |
|---|---|---|
| 1 | Longden Avenue | Myrtle Avenue to Live Oak Avenue |
| 2 | Live Oak Avenue | Peck Road to Longden Avenue |
| 3 | Live Oak Avenue | Longden Avenue to Live Oak Avenue |
| 4 | Arrow Highway | Live Oak Avenue to Driveway 1 |
| 5 | Arrow Highway | Driveway 1 to Driveway 3 |
| 6 | Arrow Highway | Driveway 3 to Driveway/Private Drive B |
| 7 | Arrow Highway | Driveway/Private Drive B to Driveway 6 |
| 8 | Arrow Highway | Driveway 6 to Avenida Barbosa/Private Drive A |
| 9 | Arrow Highway | Avenida Barbosa/Private Drive A to Driveway 8 |
| 10 | Arrow Highway | Driveway 8 to Driveway 9 |
| 11 | Arrow Highway | Driveway 9 to I-605 Southbound Off-Ramp |
| 12 | Arrow Highway | I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane |
| 13 | Arrow Highway | I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road |
| 14 | Arrow Highway | Rivergrade Road to Live Oak Avenue |
| 15 | Private Drive B | South of Arrow Highway |
| 16 | Avenida Barbosa | Alpha Street/Buena Vista Street to Arrow Highway |
| 17 | Private Drive A | South of Arrow Highway |
| 18 | Private Drive A | North of Live Oak Avenue |
| 19 | Live Oak Avenue | Live Oak Avenue/Arrow Highway to Driveway 2 |
| 20 | Live Oak Avenue | Driveway 2 to Speedway Driveway |
| 21 | Live Oak Avenue | Speedway Driveway to Driveway 4 |
| 22 | Live Oak Avenue | Driveway 4 to Driveway 5 |
| 23 | Live Oak Avenue | Driveway 5 to Driveway 7 |
| 24 | Live Oak Avenue | Driveway 7 to Private Drive A |
| 25 | Live Oak Avenue | Private Drive A to Driveway 10 |
| 26 | Live Oak Avenue | Driveway 10 to I-605 Southbound On-Ramp |
| 27 | Live Oak Avenue | I-605 Southbound On-Ramp to I-605 Northbound Off-Ramp |
| 28 | Live Oak Avenue | I-605 Northbound Off-Ramp to Rivergrade Road |
| 29 | Live Oak Avenue | Rivergrade Road to Stewart Avenue |
| 30 | Live Oak Avenue | Stewart Avenue to Baldwin Park Boulevard |
| 31 | Live Oak Avenue | Baldwin Park Boulevard to Arrow Highway |
| 32 | Live Oak Avenue | Arrow Highway to Maine Avenue |
| 33 | Rivergrade Road | Arrow Highway to Stewart Avenue |
| 34 | Rivergrade Road | Stewart Avenue to Live Oak Avenue |

### 1.3.3 FREEWAY MAINLINE SEGMENTS

The study area freeway mainline analysis locations include six I-605 Freeway mainline segments for the southbound and northbound directions of flow as shown on Table 1-3:

**TABLE 1-3: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS**

| ID | Freeway Mainline Segments |
|---|---|
| 1 | I-605 Freeway Southbound, North of Arrow Highway |
| 2 | I-605 Freeway Southbound, Arrow Highway to Live Oak Avenue |
| 3 | I-605 Freeway Southbound, South of Live Oak Avenue |
| 4 | I-605 Freeway Northbound, North of Arrow Highway |
| 5 | I-605 Freeway Northbound, Arrow Highway to Live Oak Avenue |
| 6 | I-605 Freeway Northbound, South of Live Oak Avenue |

### 1.3.4 FREEWAY MERGE/DIVERGE RAMP JUNCTIONS

The study area freeway merge/diverge ramp junction analysis locations include five I-605 Freeway ramp junctions for the southbound and northbound directions of flow as shown on Table 1-4:

**TABLE 1-4: FREEWAY RAMP JUNCTION ANALYSIS LOCATIONS**

| ID | Freeway Merge/Diverge Ramp Junctions |
|---|---|
| 1 | I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (Diverge) |
| 2 | I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (Merge) |
| 3 | I-605 Freeway – Northbound, On-Ramp at Arrow Highway (Merge) |
| 4 | I-605 Freeway – Northbound, Loop On-Ramp at Arrow Highway (Merge) |
| 5 | I-605 Freeway – Northbound, Off-Ramp at Live Oak Avenue (Diverge) |

## 1.4 ANALYSIS FINDINGS

This section provides a summary of the analysis results for Existing, E+P, Opening Year Cumulative, and Horizon Year traffic conditions. For signalized intersections, analysis results are provided using both the Highway Capacity Methodology (HCM) and the Intersection Capacity Utilization (ICU). However, only the ICU analysis will be utilized to determine significant impacts per the City's traffic study guidelines. Caltrans ramp locations and unsignalized intersections have been analyzed using the HCM analysis methodology only.

### 1.4.1 INTERSECTIONS

**Existing (2017) Conditions**

*Intersection Operations Analysis*

A summary of LOS results for Existing traffic conditions are presented in Exhibit 1-3. As shown, a total of 7 intersections within the study area are currently operating at a deficient LOS.

*Roadway Segment Capacity Analysis*

Exhibit 1-4 presents a summary of LOS conditions by analysis scenario for the roadway segments. As shown on Exhibit 1-4, there are currently 4 segments that are currently operating at a deficient LOS.

*Off-Ramp Queuing Analysis*

A queuing analysis was performed for the southbound and northbound off-ramps at the I-605 Freeway on Arrow Highway and Live Oak Avenue interchanges. The analysis indicates there are currently no queuing issues that may potentially "spill back" onto the I-605 Freeway mainline.

*Freeway Operations Analyses*

For Existing (2017) traffic conditions, the study area freeway mainline segments and ramp merge/diverge junctions are currently operating at an acceptable LOS (i.e., LOS D or better) during one or both peak hours.

It should be noted that although the I-605 Northbound Freeway mainline is found to operate at an acceptable LOS, according to Caltrans Performance Measurement System (PeMS), the average speed along these freeway segments is 17 miles per hour (mph) during the PM peak hour only. However, the reported LOS is acceptable due to constrained traffic flow conditions. In other words, the freeway is slow moving at 17 mph during the PM peak hours, therefore, not as many vehicles are passing by and being reported in the PeMS data. As a result, the LOS is reported as acceptable, however, the freeway is considered at capacity during the evening peak commute hours (i.e., LOS E or worse).

**Existing Plus Project (E+P) Conditions**

*Intersection Operations Analysis*

As shown on Exhibit 1-3, there are 3 additional study area intersections that would operate at an unacceptable LOS during one or both peak hours with the addition of Project traffic in addition to those previously identified under Existing (2017) traffic conditions (i.e., Intersections #3, #27, #29).

*Roadway Segment Capacity Analysis*

As shown on Exhibit 1-4, there are 7 additional roadway segments that would operate at a deficient LOS with the addition of Project traffic, in addition to those previously identified for Existing traffic conditions.

## EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

| # | Intersection | Existing (2017) | E+P | Opening Year (2020) Without Project | Opening Year (2020) With Project | Horizon Year (2040) Without Project | Horizon Year (2040) With Project |
|---|---|---|---|---|---|---|---|
| 1 | Myrtle Av. / Longden Av. | | | | | | |
| 2 | Myrtle Av. / Peck Rd. / Live Oak Av. | | | | | | |
| 3 | Longden Av. / Live Oak Av. / Dwy. | | | | | | |
| 4 | Live Oak Av. / Arrow Hwy. (West) | | | | | | |
| 5 | Dwy. 1 / Arrow Hwy. | NA | | NA | | NA | |
| 6 | Dwy. 2 / Live Oak Av. | NA | | NA | | NA | |
| 7 | Speedway Dwy. / Live Oak Av. | | | | | | |
| 8 | Dwy. 3 / Arrow Hwy. | NA | | NA | | NA | |
| 9 | Dwy. 4 / Live Oak Av. | NA | | NA | | NA | |
| 10 | Dwy. 5 / Live Oak Av. | NA | | NA | | NA | |
| 11 | Dwy./ Private Dwy B / Arrow Hwy. | | | | | | |
| 12 | Dwy. 6 / Arrow Hwy. | NA | | NA | | NA | |
| 13 | Dwy. 7 / Speedway Dr. / Live Oak Av. | | | | | | |
| 14 | Ave Barbosa / Alpha St. / Buena Vista St. | | | | | | |
| 15 | Ave Barbosa / Private Dwy. A / Arrow Hwy. | | | | | | |
| 16 | Private Dwy. A / Live Oak Av. | NA | | NA | | NA | |
| 17 | Dwy. 8 / Arrow Hwy. | NA | | NA | | NA | |
| 18 | Dwy. 9 / Arrow Hwy. | NA | | NA | | NA | |
| 19 | Dwy. 10 / Live Oak Av. | NA | | NA | | NA | |
| 20 | I-605 SB Off-Ramp / Arrow Hwy. | | | | | | |
| 21 | I-605 SB On-Ramp/ Live Oak Av. | | | | | | |
| 22 | I-605 NB On-Ramp/Live Oak Ln./Arrow Hwy. | | | | | | |
| 23 | I-605 NB Off-Ramp/ Live Oak Av. | | | | | | |
| 24 | Rivergrade Rd. / Arrow Hwy. | | | | | | |
| 25 | Stewart Rd. / Dwy. / Rivergrade Rd. | | | | | | |
| 26 | Rivergrade Rd. / Live Oak Av. | | | | | | |
| 27 | Stewart Rd. / Live Oak Av. | | | | | | |
| 28 | Baldwin Park Bl. / Live Oak Av. | | | | | | |
| 29 | Arrow Hwy. / Live Oak Av. (East) | | | | | | |
| 30 | Maine Av. / Arrow Hwy. | | | | | | |

**LEGEND:**

- AM PEAK HOUR
- PM PEAK HOUR
- LOS A-D
- LOS E
- LOS F

## EXHIBIT 1-4: SUMMARY OF ROADWAY SEGMENT LOS BY ANALYSIS SCENARIO

| # | Roadway | Segment Limits | Existing (2017) | E+P | Opening Year (2020) Without Project | Opening Year (2020) With Project | Horizon Year (2040) Without Project | Horizon Year (2040) With Project |
|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | D-E | D-E | D-E | D-E | F | F |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | A-C | D-E | D-E | D-E | D-E | D-E |
| 3 | Live Oak Av. | Longden Av. to Live Oak Av. | A-C | D-E | D-E | D-E | D-E | D-E |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | A-C | A-C | F | F | F | F |
| 5 | Arrow Hwy. | Dwy. 1 to Dwy. 3 | A-C | A-C | F | F | F | F |
| 6 | Arrow Hwy. | Dwy. 3 to Dwy./Private Dwy. B | A-C | D-E | F | F | F | F |
| 7 | Arrow Hwy. | Dwy./Private Dwy. B to Dwy. 6 | A-C | A-C | D-E | D-E | D-E | D-E |
| 8 | Arrow Hwy. | Dwy. 6 to Ave. Barbosa/Private Drive A | A-C | A-C | D-E | D-E | D-E | D-E |
| 9 | Arrow Hwy. | Ave. Barbosa/ Private Drive A to Dwy. 8 | A-C | D-E | F | F | F | F |
| 10 | Arrow Hwy. | Dwy. 8 to Dwy. 9 | A-C | F | F | F | F | F |
| 11 | Arrow Hwy. | Dwy. 9 to I-605 SB Off-Ramp | A-C | F | F | F | F | F |
| 12 | Arrow Hwy. | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | D-E | F | F | F | F | F |
| 13 | Arrow Hwy. | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | D-E | D-E | D-E | D-E | D-E | F |
| 14 | Arrow Hwy. | Rivergrade Rd. to Live Oak Av. | A-C | A-C | D-E | D-E | D-E | D-E |
| 15 | Private Drive B | South of Arrow Hwy. | NA | A-C | NA | A-C | NA | A-C |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | A-C | A-C | D-E | D-E | D-E | D-E |
| 17 | Private Drive A | South of Arrow Hwy. | NA | A-C | NA | A-C | NA | A-C |
| 18 | Private Drive A | North of Live Oak Av. | NA | A-C | NA | A-C | NA | A-C |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | A-C | A-C | D-E | F | F | F |
| 20 | Live Oak Av. | Dwy. 2 to Speedway Dr. | A-C | A-C | F | F | F | F |
| 21 | Live Oak Av. | Speedway Dr. to Dwy. 4 | A-C | A-C | D-E | D-E | D-E | D-E |
| 22 | Live Oak Av. | Dwy. 4 to Dwy. 5 | A-C | A-C | D-E | D-E | D-E | D-E |
| 23 | Live Oak Av. | Dwy. 5 to Dwy. 7 | A-C | A-C | D-E | D-E | D-E | D-E |
| 24 | Live Oak Av. | Dwy. 7 to Private Drive A | A-C | A-C | D-E | D-E | D-E | D-E |
| 25 | Live Oak Av. | Private Drive A to Dwy. 10 | A-C | A-C | D-E | D-E | D-E | F |
| 26 | Live Oak Av. | Dwy. 10 to I-605 SB On-Ramp | A-C | A-C | D-E | D-E | D-E | F |
| 27 | Live Oak Av. | I-605 SB On-Ramp to I-605 NB Off-Ramps | A-C | D-E | D-E | F | D-E | F |
| 28 | Live Oak Av. | I-605 NB Off-Ramps to Rivergrade Rd. | A-C | A-C | A-C | D-E | D-E | D-E |
| 29 | Live Oak Av. | Rivergrade Rd. to Stewart Av. | A-C | A-C | A-C | D-E | D-E | D-E |
| 30 | Live Oak Av. | Stewart Av. to Baldwin Park Bl. | A-C | A-C | D-E | D-E | D-E | D-E |
| 31 | Live Oak Av. | Baldwin Park Bl. to Arrow Hwy. | A-C | A-C | A-C | A-C | A-C | A-C |
| 32 | Live Oak Av. | Arrow Hwy. to Maine Av. | F | F | F | F | F | F |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | A-C | A-C | A-C | A-C | A-C | A-C |
| 34 | Rivergrade Rd. | Stewart Av. to Live Oak Av. | A-C | A-C | A-C | A-C | A-C | A-C |

**LEGEND:**

- = LOS A-C
- = LOS D-E
- = LOS F





URBAN CROSSROADS

*Mitigation Measures*

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for E+P traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)

The following improvements are recommended to improve each impacted intersection's LOS back to pre-project conditions, or better:

***Mitigation Measure 1.1 – Myrtle Avenue & Longden Avenue (#1)***

- Contribute fair share towards restriping a 2nd eastbound through lane (this improvement may require the overcrossing to the east to be widened to accommodate the 2nd receiving lane).

***Mitigation Measure 2.1 – Myrtle Avenue/Peck Road & Live Oak Avenue (#2)***

- Contribute fair share towards a 2nd southbound left turn lane.

***Mitigation Measure 3.1 – Longden Avenue & Live Oak Avenue/Driveway (#3)***

- Project to restripe a 3rd eastbound through lane.

***Mitigation Measure 4.1 – Live Oak Avenue & Arrow Highway (West) (#4)***

- Contribute fair share towards a 3rd westbound through lane.

***Mitigation Measure 5.1 – Avenida Barbosa/Private Drive A & Arrow Highway (#15)***

- Project to construct a northbound left turn lane, through lane, and right turn lane (needed for site access).
- Project to construct a southbound through lane (needed for site access).
- Project to restripe a 3rd eastbound through lane (site adjacent improvement).
- Project to construct a westbound left turn lane (needed for site access) and contribute fair share towards a 3rd westbound through lane.

***Mitigation Measure 6.1 – I-605 Northbound Off-Ramp & Live Oak Avenue (#23)***

- Contribute fair share towards the installation of a traffic signal.

***Mitigation Measure 7.1 – Rivergrade Road & Live Oak Avenue (#26)***

- Contribute fair share towards modifying the traffic signal and implement overlap phasing on the northbound right turn lane.

***Mitigation Measure 8.1 – Stewart Avenue & Live Oak Avenue (#27)***

- Project to restripe a 3rd westbound through lane.

***Mitigation Measure 9.1 – Arrow Highway & Live Oak Avenue (East) (#29)***

- Project to restripe a 3rd eastbound through lane.

The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented.

Based on the planning level roadway segment capacity analysis, there are 7 roadway segments that would operate at a deficient LOS for E+P traffic conditions after the implementation of the intersection improvements identified above. Intersections represent the choke points along a roadway segment as they are locations where traffic is stopped or slowed, thus experiencing greater delays, in comparison to the roadway segment with free-flow operations. Due to the additional capacity provided by turn lanes at the study area intersections, roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS (or better than pre-project traffic conditions) during the peak hours with the recommended intersection improvements listed above.

*Off-Ramp Queuing Analysis*

A queuing analysis was performed for the southbound and northbound off-ramps at the I-605 Freeway on Arrow Highway and Live Oak Avenue interchanges for E+P traffic conditions. Consistent with Existing traffic conditions, the analysis indicates there are no queuing issues anticipated that may potentially "spill back" onto the I-605 Freeway mainline.

*Freeway Operations Analyses*

For E+P traffic conditions, the study area freeway mainline segments and ramp merge/diverge junctions would continue to operate at an acceptable LOS (i.e., LOS D or better) during one or both peak hours, with the exception of the following ramp junctions:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale on the State Highway System (SHS) freeway facilities. As such, no improvements have been recommended to address the E+P deficiencies on the SHS.

**Opening Year Cumulative (2020) Conditions**

*Intersection Operations Analysis*

As shown on Exhibit 1-3, there are 3 additional study area intersections that would operate at an unacceptable LOS during one or both peak hours for Opening Year Cumulative (2020) Without Project traffic conditions in addition to those previously identified under Existing (2017) traffic

conditions (i.e., #3, #27, and #29). For Opening Year Cumulative (2020) With Project traffic conditions, the study area intersection of Maine Avenue & Arrow Highway (#30) would operate at an unacceptable LOS with the addition of Project traffic.

*Roadway Segment Capacity Analysis*

As shown on Exhibit 1-4, there are 22 additional roadway segments would operate at a deficient LOS for Opening Year Cumulative (2020) Without Project traffic conditions in addition to those previously identified under Existing traffic conditions. The following roadway segments would operate at a deficient LOS with the addition of Project traffic in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Rivergrade Road to Stewart Avenue (#29) – LOS D

*Mitigation Measures*

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for Opening Year Cumulative (2020) traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Speedway Drive & Live Oak Avenue (#7)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)
- Maine Avenue & Arrow Highway (#30)

In conjunction with Mitigation Measures 1.1 through 9.1 identified previously for E+P traffic conditions, the following additional improvements are recommended to improve the impacted intersection's LOS back to pre-project conditions, or better:

***Mitigation Measure 4.2 – Live Oak Avenue & Arrow Highway (West) (#4)***

- Contribute fair share towards restriping a 3rd eastbound through lane.

***Mitigation Measure 10.1 – Speedway Driveway & Live Oak Avenue (#7)***

- Contribute fair share towards the installation of a traffic signal.
- Project to restripe a 3rd westbound through lane as part of the site adjacent improvements.

***Mitigation Measure 11.1 – Maine Avenue & Arrow Highway (#30)***

- Project to restripe a 3rd eastbound through lane.

The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented.

Based on the planning level roadway segment capacity analysis, there are 15 roadway segments would operate at a deficient LOS for Opening Year Cumulative (2020) With Project traffic conditions after the implementation of the intersection improvements identified above. Due to the additional capacity provided by turn lanes at the study area intersections, roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS (or better than pre-project traffic conditions) during the peak hours with the recommended intersection improvements listed above.

*Off-Ramp Queuing Analysis*

A queuing analysis was performed for the southbound and northbound off-ramps at the I-605 Freeway on Arrow Highway and Live Oak Avenue interchanges for Opening Year Cumulative (2020) traffic conditions. Consistent with Existing traffic conditions, the analysis indicates there are no queuing issues that may potentially "spill back" onto the I-605 Freeway mainline for both Without and With Project traffic conditions.

*Freeway Operations Analyses*

For Opening Year Cumulative (2020) Without Project traffic conditions, the study area freeway mainline segments and ramp merge/diverge junctions would continue to operate at an acceptable LOS (i.e., LOS D or better) during one or both peak hours, with the exception of the following ramp junctions:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only
- I-605 Freeway – Northbound, Off-Ramp at Live Oak Avenue (#5) – LOS E PM peak hour only

The addition of Project traffic would not result in any additional deficient freeway mainline segments or ramp merge/diverge junctions in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions.

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale on the SHS freeway facilities. As such, no improvements have been recommended to address the Opening Year Cumulative (2020) Without and With Project deficiencies on the SHS.

**Horizon Year (2040) Conditions**

*Intersection Operations Analysis*

As shown on Exhibit 1-3, there are no additional study area intersections would operate at an unacceptable LOS during the peak hours for Horizon Year (2040) Without Project traffic conditions in addition to those previously identified under Opening Year Cumulative (2020) traffic conditions. Similarly, there are no additional study area intersections would operate at an

unacceptable LOS with the addition of Project traffic in addition to those operating at a deficient LOS under Horizon Year (2040) Without Project traffic conditions.

*Roadway Segment Capacity Analysis*

As shown on Exhibit 1-4, there are 2 additional roadway segments would operate at a deficient LOS for Horizon Year (2040) Without Project traffic conditions in addition to those previously identified under Existing and Opening Year Cumulative (2020 Without Project traffic conditions:

- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Rivergrade Road to Stewart Avenue (#29) – LOS D

There are no additional roadway segments anticipated to operate at a deficient LOS with the addition of Project traffic in addition to those previously identified for Horizon Year (2040) Without Project traffic conditions.

*Mitigation Measures*

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for Horizon Year (2040) traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Speedway Drive & Live Oak Avenue (#7)
- Driveway 7/Driveway & Live Oak Avenue (#13)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)
- Maine Avenue & Arrow Highway (#30)

In conjunction with Mitigation Measures 1.1 through 11.1 identified previously for E+P and Opening Year Cumulative (2020) traffic conditions, the following additional improvements are recommended to improve the impacted intersection's LOS back to pre-project conditions, or better:

***Mitigation Measure 12.1 – Driveway 7/Driveway & Live Oak Avenue (#13)***

- Project to construct a southbound left turn lane and shared through-right turn lane (needed for site access).
- Contribute fair share towards an eastbound right turn lane.
- Project to restripe a 3rd eastbound through lane (site adjacent improvement).

***Mitigation Measure 5.2 – Avenida Barbosa/Private Drive A & Arrow Highway (#15)***

- Contribute fair share towards a 2nd eastbound left turn lane.

- Contribute fair share towards modifying the traffic signal to implement overlap phasing on the westbound right turn lane.

***Mitigation Measure 8.2 – Stewart Avenue & Live Oak Avenue (#27)***

- Contribute fair share towards restriping a 3rd eastbound through lane.

The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented.

Based on the planning level roadway segment capacity analysis, there are 17 roadway segments would operate at a deficient LOS for Horizon Year (2040) With Project traffic conditions after the implementation of the intersection improvements identified above. Due to the additional capacity provided by turn lanes at the study area intersections, roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS (or better than pre-project traffic conditions) during the peak hours with the recommended intersection improvements listed above.

*Off-Ramp Queuing Analysis*

A queuing analysis was performed for the southbound and northbound off-ramps at the I-605 Freeway on Arrow Highway and Live Oak Avenue interchanges for Horizon Year (2040) traffic conditions. Consistent with Existing traffic conditions, the analysis indicates there are no queuing issues that may potentially "spill back" onto the I-605 Freeway mainline for both Without and With Project traffic conditions.

*Freeway Operations Analyses*

The freeway mainline segments would operate at an acceptable LOS for Horizon Year (2040) Without Project traffic conditions. However, the addition of Project traffic would result in the following deficient freeway mainline segment:

- I-605 Freeway Southbound, South of Live Oak Avenue (#3) – LOS E PM peak hour only

For Horizon Year (2040) Without Project traffic conditions, the following freeway ramp merge/diverge junctions would operate at an unacceptable LOS (i.e., LOS E or worse) during one or both peak hours:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only
- I-605 Freeway – Northbound, Off-Ramp at Live Oak Avenue (#5) – LOS E AM and PM peak hours

The addition of Project traffic would not result in any additional deficient ramp merge/diverge junctions in addition to those previously identified for Horizon Year (2040) Without Project traffic conditions.

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale on the SHS freeway

facilities. As such, no improvements have been recommended to address the Horizon Year (2040) Without and With Project deficiencies on the SHS.

## 1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements throughout LA County are typically funded through a combination of direct project mitigation, fair share contributions and regional/local Development Impact Fee (DIF) programs. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors. A regional fee program is currently in the process of being developed for Los Angeles County by the Metropolitan Transportation Authority (Metro) and the regional transportation planning agency (RTPA).

A summary of off-site improvements needed to address intersection operational deficiencies for each analysis scenario is included in Table 1-5. These recommended improvements are consistent with or less than the geometrics assumed in the City of Irwindale Circulation Element. Table 1-5 also indicates the Project's fair share percentage of the required improvements.

In cases where this assessment identifies that the proposed Project would have a significant cumulative impact to a study area intersection, and the recommended mitigation measure is a fair share monetary contribution, the following methodology was applied to determine the fair share contribution. Although a fair share contribution has been identified, the impact would remain significant until such time the recommended improvement is implemented. The project's fair share contribution at an off-site study area intersection is determined based on the following equation (from the City's traffic study guidelines), which is the ratio of project traffic to E+P traffic:

$$\text{Project Fair Share \%} = \text{Project Traffic} / \text{E+P Traffic}$$

The detailed Project fair share contribution calculations are provided in Table 1-6.

**Table 1-5**
Page 1 of 2

**Summary of Intersection Improvements**

| # | Intersection Location | Jurisdiction | Recommended Improvements | | | Project respsonbility?[1] | Fair Share %[2] | Significant Impact?[3] |
|---|---|---|---|---|---|---|---|---|
| | | | E+P | 2020 With Project | 2040 With Project | | | |
| 1 | Myrtle Av. & Longden Av. | Irwindale | - Restripe a 2nd EB through lane[4] | - Same | - Same | Fair Share | 2.7% | Yes |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | Irwindale, Arcadia | - 2nd SB left turn lane | - Same | - Same | Fair Share | 2.4% | Yes |
| 3 | Longden Av. & Live Oak Av./Driveway | Irwindale | - Restripe a 3rd EB through lane[5] | - Same | - Same | Construct | 0.0% | No |
| 4 | Live Oak Av. & Arrow Hwy. (West) | Irwindale | - 3rd WB through lane | - Same<br>- Restripe a 3rd EB through lane | - Same<br>- Same | Fair Share<br>Fair Share | 3.4%<br>2.9% | Yes<br>Yes |
| 7 | Speedway Dwy. & Live Oak Av. | Irwindale | - 3rd WB through lane[5] | - Same<br>- Install a traffic signal | - Same<br>- Same | Construct<br>Fair Share | 0.0%<br>4.8% | No<br>Yes |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | Irwindale | - SB left turn lane[5]<br>- SB shared through-right turn lane[5]<br>- Restripe a 3rd EB through lane[5] | - Same<br>- Same<br>- Same | - Same<br>- Same<br>- Same<br>- EB right turn lane | Construct<br>Construct<br>Construct<br>Fair Share | 0.0%<br>0.0%<br>0.0%<br>8.8% | No<br>No<br>No<br>Yes |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | Irwindale | - NB left turn lane[5]<br>- NB through lane[5]<br>- NB right turn lane[5]<br>- Restripe a SB through lane[5]<br>- 3rd EB through lane[5]<br>- WB left turn lane[5]<br>- 3rd WB through lane | - Same<br>- Same<br>- Same<br>- Same<br>- Same<br>- Same<br>- Same | - Same<br>- Same<br>- Same<br>- Same<br>- Same<br>- Same<br>- Same<br>- 2nd EB left turn lane<br>- Modify the traffic signal to implement overlap phasing on the WB right turn lane | Construct<br>Construct<br>Construct<br>Construct<br>Construct<br>Construct<br>Fair Share<br>Fair Share<br>Fair Share | 0.0%<br>0.0%<br>0.0%<br>0.0%<br>0.0%<br>0.0%<br>18.6%<br>14.9%<br>14.9% | No<br>No<br>No<br>No<br>No<br>No<br>Yes<br>Yes<br>Yes |

**Table 1-5**
Page 2 of 2

**Summary of Intersection Improvements**

| # | Intersection Location | Jurisdiction | Recommended Improvements | | | Project respsonbility?[1] | Fair Share %[2] | Significant Impact?[3] |
|---|---|---|---|---|---|---|---|---|
| | | | E+P | 2020 With Project | 2040 With Project | | | |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | Caltrans, Irwindale | - Install a traffic signal | - Same | - Same | Fair Share | 12.2% | Yes |
| 26 | Rivergrade Rd. & Live Oak Av. | Irwindale, Baldwin Park | - Modify the traffic signal to implement overlap phasing on the NB right turn lane | - Same | - Same | Fair Share | 5.0% | Yes |
| 27 | Stewart Av. & Live Oak Av. | Irwindale, Baldwin Park | - Restripe a 3rd WB through lane[5] | - Same | - Same<br><br>- Restripe a 3rd EB through lane | Construct<br><br>Fair Share | 0.0%<br><br>2.5% | Yes<br><br>Yes |
| 29 | Arrow Hwy. & Live Oak Av. (East) | Irwindale | - Restripe a 3rd EB through lane[5] | - Same | - Same | Construct | 0.0% | No |
| 30 | Maine Av. & Arrow Hwy. | Irwindale, Baldwin Park | - None | - Restripe a 3rd EB through lane | - Same | Construct | 0.0% | No |

[1] Identifies the Project's responsibility to construct an improvement or contribute fair share towards the implementation of the improvement shown.

[2] Program improvements constructed by project may be eligible for fee credit, at discretion of City of Irwindale. See Table 1-6 for Fair Share Calculations. Fair share applicable to non-construct improvements only.

[3] If improvements are not fully covered by an applicable pre-existing fee program, then the intersection has been identified to have a significant impact even after mitigation measures are implemented. However, if the improvements are in a pre-existing program are fully funded by the pre-existing fee program, or the Project constructs the improvements, then the intersection is found to have no significant impact after the implementation of the mitigation measure.

[4] Improvement requires overcrossing (bridge) to the east to be widened to accommodate the 2nd receiving lane.

[5] Direct Project impact; Project mitigation measure.

## Table 1-6

### Project Fair Share Calculations

| # | Intersection | | Project | E+P | Project % of E+P Traffic[1] | 2020 WP | Project % of 2020 WP Traffic[1] | 2040 WP | Project % of 2040 WP Traffic[1] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Myrtle Av. & Longden Av. | | | | | | | | |
| | | AM: | 88 | 3,309 | 2.66% | Not Applicable | | Not Applicable | |
| | | PM: | 99 | 3,675 | **2.69%** | | | | |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | | | | | | | | |
| | | AM: | 92 | 4,163 | 2.21% | Not Applicable | | Not Applicable | |
| | | PM: | 102 | 4,335 | **2.35%** | | | | |
| 4 | Live Oak Av. & Arrow Hwy. (West) | | | | | | | | |
| | | AM: | 125 | 4,456 | 2.81% | 5,028 | 2.49% | Not Applicable | |
| | | PM: | 169 | 4,958 | **3.41%** | 5,819 | **2.90%** | | |
| 7 | Speedway Dwy. & Live Oak Av. | | | | | | | | |
| | | AM: | 131 | Not Applicable | | 2,727 | **4.80%** | Not Applicable | |
| | | PM: | 145 | | | 4,478 | 3.24% | | |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | | | | | | | | |
| | | AM: | 266 | Not Applicable | | Not Applicable | | 3,023 | **8.80%** |
| | | PM: | 322 | | | | | 5,167 | 6.23% |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | | | | | | | | |
| | | AM: | 534 | 4,049 | 13.19% | Not Applicable | | 4,770 | 11.19% |
| | | PM: | 684 | 3,682 | **18.58%** | | | 4,588 | **14.91%** |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | | | | | | | | |
| | | AM: | 391 | 3,205 | **12.20%** | Not Applicable | | Not Applicable | |
| | | PM: | 307 | 3,709 | 8.28% | | | | |
| 26 | Rivergrade Rd. & Live Oak Av. | | | | | | | | |
| | | AM: | 150 | 3,197 | 4.69% | Not Applicable | | Not Applicable | |
| | | PM: | 182 | 3,640 | **5.00%** | | | | |
| 27 | Stewart Av. & Live Oak Av. | | | | | | | | |
| | | AM: | 86 | Not Applicable | | Not Applicable | | 3,480 | 2.47% |
| | | PM: | 95 | | | | | 3,767 | **2.52%** |

[1] Highest fair share percentage is highlighted.

## 1.6 CUMULATIVE MITIGATION MEASURES

This section provides a summary of recommended mitigation measures necessary to address cumulative impacts. The construction of facilities by the Project Applicant would be eligible for fee credit and reimbursement if the construction exceeds the Project's fair share. The City shall review the proposed mitigation measures to determine if the Project shall construct certain improvements, including traffic signals or contribute fair share.

### 1.6.1 MITIGATION MEASURES

***Mitigation Measure 13.1*** – Prior to the issuance of building permits, the Project Applicant shall pay the Project's fair share amount for the improvements identified in Table 1-5 that are consistent with the improvements shown on Table 7-7, or as agreed to by the City and Project Applicant.

***Mitigation Measure 14.1*** – Table 1-5 of the TIA includes intersections that either share a mutual border with the City of Baldwin Park or are wholly located within the City of Baldwin Park that have recommended improvements which are not covered by a pre-existing fee program. Because the City of Irwindale does not have plenary control over intersections that share a border with the City of Baldwin Park, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Irwindale shall participate in a multi-jurisdictional effort with the City of Baldwin Park to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in Table 1-5 of the TIA, that are located in the City of Baldwin Park. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to City of Baldwin Park facilities that are not attributable to development located within the City of Irwindale are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program.

***Mitigation Measure 14.2*** – Developer shall use reasonable efforts to pay the fair share amount to the City of Baldwin Park prior to the issuance of the Project's final certificate of occupancy. If the City of Baldwin Park chooses to accept developer's fair share payment, the City of Baldwin Park shall apply Developer's Fair Share payment to any fee program adopted or agreed upon by the Developer and City of Baldwin Park as a result of compliance with Mitigation Measure 13.1. The City of Baldwin Park shall only accept the fair share payment if it has complied with Mitigation Measure 13.1. If, within five years from the date the final certificate of occupancy is issued for the project, and the Developer and the City of Baldwin Park have not complied with Mitigation Measure 13.1, then Developer's Fair Share payment shall be returned to the Developer, if it has been paid, or Developer shall have no further obligation to attempt to comply with this Mitigation Measure.

***Mitigation Measure 15.1*** – Table 1-5 of the TIA includes intersections that either share a mutual border with Caltrans or are wholly located within Caltrans' jurisdiction that have a recommended improvement which is not covered by a pre-existing fee program. Because the City of Irwindale does not have plenary control over intersections that are within Caltrans' jurisdiction, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Irwindale shall participate in a multi-jurisdictional effort with Caltrans to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in Table 1-5 of the TIA, that are located in Caltrans' jurisdiction. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to Caltrans facilities that are not attributable to development located within the City of Irwindale are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program.

***Mitigation Measure 15.2*** – Developer shall use reasonable efforts to pay the fair share amount to Caltrans prior to the issuance of the Project's final certificate of occupancy. If Caltrans chooses to accept developer's fair share payment, Caltrans shall apply Developer's Fair Share payment to any fee program adopted or agreed upon by the Developer and Caltrans as a result of compliance with Mitigation Measure 14.1. Caltrans shall only accept the fair share payment if it has complied with Mitigation Measure 14.1. If, within five years from the date the final certificate of occupancy is issued for the project, and the Developer and Caltrans have not complied with Mitigation Measure 14.1, then Developer's Fair Share payment shall be returned to the Developer, if it has been paid, or Developer shall have no further obligation to attempt to comply with this Mitigation Measure.

### 1.6.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the E+P, Opening Year Cumulative (2020), or Horizon Year (2040) deficiencies on the SHS, because there is no feasible mitigation available.

## 1.7 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements would be in place prior to Project building occupancy.

The site adjacent roadways of Arrow Highway and Live Oak Avenue appear to be built to their ultimate curb-to-curb width as indicated in the City of Irwindale General Plan Circulation Element as a Major Highway (100-foot right-of-way). However, the Project would restripe these roadways to provide the ultimate number of lanes adjacent to their site. Additional curb, gutter and parkway improvements are recommended, as needed for site access, along the Project's frontage consistent with City of Irwindale standards as will be specified in the Project's final conditions of approval.

### 1.7.1 SITE ACCESS IMPROVEMENTS

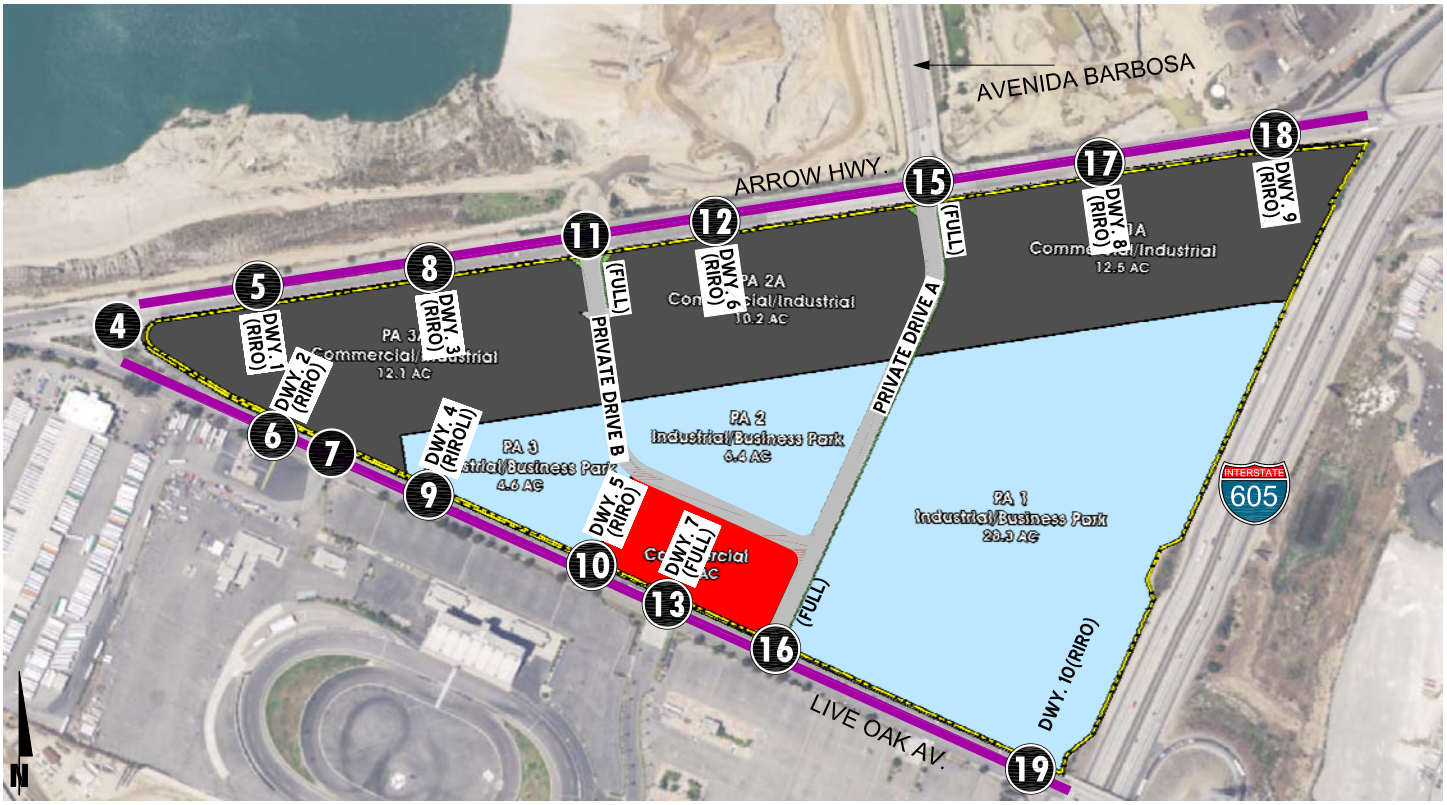
The recommended site access driveway improvements for the Project are described below. Exhibit 1-5 illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

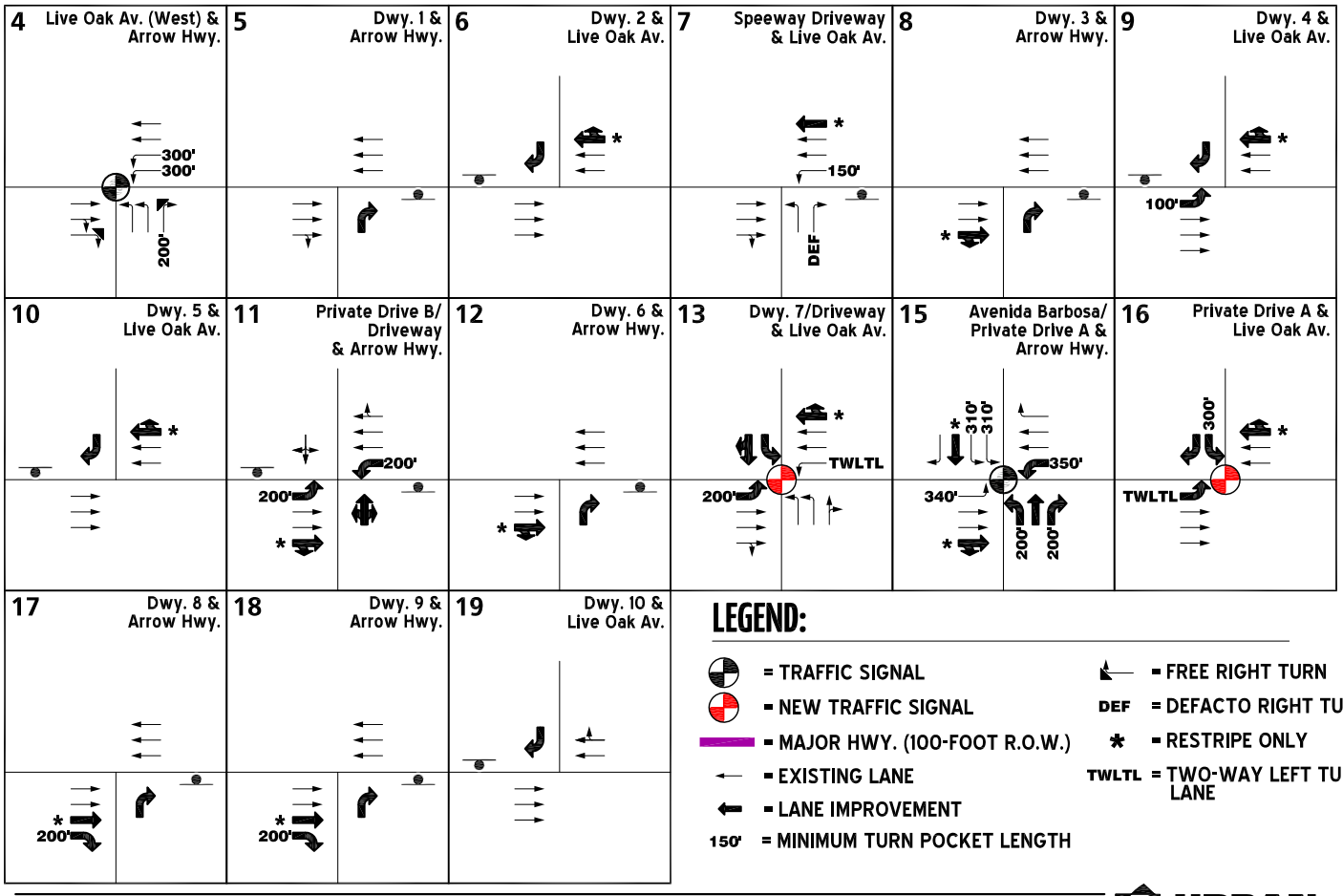
Exhibit 1-6 shows a conceptual striping plan for Live Oak Avenue between Driveway 7 and Private Drive A. The recommendations include removing the existing raised median to accommodate a striped two-way-left-turn lane between these two intersections.

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

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

## EXHIBIT 1-5: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS




**LEGEND:**

- = TRAFFIC SIGNAL
- = NEW TRAFFIC SIGNAL
- = MAJOR HWY. (100-FOOT R.O.W.)
- = EXISTING LANE
- = LANE IMPROVEMENT
- 150' = MINIMUM TURN POCKET LENGTH
- = FREE RIGHT TURN
- DEF = DEFACTO RIGHT TURN
- * = RESTRIPE ONLY
- TWLTL = TWO-WAY LEFT TURN LANE

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URBAN CROSSROADS

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**EXHIBIT 1-6: LIVE OAK AVENUE (DRIVEWAY 7 TO PRIVATE DRIVE A) CONCEPTUAL STRIPING**


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### .7.2 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS AND SITE ADJACENT INTERSECTIONS

A queuing analysis was conducted at the Project driveways along Arrow Highway and Live Oak Avenue for Horizon Year (2040) traffic conditions to determine the turn pocket length necessary to accommodate long-range 95th percentile peak hour volumes. The analysis was conducted for both the weekday AM and weekday PM peak hours. The 95th percentile queues for the applicable study area intersections can be found in Appendix 1.2.

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to assess queues at the Project driveways and site adjacent intersections. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length in Synchro. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). However, the average queue is the average of all the two-minute maximum queues observed by SimTraffic. The maximum back of queue observed for every two-minute period is recorded by SimTraffic.

SimTraffic has been utilized to assess peak hour queuing at the site access driveways for Horizon Year With Project traffic conditions. The random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 60-minute periods with 60-minute recording intervals. The storage length recommendations for the turning movements at the Project were reflected previously on Exhibit 1-5.

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# 2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with the City of Irwindale and Caltrans traffic study requirements. [1] [2]

## 2.1 LEVEL OF SERVICE

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

## 2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. LOS analysis was conducted to determine existing traffic conditions using the Intersection Capacity Utilization (ICU) methodology for signalized study intersections in the Cities of Irwindale and Baldwin Park. [5] The Highway Capacity Manual (HCM) (6$^{th}$ Edition) methodology was used to determine LOS's for unsignalized intersections in those cities. In addition, in accordance with Caltrans' guidelines, HCM (6$^{th}$ Edition) methodology was used for ramp-to-arterial study area intersections. [6] The HCM (6$^{th}$ Edition) methodology expresses the LOS at an intersection in terms of average control delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

### 2.2.1 SIGNALIZED INTERSECTIONS

The City of Irwindale, City of Baldwin Park, City of Monrovia, and County of Los Angeles require signalized intersections to be evaluated through ICU analysis which compares the peak hour traffic volumes to intersection capacity. Lane capacities of 1,600 vehicles per hour of green time have been assumed for the ICU calculations. 0.10 of V/C assumed representing 10 seconds of delay for the yellow and all-red signal indication and inherent vehicle delay between cycles with an assumed signal cycle of 100 seconds. The ICU LOS definitions based on V/C ratio are presented in Table 2-1.

**TABLE 2-1 INTERSECTION CAPACITY UTILIZATION (ICU) LOS DEFINITIONS**

| Level of Service | Critical Volume To Capacity Ratio |
|---|---|
| A | 0.00 - 0.60 |
| B | 0.61 - 0.70 |
| C | 0.71 - 0.80 |
| D | 0.81 - 0.90 |
| E | 0.91 - 1.00 |
| F | >1.00 |

Source: 2010 LA County CMP

Caltrans requires signalized intersection operations analysis based on the methodology described in the HCM (6th Edition). [6] Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-2.

**TABLE 2-2: SIGNALIZED INTERSECTION HCM LOS THRESHOLDS**

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

Source: HCM (6th Edition)

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the study area. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM (6th Edition). [6] Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. The LOS analysis for signalized intersections has been performed using existing signal timing, where applicable. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-mintue rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios for HCM intersections. ICU intersections have assumed a PHF of 1.00 per the ICU methodology. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. [6] As such, new intersections have been conservatively evaluated with a PHF of 0.92.

### 2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Irwindale, City of Baldwin Park, City of Monrovia, and County of Los Angeles require the operations of unsignalized intersections be evaluated using the methodology described in the HCM (6th Edition). [6] The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-3).

**TABLE 2-3: UNSIGNALIZED INTERSECTION HCM LOS THRESHOLDS**

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

Source: HCM (6th Edition)

At two-way or side-street stop-controlled intersections, The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole. For all-way stop controlled intersections, LOS is based solely on control delay for assessment of LOS at the approach and intersection levels.

## 2.3 ROADWAY SEGMENT CAPACITY ANALYSIS

Roadway segment operations have been evaluated using the City of Irwindale roadway segment capacity thresholds provided in Table 4-10 (Roadway Classification Standards) of the City's General Plan Update. [7] The roadway segment analysis prepared for the purposes of this TIA evaluated is based on the projected daily volume for each study area roadway segment. LOS is determined based on the V/C ratio, for each roadway segment. For the purposes of this analysis, the roadway segment locations where the Project is anticipated to contribute 50 or more peak hour trips have been evaluated.

- Major Highways are 4-6 lanes (divided) with an estimated daily capacity of 40,400 to 53,000 vehicles per day
- Secondary Highways are 2-4 lanes (undivided) with an estimated daily capacity of 10,000 to 30,000 vehicles per day
- Collector Roads are 2 lanes with an estimated daily capacity of up to 10,000 vehicles per day
- Local Streets are 2 lanes with an estimated daily capacity of 2,000 (or less) vehicles per day.

For the purposes of this analysis, roadway widening has only been recommended if the more constrained peak hour intersection operations indicate that additional roadway widening is necessary to accommodate the future traffic flows.

## 2.4 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the Caltrans 2014 *California Manual on Uniform Traffic Control Devices (CA MUTCD)* for all study area intersections. [8]

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The 2014 *CAMUTCD* indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. [8] Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for Existing traffic conditions. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future unsignalized intersections have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Traffic signal warrant analyses were performed for the following unsignalized study area intersections (see Table 2-4):

**TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS**

| ID | Intersection Location | Jurisdiction |
|---|---|---|
| 7 | Speedway Driveway & Live Oak Avenue | Irwindale |
| 11 | Driveway/Private Drive B & Arrow Highway | Irwindale |
| 16 | Private Drive A & Live Oak Avenue | Irwindale |

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

## 2.5 FREEWAY RAMP QUEUING ANALYSIS

The study area for this TIA includes the I-605 Freeway at Arrow Highway and Live Oak Avenue ramps. Consistent with Caltrans requirements, the freeway ramp queuing has been assessed to determine potential queuing impacts at the freeway off-ramp intersections on both Arrow Highway and Live Oak Avenue at the I-605 Freeway. Specifically, the off-ramp queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-605 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95$^{th}$ percentile queue resulting from the Synchro progression analysis. The 95$^{th}$ percentile queue is the maximum back of queue with 95$^{th}$ percentile traffic volumes. The queue length reported is for the lane with the highest queue in the lane group.

Although only the 95$^{th}$ percentile queue has been reported in the tables, the 50$^{th}$ percentile queue can be found in the appendix alongside the 95$^{th}$ percentile queue for each ramp location. The 50$^{th}$ percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95$^{th}$ percentile queue is the maximum back of queue with 95$^{th}$ percentile traffic volumes during the peak hour. The 50$^{th}$ percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95$^{th}$ percentile queue is derived from the average queue plus 1.65 standard deviations. The 95$^{th}$ percentile queue is not necessarily ever observed, it is simply based on statistical calculations.

## 2.6 FREEWAY MAINLINE SEGMENT ANALYSIS

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TIA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM (6$^{th}$ Edition) and performed using HCS7 software. [6] The performance

measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-5 illustrates the freeway segment LOS thresholds for each density range utilized for this analysis.

**TABLE 2-5: FREEWAY MAINLINE LOS THRESHOLDS**

| Level of Service | Description | Density Range (pc/mi/ln)[1] |
|---|---|---|
| A | Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed. | 0.0 – 11.0 |
| B | Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed. | 11.1 – 18.0 |
| C | Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages. | 18.1 – 26.0 |
| D | Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions. | 26.1 – 35.0 |
| E | Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing. | 35.1 – 45.0 |
| F | Breakdown in vehicle flow. Demand exceeds capacity. | >45.0 |

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM (6th Edition)

The number of lanes for Existing conditions has been obtained from field observations conducted by Urban Crossroads in December 2017. The I-605 Freeway mainline volume data was obtained from the Caltrans Performance Measurement System (PeMS) website for the study segments. [9] In an effort to conduct a conservative analysis, the maximum value observed within the three-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and potential impacts. As such, actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. Truck data has also been obtained from the PeMS website. Caltrans does not currently have any improvement plans to widen the I-605 Freeway Arrow Highway or Live Oak Avenue.

## 2.7 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in six existing on and off ramp locations. Although the HCM (6th Edition) indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange, which goes beyond the HCM (6th Edition)

recommendations. This has been done in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in southern California. [6]

The merge/diverge analysis is based on the HCM (6th Edition) Freeway Merge and Diverge Segments analysis method and performed using HCS7 software. [6] The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-6 presents the merge/diverge area LOS thresholds for each density range utilized for this analysis.

**TABLE 2-6: FREEWAY MERGE AND DIVERGE LOS THRESHOLDS**

| Level of Service | Density Range (pc/mi/ln)[1] |
|---|---|
| A | ≤10.0 |
| B | 10.0 – 20.0 |
| C | 20.0 – 28.0 |
| D | 28.0 – 35.0 |
| E | >35.0 |
| F | Demand Exceeds Capacity |

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM (6th Edition)

Similar to the basic freeway segment analysis, the I-605 Freeway mainline volume data were obtained from the Caltrans PeMS website for the segment of the I-605 Freeway north of Arrow Highway. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes and determines the I-605 Freeway mainline volumes. The data obtained was for November 28-30, 2017. In an effort to conduct a conservative analysis, the maximum value observed within the three-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized on the Freeway mainline for the purposes of this analysis and PCE volumes for the ramps have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis. Truck data has also been obtained from the Caltrans PeMS website.

## 2.8 LOS CRITERIA

The definition of an intersection deficiency has been obtained from each of the applicable surrounding jurisdictions.

### 2.8.1 CITY OF IRWINDALE

The City of Irwindale has established LOS D as a target LOS standard and LOS E as a threshold standard. The City recognizes that not all intersections within the City can meet the target LOS D. In these instances, the City Council must find the improvements necessary to meet the target LOS D are not feasible because of one or more of the following reasons:

1. the cost of the necessary improvements exceeds available funding sources;
2. the design of the necessary improvements is not compatible with the surrounding land uses; or,
3. the design of the necessary improvements is contrary to other established City policies.

For individual roadway segments, a LOS C standard is used to monitor capacity needs.

### 2.8.2 CITY OF BALDWIN PARK

Per the City of Baldwin Park's General Plan (Policy 1.4), maintain as a goal the provision of service levels at intersections along arterial highways at Level of Service D or better during morning and evening peak travel periods. [10] The City's General Plan recognizes that the following facilities within the City of Baldwin Park are expected to experience decline in service levels, meaning increased congestion and delays with the future increase in traffic demand:

- Dalewood Street, north of Judith Street
- Francisquito Avenue, east of Big Dalton Avenue and east of Maine Avenue
- Live Oak Avenue, east of Steward Avenue
- Maine Avenue, south of Clark Street
- Puente Avenue, north of Dalewood Street
- Ramona Avenue, east of Maine Avenue and west of Merced Avenue
- Ramona Avenue, east of Syracuse Avenue and east of I-605 Freeway

### 2.8.3 CITY OF MONROVIA

With the recognition that the City is largely built out and that major physical improvements to the circulation system will be limited to certain areas, establish LOS D as the minimum standard (both intersections and roadway segments) to be maintained, expect at locations where LOS F conditions currently exist.

### 2.8.4 LA COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better. The only two CMP intersections identified in the 2010 CMP within the study area are the I-605 Freeway ramps on Arrow Highway. [4] However, the more conservative LOS criteria of LOS D (per Caltrans) has been utilized for these locations.

### 2.8.5 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on SHS facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is LOS D. Consistent with the City of Irwindale LOS threshold of LOS D and in excess of the LA County CMP stated LOS threshold of LOS E, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

## 2.9 THRESHOLDS OF SIGNIFICANCE

### 2.9.1 CITY OF IRWINDALE

City of Irwindale traffic study guidelines states that a signalized intersection is significantly impacted by Project traffic if:

- When a signalized intersection operates at LOS D or better under existing or future conditions, and the addition of project trips degrades the intersection operations to LOS E or F.
- When a signalized intersection operates at LOS E or better under existing or future baseline conditions, and the addition of the project trips degrades the intersection operations to LOS F or increases the V/C ratio by 0.02 or greater.
- When a signalized intersection operates at LOS F under existing or future baseline conditions, and the addition of more than 50 peak hour project trips increases the V/C ratio by 0.02 or greater.

### 2.9.2 CITY OF MONROVIA

The City of Monrovia has determined that a project would have a significant traffic impact under the California Environmental Quality Act (CEQA) at an intersection if the conditions in the following table are found:

- LOS A (Intersection LOS under Existing) results in a project-related increase in V/C of 0.06
- LOS B (Intersection LOS under Existing) results in a project-related increase in V/C of 0.05
- LOS C (Intersection LOS under Existing) results in a project-related increase in V/C of 0.04
- LOS D (Intersection LOS under Existing) results in a project-related increase in V/C of 0.03
- LOS E (Intersection LOS under Existing) results in a project-related increase in V/C of 0.02
- LOS F (Intersection LOS under Existing) results in a project-related increase in V/C of 0.01

### 2.9.3 CITY OF BALDWIN PARK AND LA COUNTY CMP

The City of Baldwin Park and LA County CMP consider an increase of 0.02 or more in the V/C ratio at a location that reaches LOS E or F to be a significant impact.

### 2.9.4 CALTRANS

It should be noted that while Caltrans specifies target LOS, it does not specify thresholds of significance criteria for their facilities. For the purposes of this analysis, an impact is considered significant if the Project causes the level of service of a facility to go from acceptable to unacceptable or adds 50 or more peak hour trips to a facility already operating at unacceptable level of service.

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# 3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Irwindale General Plan Circulation Network, the City of Monrovia General Plan Mobility Element, the City of Baldwin Park Circulation Element, and a review of existing peak hour intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations.

## 3.1 EXISTING CIRCULATION NETWORK

The study area includes a total of 30 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

## 3.2 CITY OF IRWINDALE GENERAL PLAN CIRCULATION NETWORK

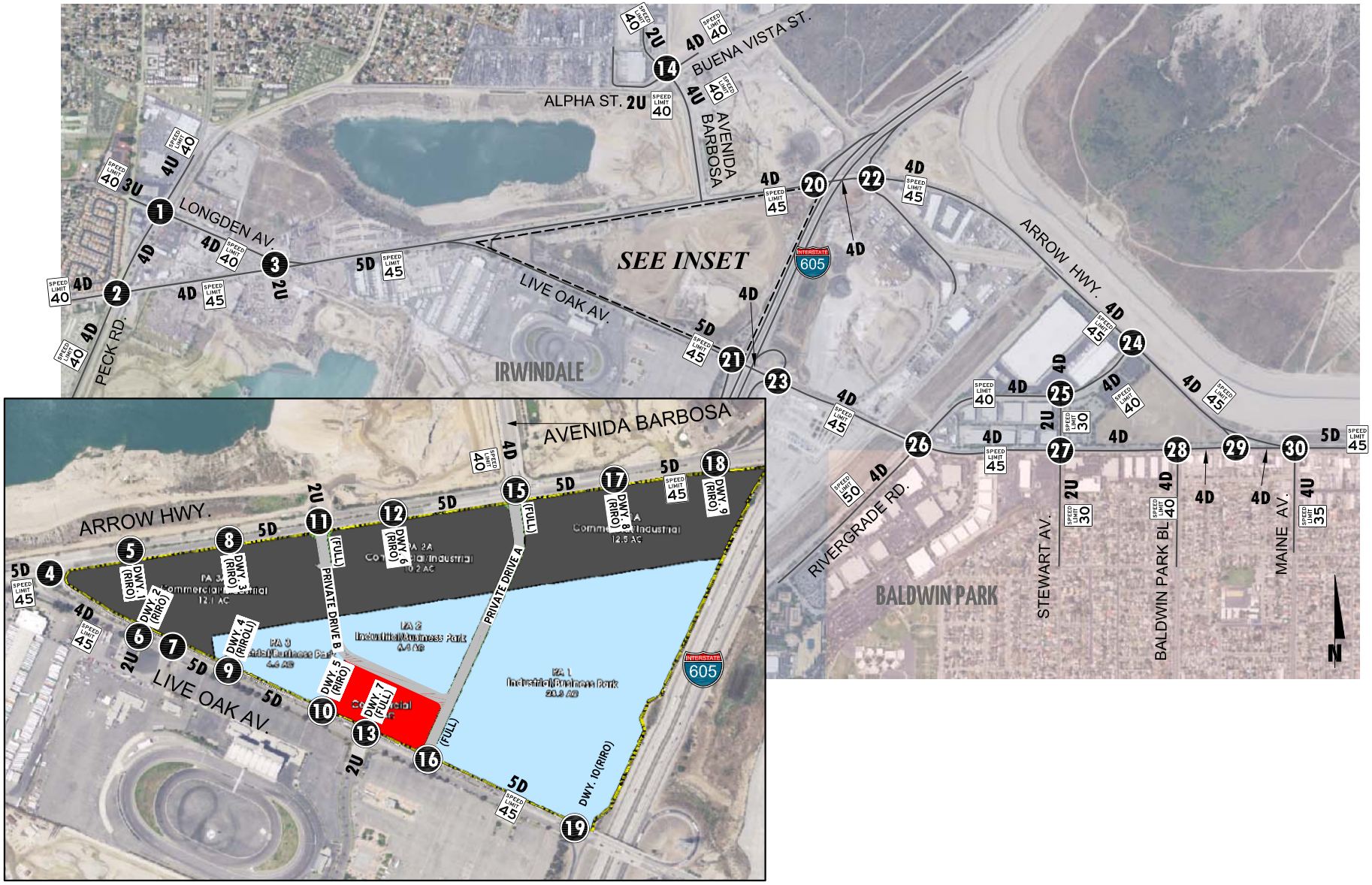
As previously noted, the Project site is located within the City of Irwindale. Exhibit 3-2 shows the City of Irwindale General Plan Circulation Network, and Exhibit 3-3 illustrates the City of Irwindale General Plan roadway cross-sections. [11] The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Irwindale General Plan Circulation Network, are described subsequently.

**Arrow Highway**: Arrow Highway is designated as a Secondary Highway in the City of Irwindale General Plan Circulation Network. The City of Irwindale roadway cross-sections indicate a right-of-way of 80 feet with a curb-to-curb measurement of 64-feet. Although the City's General Plan indicates that Secondary Highways are 4 lane roadways, some portions of Arrow Highway near the Project are currently striped to accommodate 3 lanes in each direction of travel. Arrow Highway along the Project frontage is currently built to its ultimate pavement width, however, the Project would restripe to accommodate the ultimate lanes.

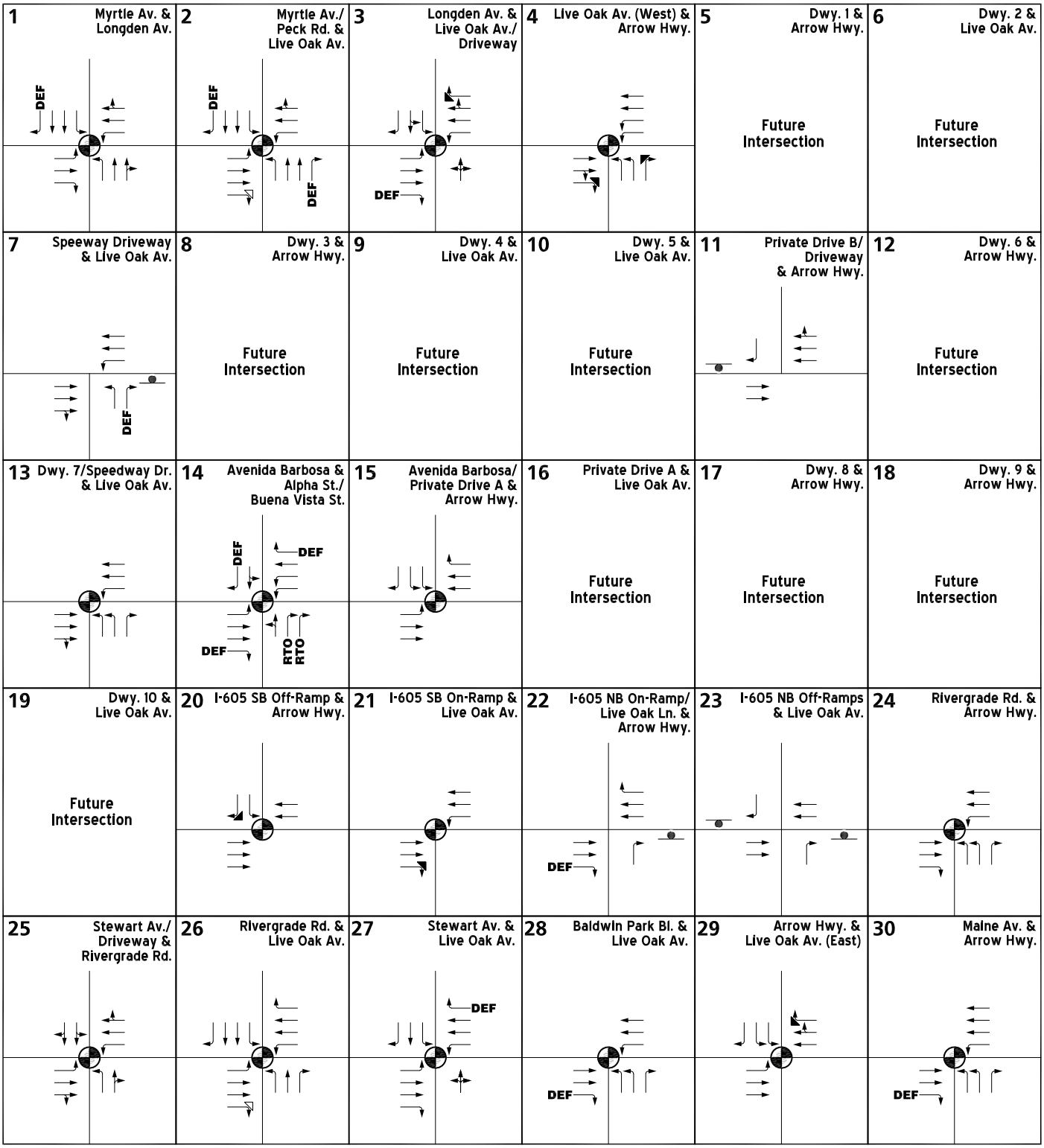
**Live Oak Avenue**: Live Oak Avenue is designated as a Major Highway in the City of Irwindale General Plan Circulation Network, east of Live Oak Avenue/Arrow Highway (West). The City of Irwindale roadway cross-sections indicate a right-of-way of 100 feet with a curb-to-curb measurement of 84-feet. Live Oak Avenue along the Project frontage is currently built to its ultimate pavement width, however, the Project would restripe to accommodate the ultimate lanes.

**Myrtle Avenue/Peck Road, Avenida Barbosa, Rivergrade Road**: Myrtle Avenue/Peck Road, Avenida Barbosa, Rivergrade Road are designated as a Collector Road/Local Street in the City of Irwindale General Plan Circulation Network. The City of Irwindale roadway cross-sections indicate a right-of-way of 60 feet with a curb-to-curb measurement of 40-feet.

## EXHIBIT 3-1 (1OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



## EXHIBIT 3-1 (2OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS




**LEGEND:**

= TRAFFIC SIGNAL
= STOP SIGN
= CHANNELIZED YIELD
= FREE RIGHT TURN
RTO = RIGHT TURN OVERLAP
DEF = DEFACTO RIGHT TURN

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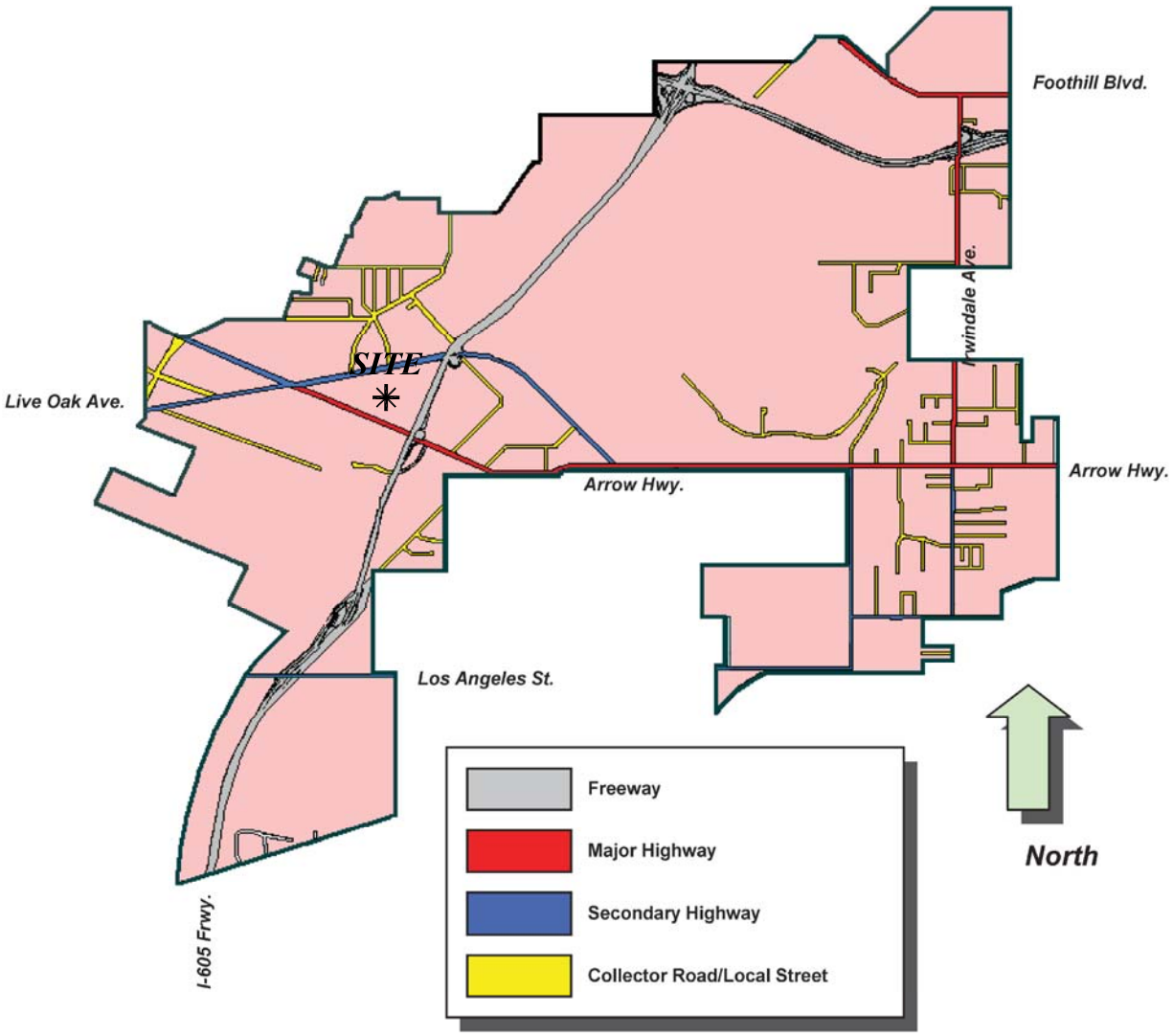
URBAN CROSSROADS

## EXHIBIT 3-2: CITY OF IRWINDALE GENERAL PLAN CIRCULATION NETWORK



## EXHIBIT 3-3: CITY OF IRWINDALE GENERAL PLAN ROADWAY CROSS-SECTIONS

| Table 4-10<br>Roadway Classification Standards | | | | |
|---|---|---|---|---|
| | **Major Highways** | **Secondary Highways** | **Collector Roads** | **Local Streets** |
| Travel Lanes | 4-6<br>(divided) | 2-4 lanes<br>(Undivided) | 2 lanes | 2 lanes |
| Estimated Daily Capacity | 40,400 to 53,000 vehicles/day | 10,000 to 30,000 vehicles/day | Up to 10,000 vehicles/day | 2,000 or less vehicles/day |
| ROW width | 100 ft. | 80 ft. | 60 ft. | 60 ft. |
| Pavement Width | 84 ft. | 64 ft. | 40 ft. | 40 ft. |
| Note: Estimated daily capacity for LOS expressed in vehicles/day | | | | |

## 3.3 CITY OF BALDWIN PARK GENERAL PLAN MOBILITY ELEMENT

Exhibit 3-4 shows the City of Baldwin Park General Plan Circulation Element, and Exhibit 3-5 illustrates the City of Baldwin Park General Plan roadway cross-sections. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Baldwin Park General Plan Circulation Element are described subsequently.

**Live Oak Avenue/Arrow Highway:** Live Oak Avenue/Arrow Highway is designated as an Arterial in the City of Baldwin Park Circulation Element. The City of Baldwin Park roadway cross-sections indicate a right-of-way of 100 feet.

**Baldwin Park Boulevard:** Baldwin Park Boulevard is designated as an Arterial in the City of Baldwin Park Circulation Element. The City of Baldwin Park roadway cross-sections indicate a right-of-way of 100 feet.

**Maine Avenue:** Maine Avenue is designated as a Collector/Industrial in the City of Baldwin Park Circulation Element. The City of Baldwin Park roadway cross-sections indicate a right-of-way of 80 feet.

## 3.4 CITY OF MONROVIA GENERAL PLAN CIRCULATION ELEMENT

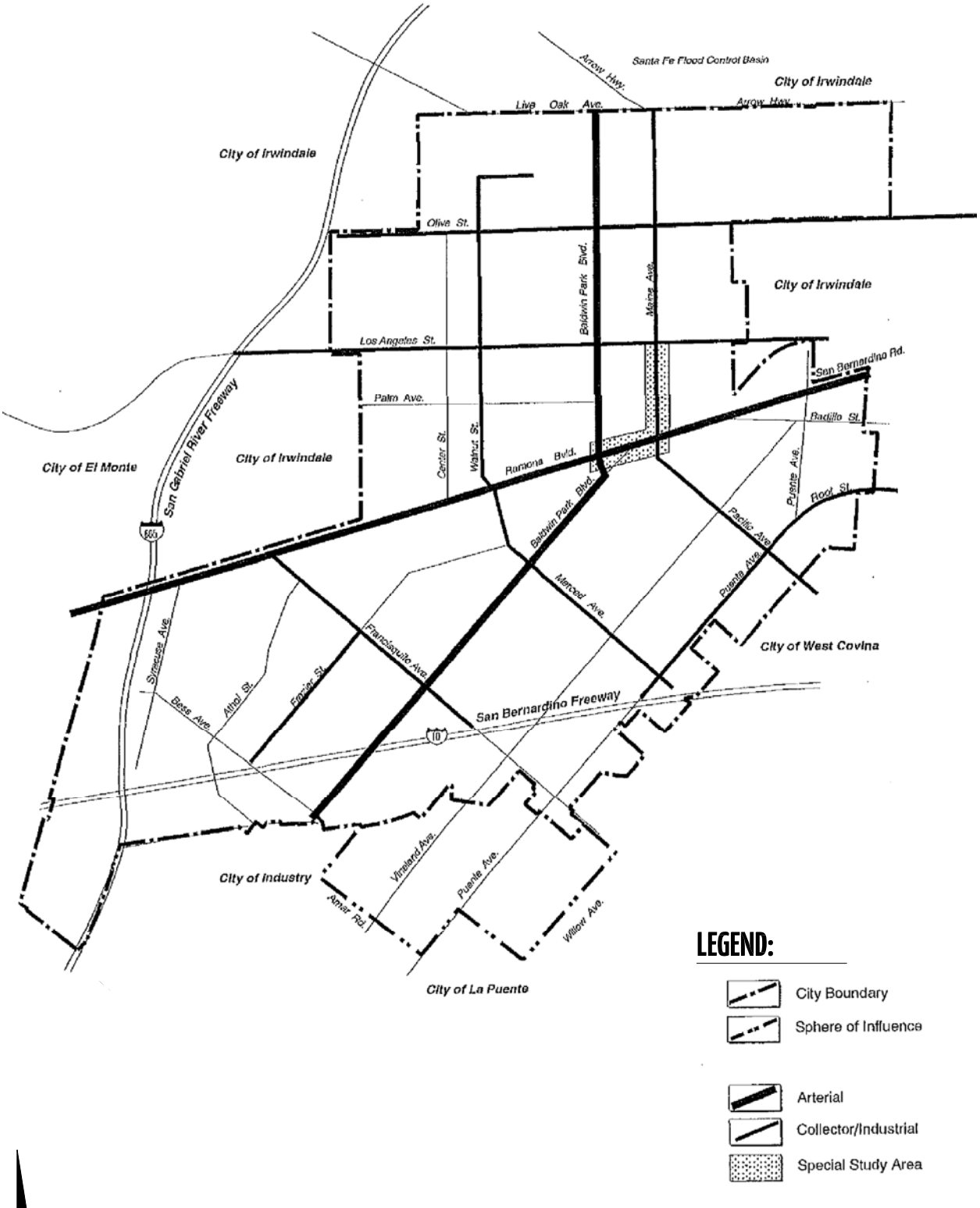
Exhibit 3-6 shows the City of Monrovia General Plan Circulation Element, and Exhibit 3-7 illustrates the City of Monrovia General Plan roadway cross-sections. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Monrovia General Plan Circulation Element are described subsequently.

**Myrtle Avenue/Peck Road:** Myrtle Avenue/Peck Road is designated as a Primary Arterial in the City of Monrovia General Plan Circulation Element. The City of Monrovia roadway cross-sections indicate a right-of-way of 100-120 feet.

## 3.5 TRUCK ROUTES

The City of Irwindale designated truck route map is shown on Exhibit 3-8. Arrow Highway and Live Oak Avenue are designated City of Irwindale truck routes. The City of Baldwin Park designated truck route map is shown on Exhibit 3-9. Baldwin Park Boulevard is identified as City of Baldwin Park truck routes. Lastly, Exhibit 3-10 shows the City of Monrovia Truck Routes, which identifies Myrtle Avenue/Peck Road as a truck route. The designated truck route maps have been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

## EXHIBIT 3-4: CITY OF BALDWIN PARK GENERAL PLAN CIRCULATION ELEMENT




SOURCE: BALDWIN PARK 2020 GENERAL PLAN

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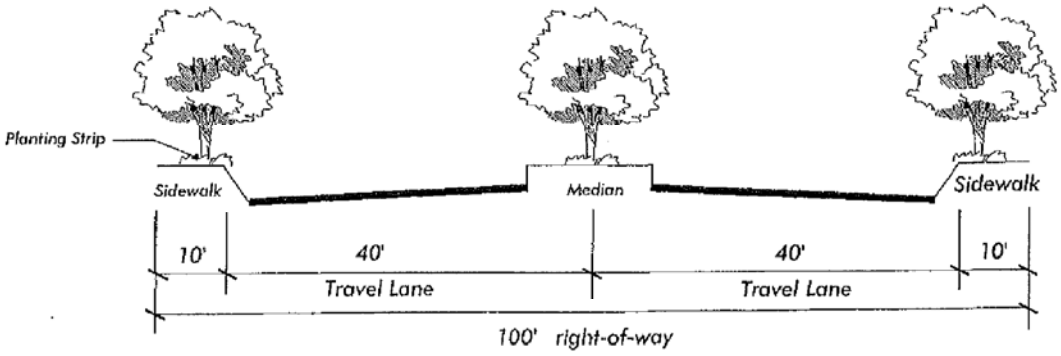
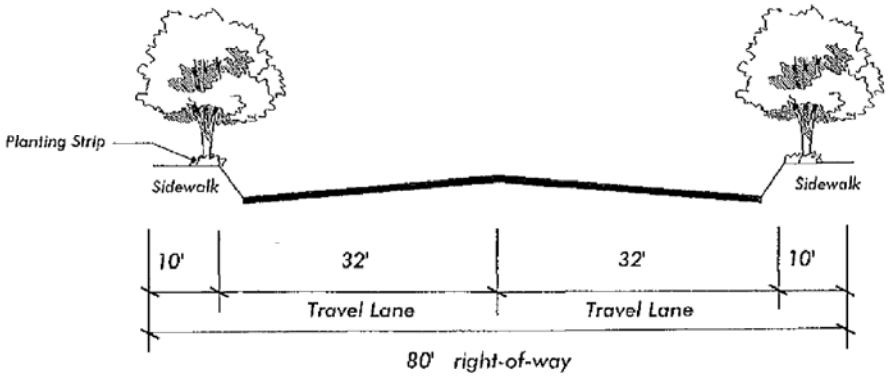
## EXHIBIT 3-5: CITY OF BALDWIN PARK GENERAL PLAN ROADWAY CROSS-SECTIONS

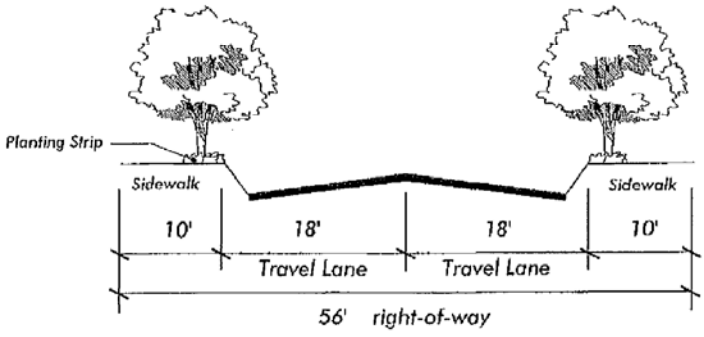
***Arterial Street: 100' right-of-way***




***Collector / Industrial: 80'right-of-way***



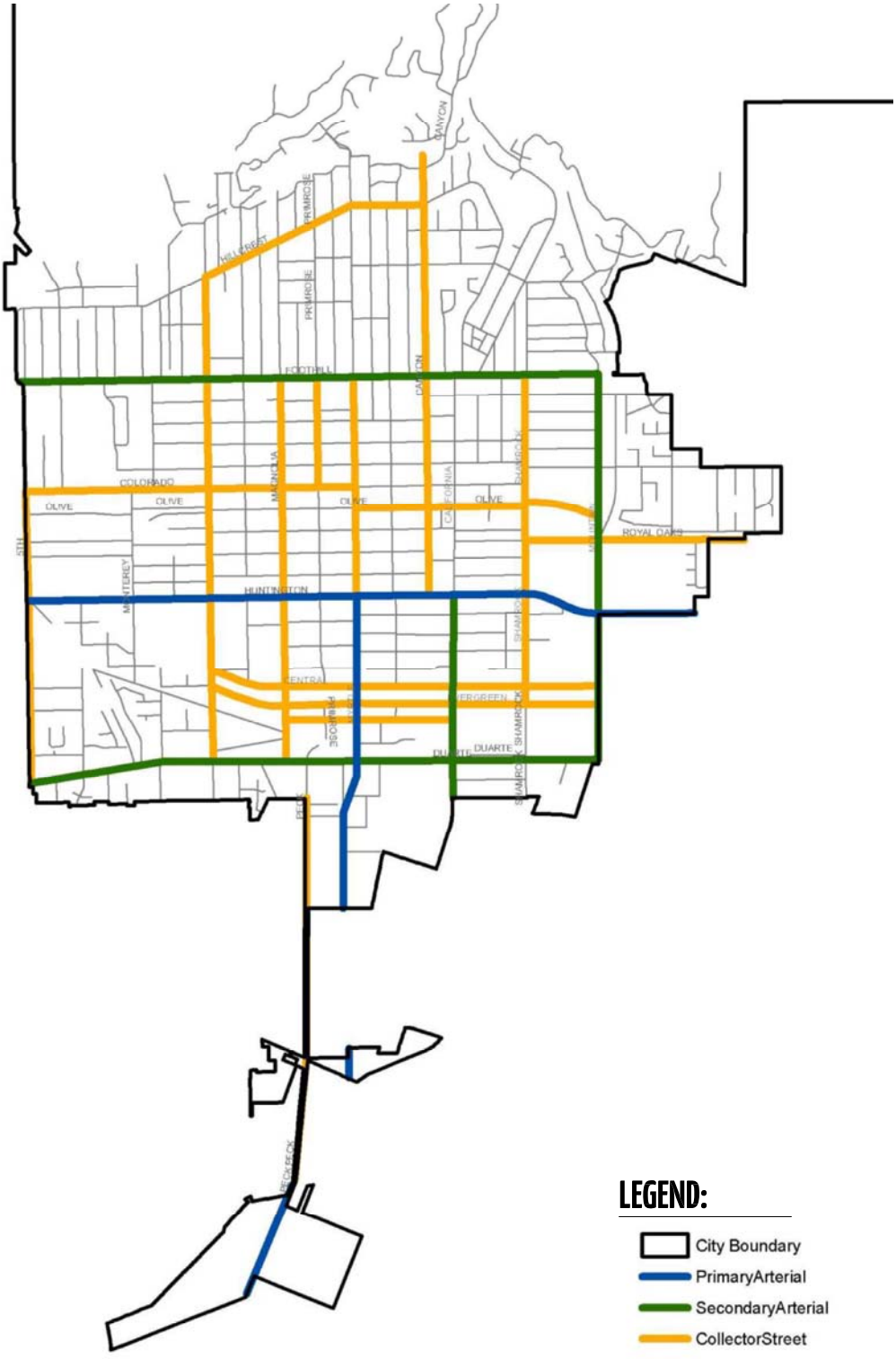

***Residential: 60' right-of-way***




Note: Right-of-way widths represent maximums. City reserves the right to develop narrower streets consistent with land use goals for pedestrian districts and within residential subdivisions.

*SOURCE: BALDWIN PARK 2020 GENERAL PLAN*

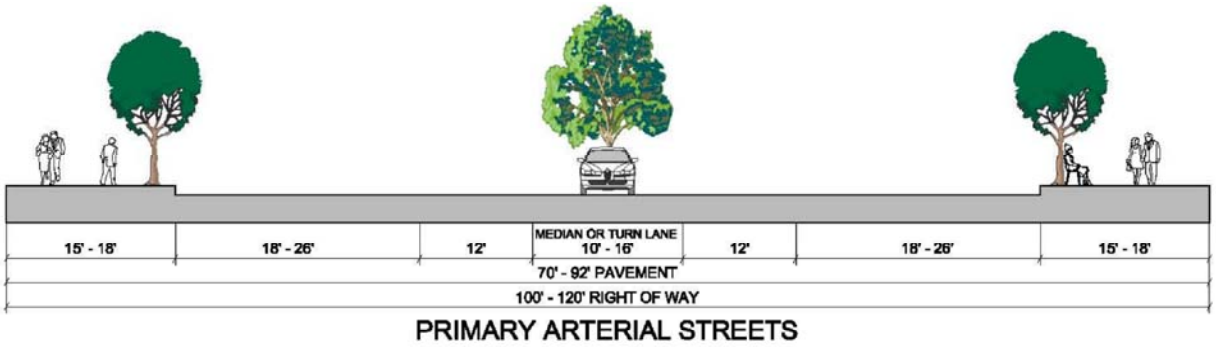
## EXHIBIT 3-6: CITY OF MONROVIA GENERAL PLAN CIRCULATION ELEMENT




SOURCE: MONROVIA CIRCULATION ELEMENT 2008

11110 - mgp.dwg

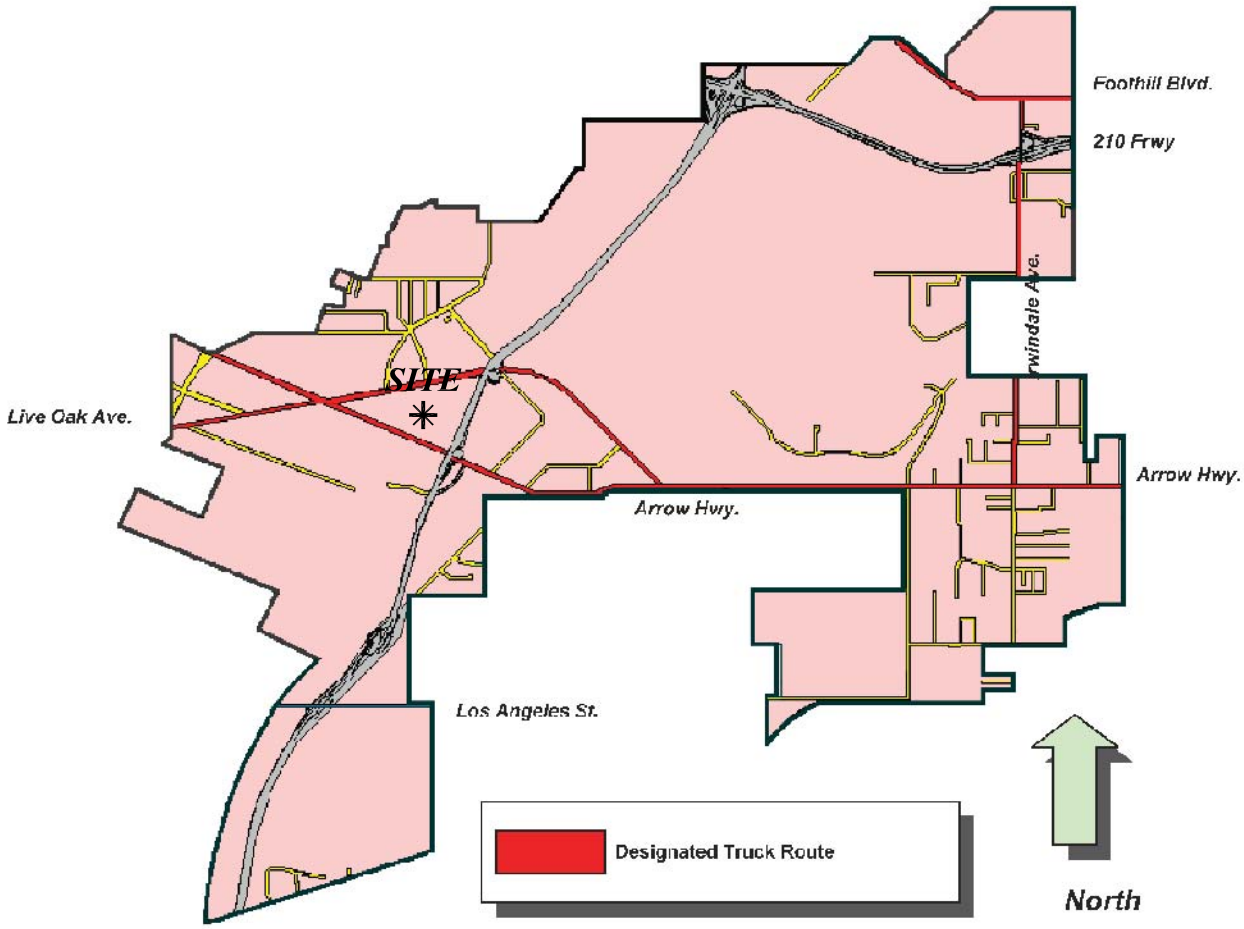
**EXHIBIT 3-7: CITY OF MONROVIA GENERAL PLAN ROADWAY CROSS-SECTIONS**




*SOURCE: MONROVIA CIRCULATION ELEMENT 2008*

*11110 - mgp.dwg*

## EXHIBIT 3-8: CITY OF IRWINDALE TRUCK ROUTES




N

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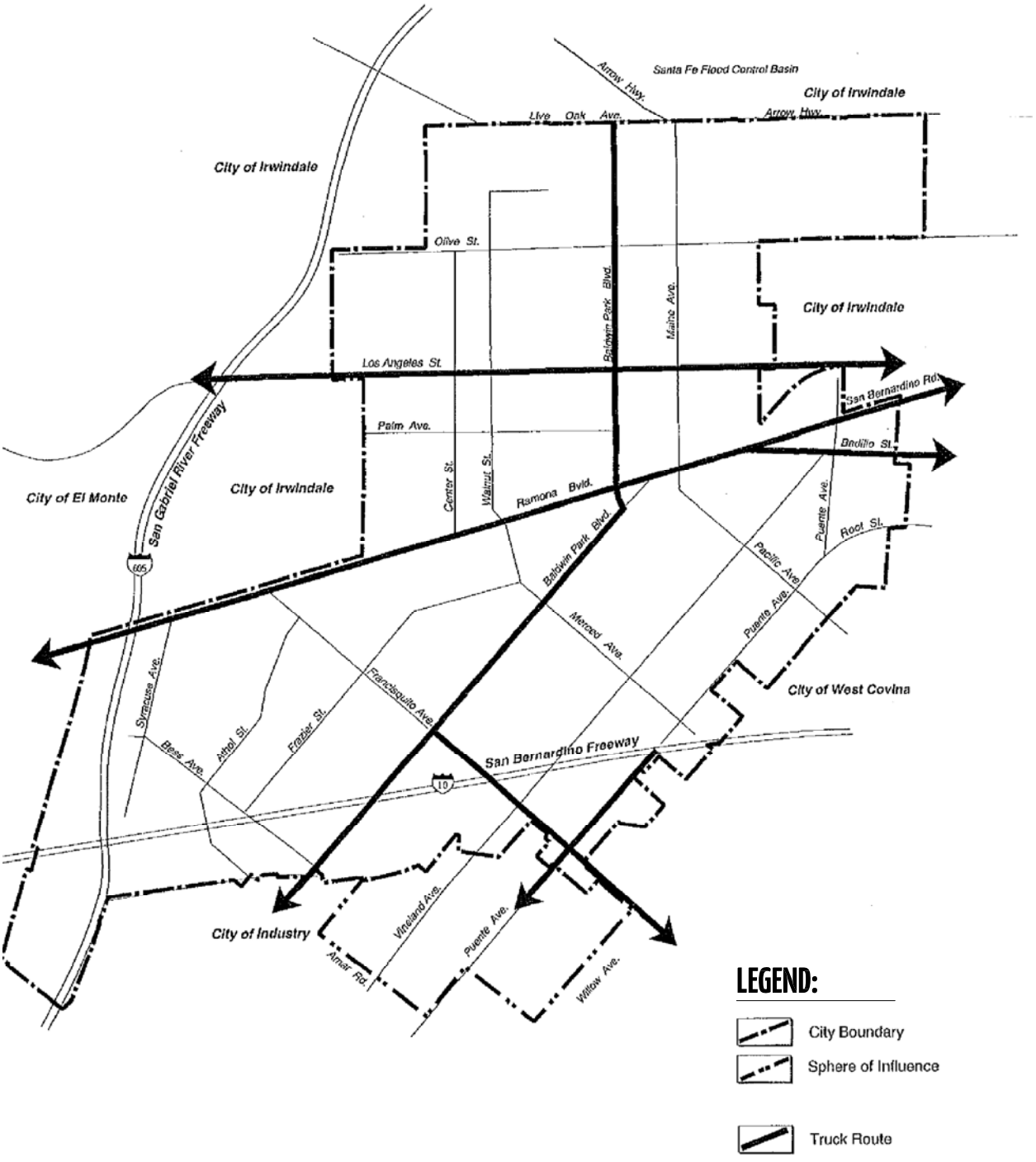
## EXHIBIT 3-9: CITY OF BALDWIN PARK TRUCK ROUTES




SOURCE: BALDWIN PARK 2020 GENERAL PLAN

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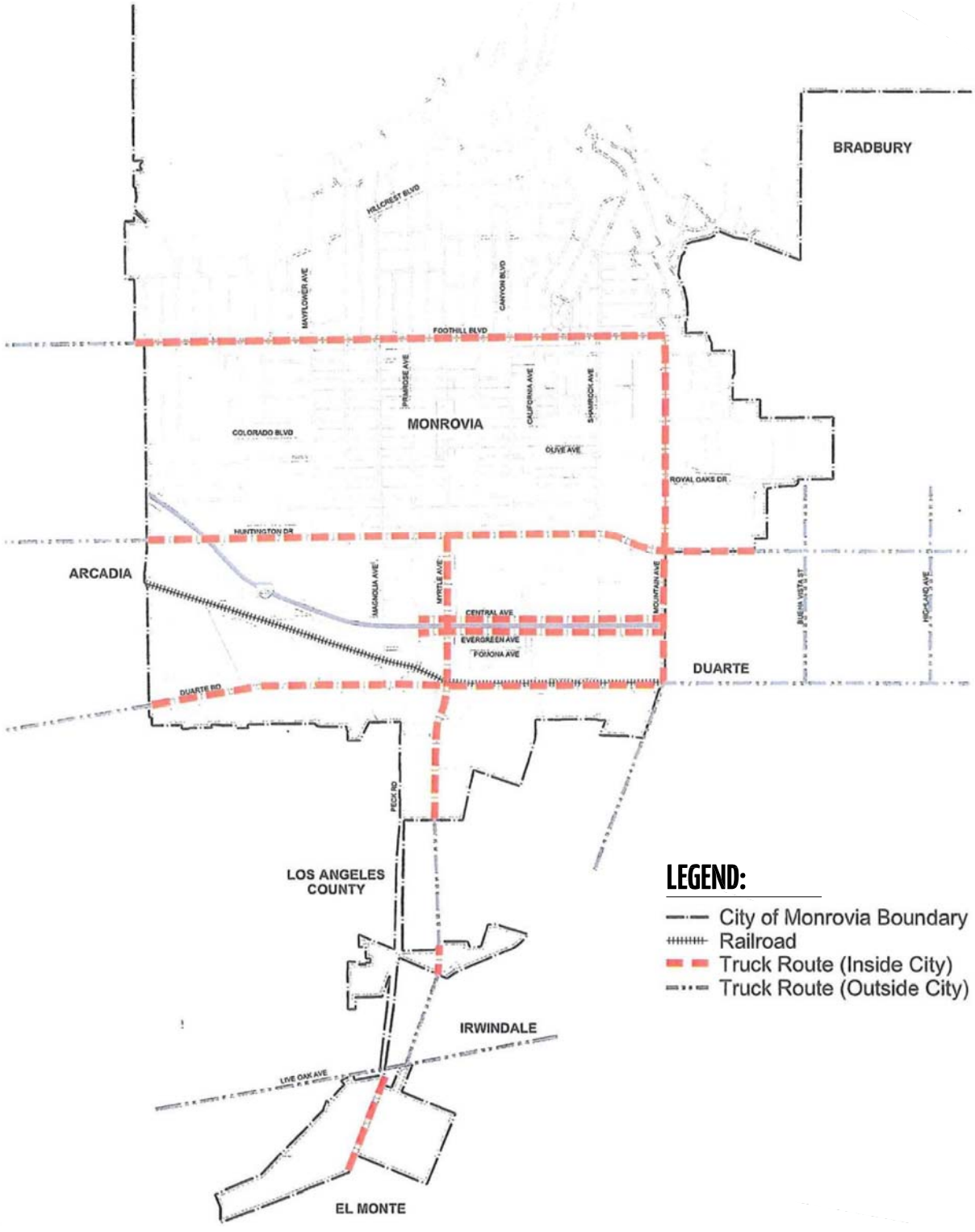
## EXHIBIT 3-10: CITY OF MONROVIA TRUCK ROUTES




SOURCE: MONROVIA CIRCULATION ELEMENT 2008

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## 3.6 BICYCLE & PEDESTRIAN FACILITIES

City of Baldwin Park bike routes are shown on Exhibit 3-11. Class II bikeways are on-road bike paths. There is a Class II bike lane proposed along Baldwin Park Boulevard. As shown on Exhibit 3-12, there are no bike lanes within the study area in the City of Monrovia.

Field observations conducted in December 2017 indicate nominal pedestrian and bicycle activity within the study area. Existing pedestrian facilities (sidewalk and crosswalk) and bus stop locations within the study area are shown on Exhibit 3-13.

## 3.7 TRANSIT SERVICE

The study area is currently served by Foothill Transit, a public transit agency serving 21-member cities in the San Gabriel and Pomona Valleys, including Irwindale and Baldwin Park. The existing transit routes in the study area are shown on Exhibit 3-14. Currently, the study area is served by Foothill Transit Route 492 along Live Oak Avenue/Arrow Highway, 272 along Buena Vista Street, Avenida Barbosa, Arrow Highway, and Baldwin Park Boulevard, and Foothill Transit Route 270 along Myrtle Avenue/Peck Road.

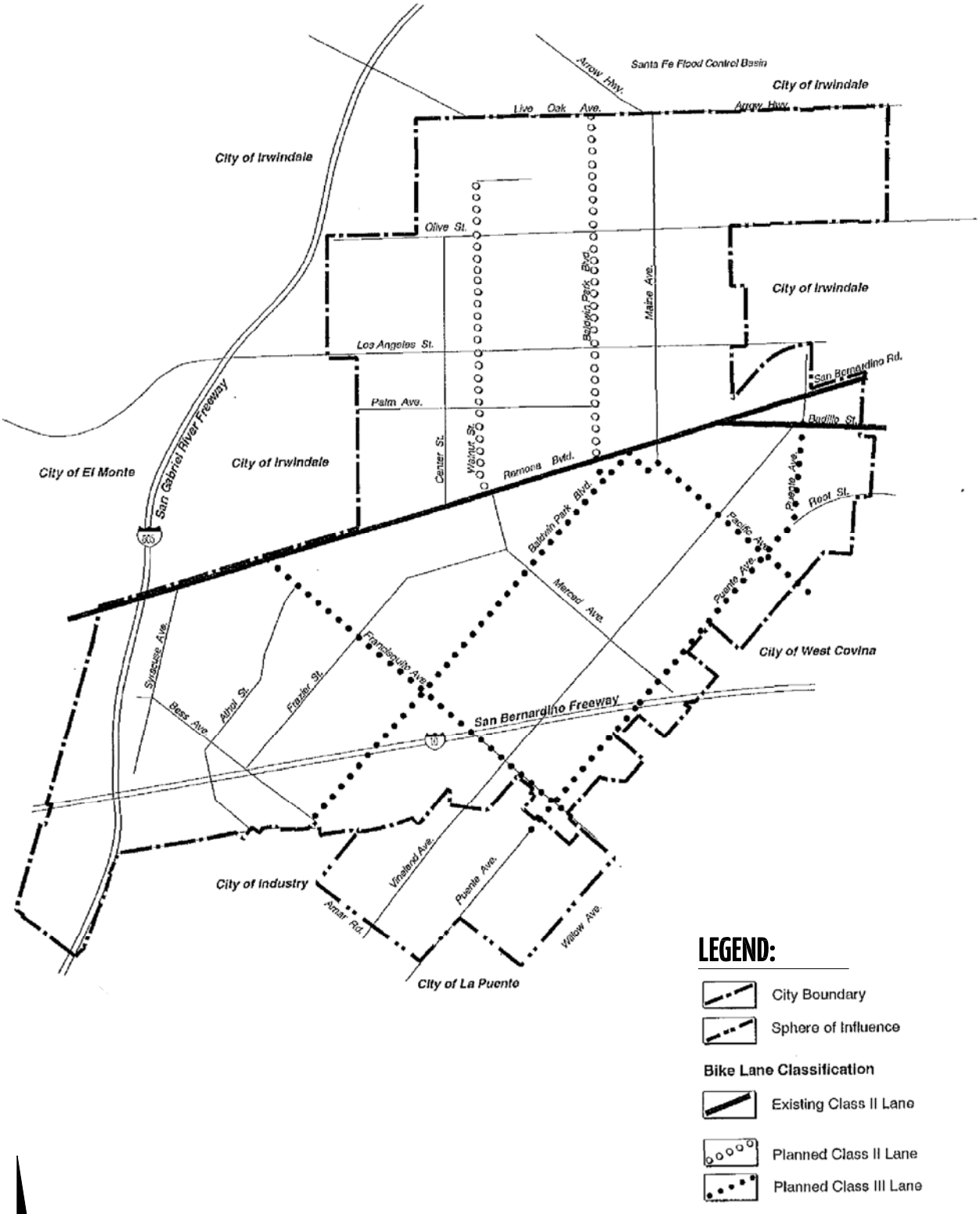
## 3.8 EXISTING TRAFFIC COUNTS

Manual weekday AM and PM peak hour turning movement counts were conducted in November 2017, while surrounding area schools were in session. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. The traffic counts collected in March and June 2017 include the vehicle classifications as shown below:

- Passenger Cars
- 2-Axle Trucks
- 3-Axle Trucks
- 4 or More Axle Trucks

To represent the impact large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCEs. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow down is also much longer than for passenger cars, and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks and 3.0 for 4+-axle trucks to estimate each turning movement. It should be noted that LA County and the Southern California Association of Governments (SCAG) do not have readily available PCE factor recommendations. As such, the PCE factors used are based on recommendations from San Bernardino County Transportation Authority (SBCTA) which is consistent with standard engineering practice throughout the southern California region. Further use of the SBCTA PCE factors was reviewed by the City of Irwindale staff during the traffic study scoping process and is appropriate based on Urban Crossroads' professional engineering judgment.

## EXHIBIT 3-11: CITY OF BALDWIN PARK BIKEWAY PLAN




SOURCE: BALDWIN PARK 2020 GENERAL PLAN

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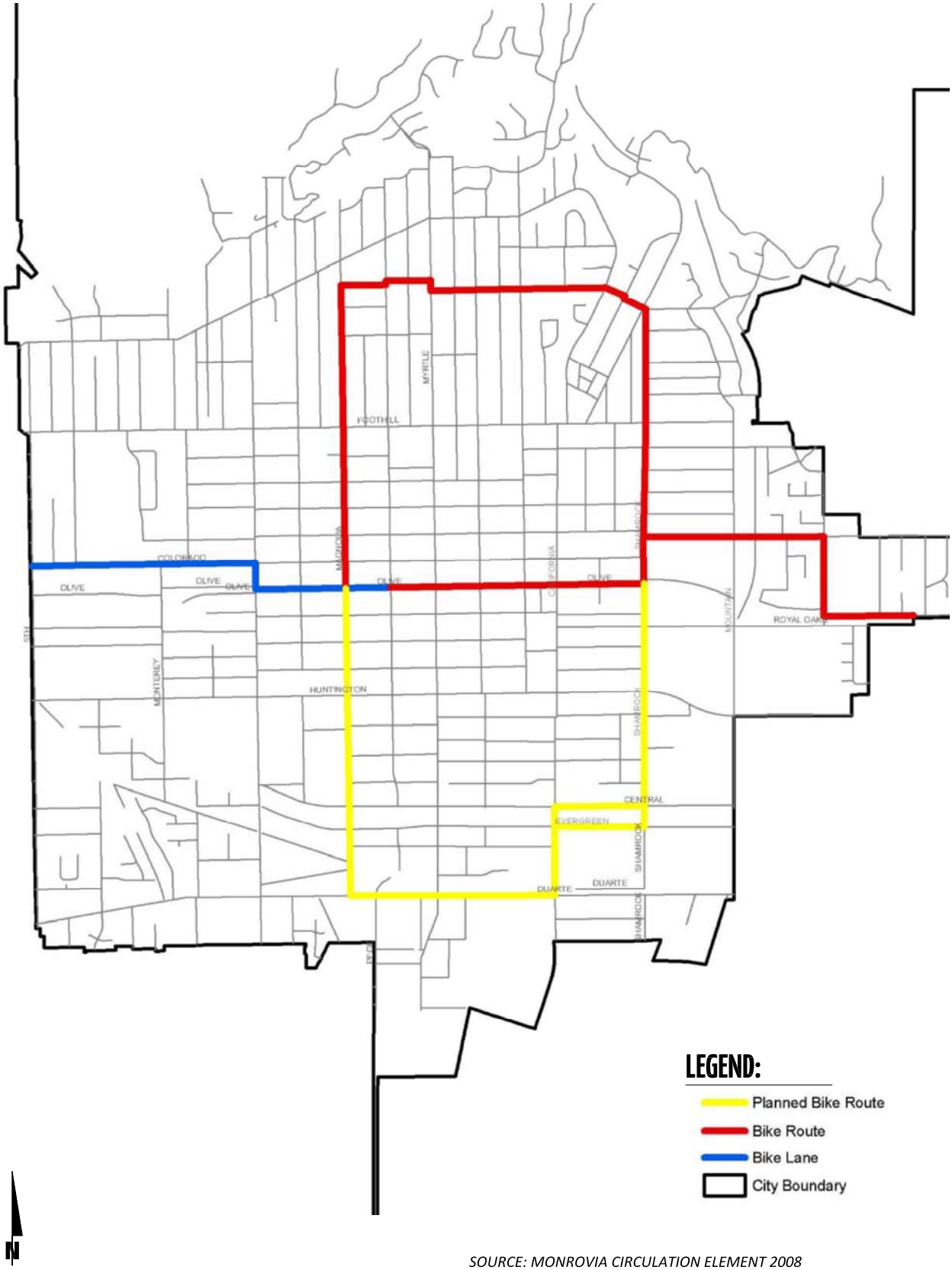
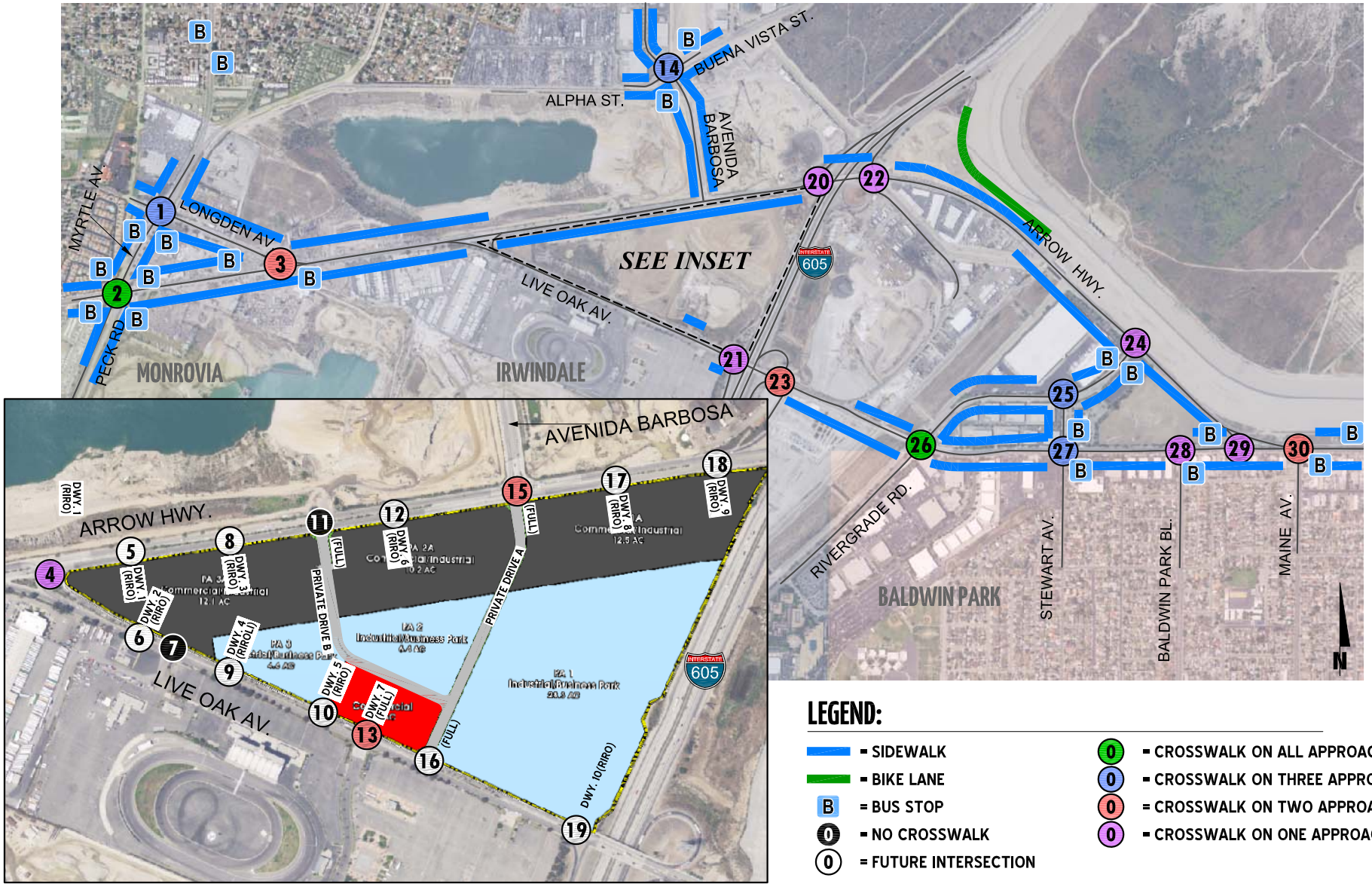
**EXHIBIT 3-12: CITY OF MONROVIA BIKE ROUTES**



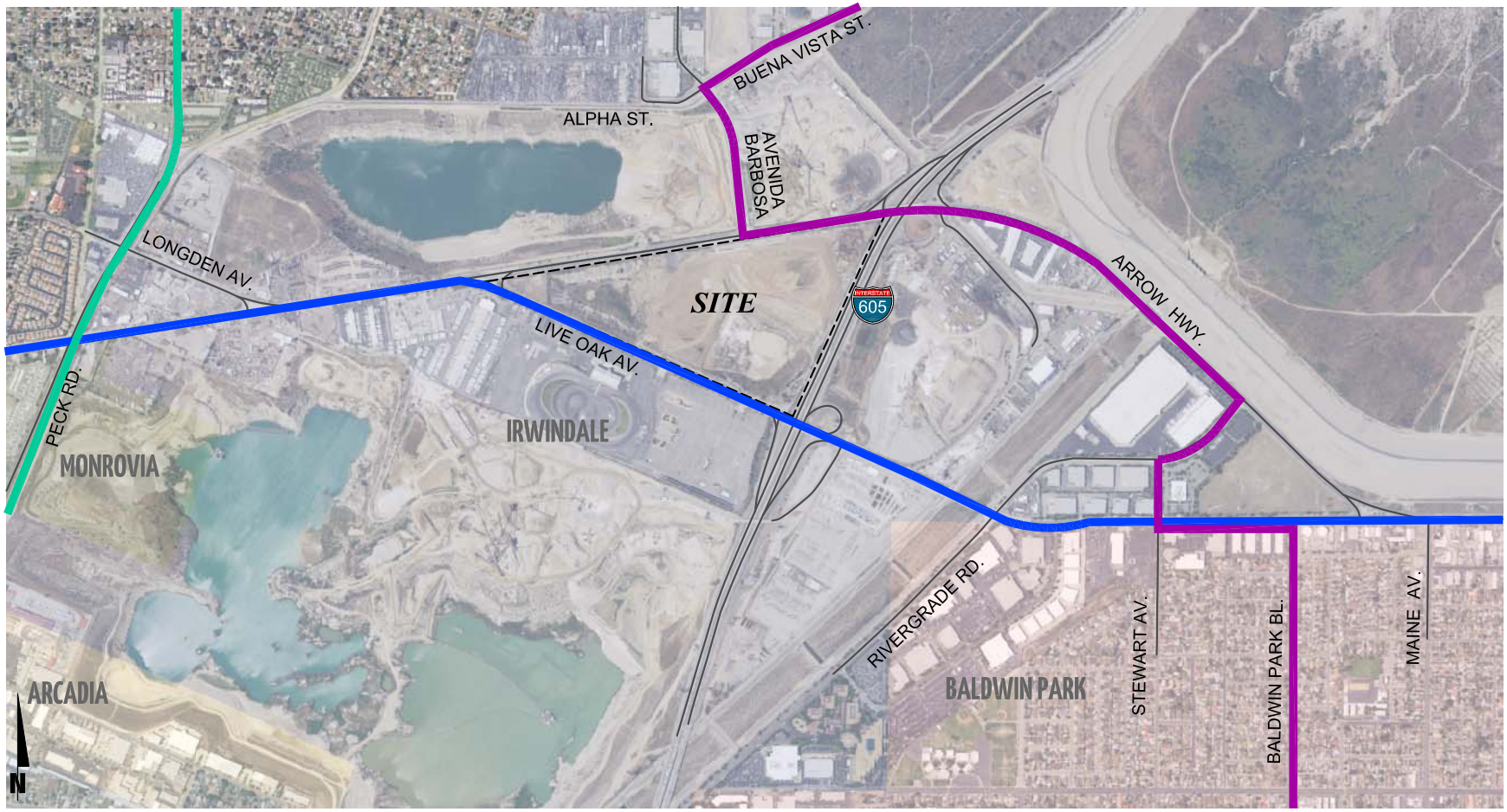

*SOURCE: MONROVIA CIRCULATION ELEMENT 2008*

*11110 - mgp.dwg*

## EXHIBIT 3-13: EXISTING PEDESTRIAN FACILITIES



## EXHIBIT 3-14: EXISTING TRANSIT ROUTES




**LEGEND:**

- = FOOTHILL TRANSIT LINE 492
- = FOOTHILL TRANSIT LINE 272
- = FOOTHILL TRANSIT LINE 270

Existing average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-15. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 10.88 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 9.19 percent. As such, the above equation utilizing a factor of 10.88 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 9.19 percent (i.e., 1/0.0919 = 10.88) and was assumed to sufficiently estimate ADT volumes for planning-level analyses.

Existing AM and PM peak hour intersection volumes are shown on Exhibit 3-16. All of the intersection turning movement volumes illustrated on the exhibits and used in the peak hour operations analyses are shown in terms of PCE.

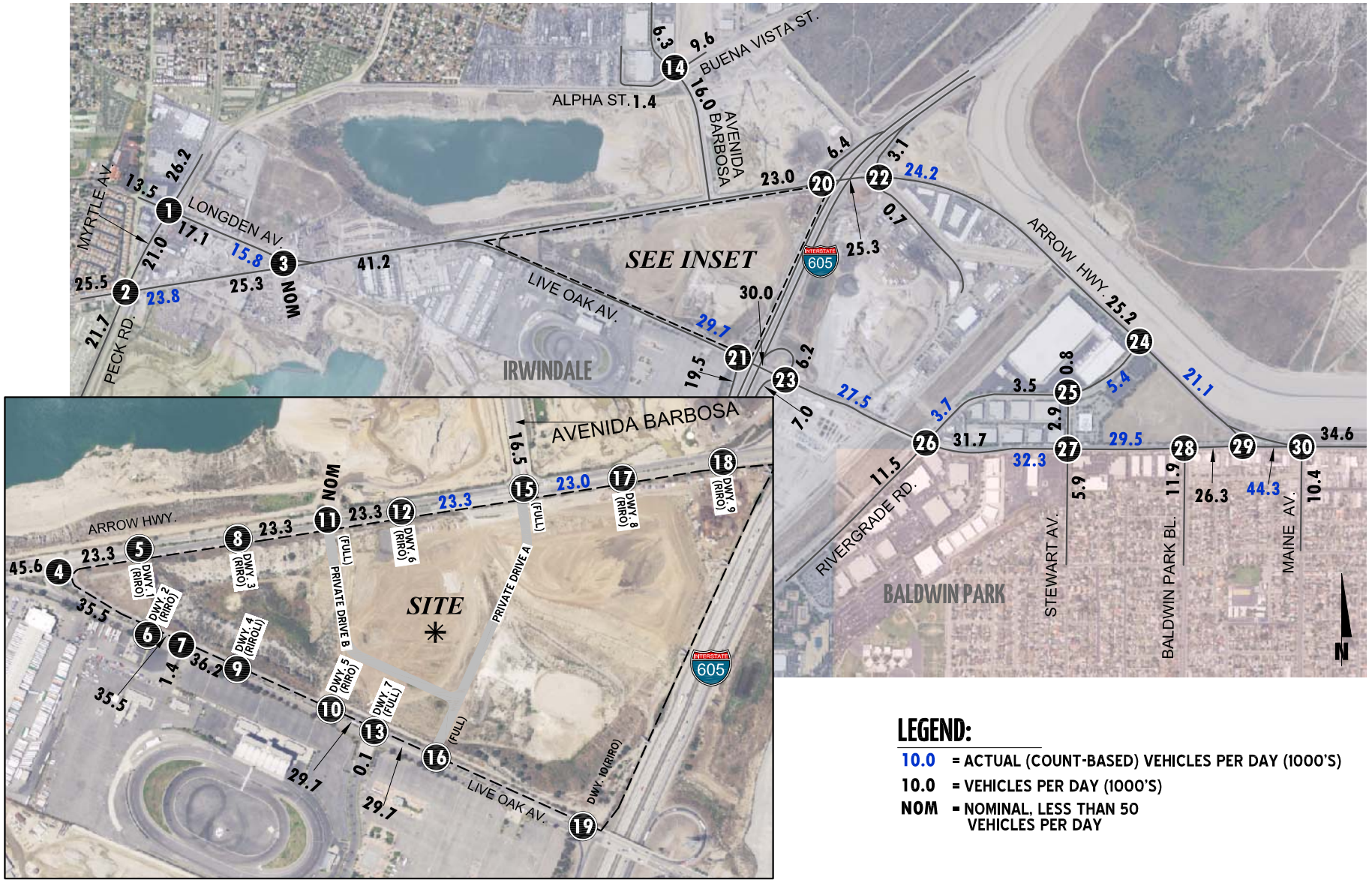
## 3.9 EXISTING CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that the following existing study area intersections are currently operating at an unacceptable LOS during the peak hours, based on each applicable jurisdiction's LOS criteria:

- Myrtle Avenue & Longden Avenue (#1) – LOS E PM peak hour only
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2) – LOS E PM peak hour only
- Live Oak Avenue & Arrow Highway (West) (#4) – LOS E AM peak hour only
- Speedway Driveway & Live Oak Avenue (#7) – LOS F PM peak hour only
- Avenida Barbosa & Arrow Highway (#15) – LOS F AM peak hour only
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23) – LOS F AM and PM peak hours
- Rivergrade Road & Live Oak Avenue (#26) – LOS F PM peak hour only

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions is shown on Exhibit 3-17. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

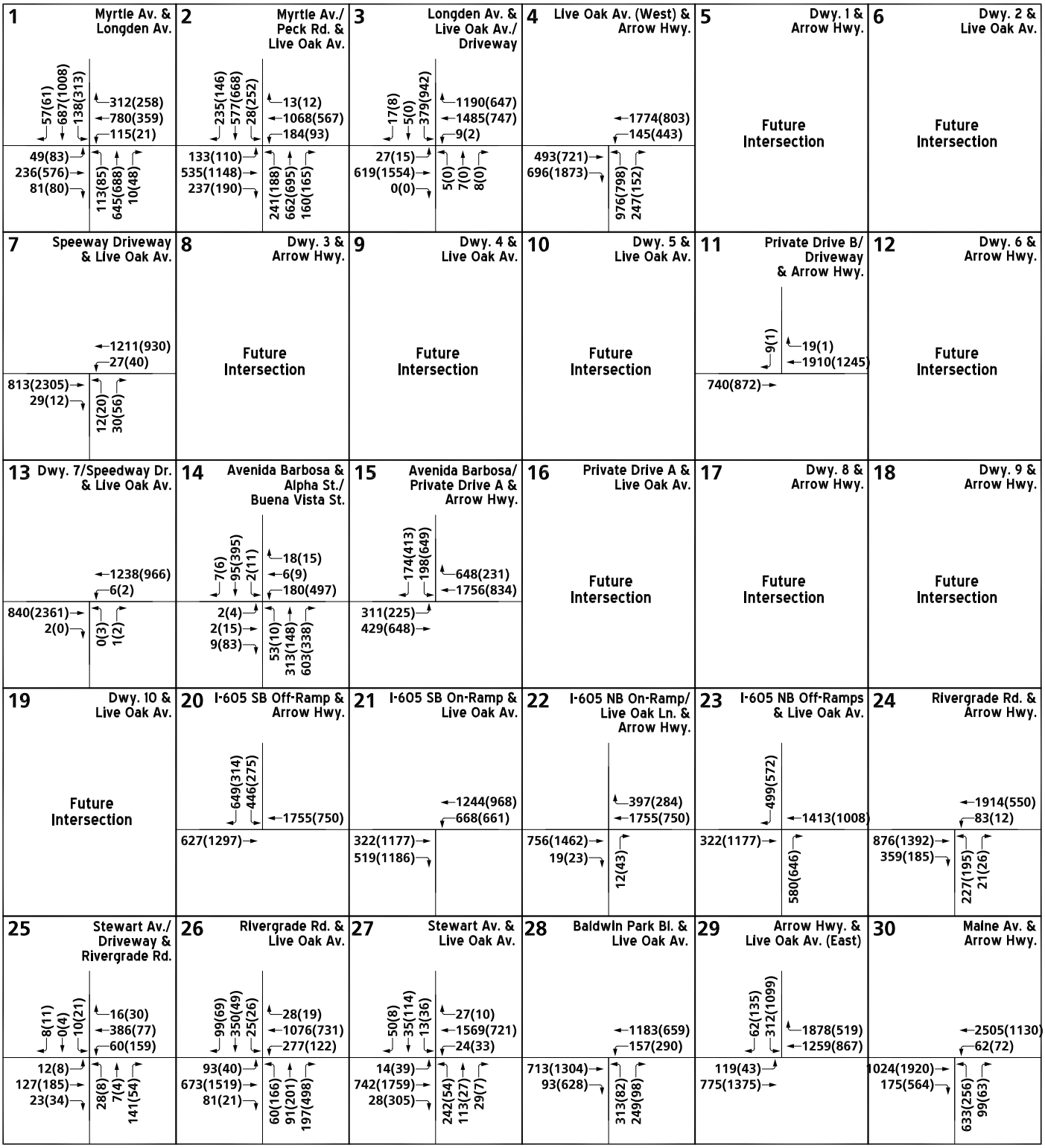
## EXHIBIT 3-15: EXISTING (2017) AVERAGE DAILY TRAFFIC (ADT)




## LEGEND:

| | |
|---|---|
| 10.0 | = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S) |
| 10.0 | = VEHICLES PER DAY (1000'S) |
| NOM | = NOMINAL, LESS THAN 50 VEHICLES PER DAY |

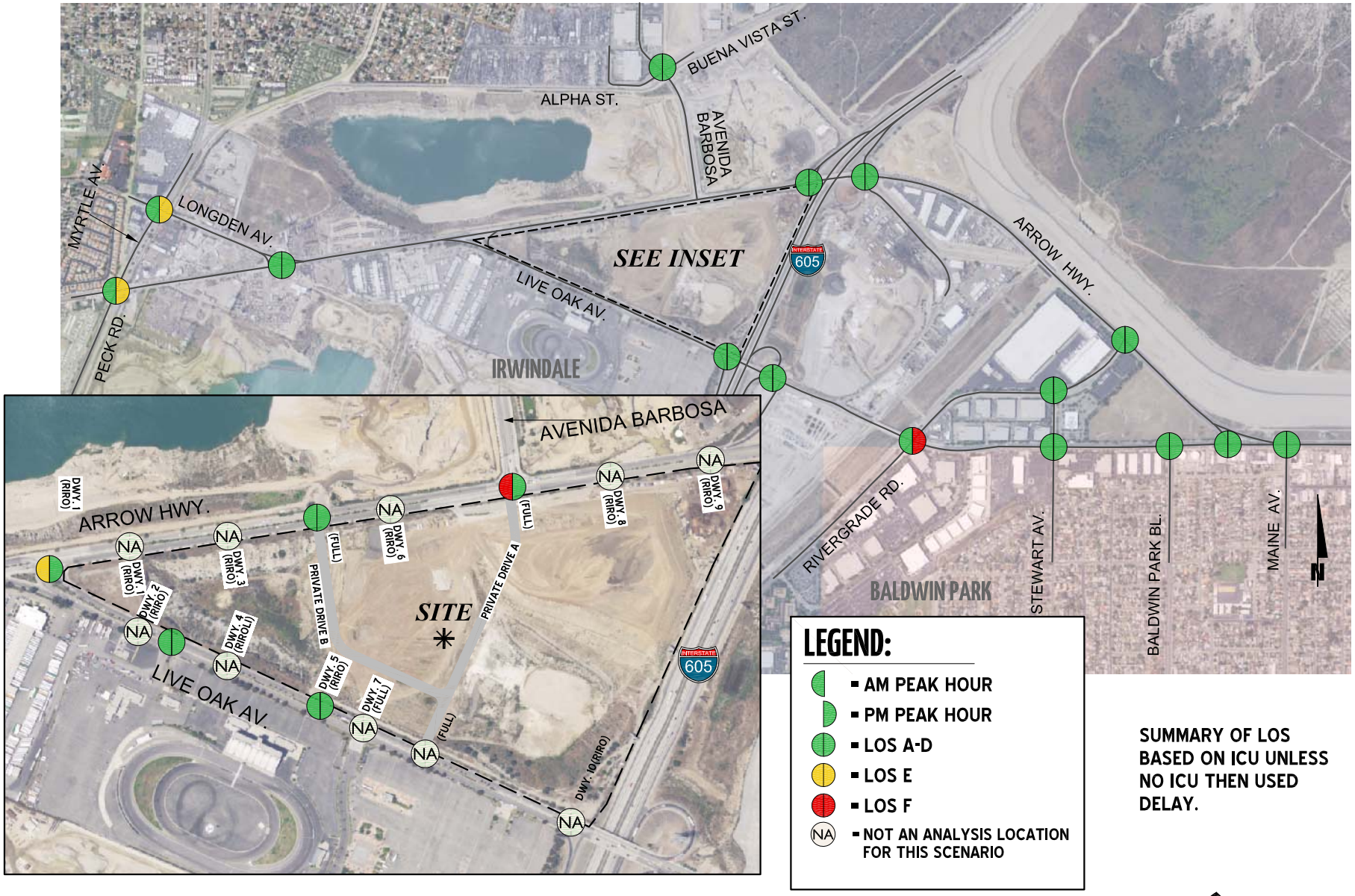
## EXHIBIT 3-16: EXISTING (2017) TRAFFIC VOLUMES (IN PCE)




## LEGEND:

**10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES**

## EXHIBIT 3-17: EXISTING (2017) SUMMARY OF LOS








URBAN CROSSROADS

## Table 3-1

**Intersection Analysis for Existing (2017) Conditions**

| # | Intersection | Traffic Control[4] | Intersection Approach Lanes[1] | | | | | | | | | | | | HCM Delay[2] (secs.) | | Level of Service | | ICU[3] (v/c) | | Level of Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | | | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | Not Applicable[7] | | | | 0.81 | **0.92** | D | **E** |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | Not Applicable[7] | | | | 0.88 | **0.94** | D | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | Not Applicable[7] | | | | 0.74 | 0.88 | C | D |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | Not Applicable[7] | | | | **0.99** | 0.69 | **E** | B |
| 5 | Dwy. 1 & Arrow Hwy. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 6 | Dwy. 2 & Live Oak Av. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 7 | Speedway Dwy. & Live Oak Av. | CSS | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 20.8 | **>100.0** | C | **F** | Not Applicable[5] | | | |
| 8 | Dwy. 3 & Arrow Hwy. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 9 | Dwy. 4 & Live Oak Av. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 10 | Dwy. 5 & Live Oak Av. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 11 | Driveway/Private Drive B & Arrow Hwy. | CSS | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 0.0 | 15.0 | A | C | Not Applicable[5] | | | |
| 12 | Dwy. 6 & Arrow Hwy. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | Not Applicable[7] | | | | 0.49 | 0.59 | A | A |
| 14 | Avenida Barbosa & Alpha St./Buena Vista St. | TS | 0 | 1 | 2> | 0 | 1 | d | 1 | 2 | d | 1 | 2 | d | Not Applicable[7] | | | | 0.51 | 0.72 | A | C |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | Not Applicable[7] | | | | **1.02** | 0.69 | **F** | B |
| 16 | Private Drive A & Live Oak Av. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 17 | Dwy. 8 & Arrow Hwy. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 18 | Dwy. 9 & Arrow Hwy. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 19 | Dwy. 10 & Live Oak Av. | | Future Intersection | | | | | | | | | | | | | | | | | | | |
| 20 | I-605 SB Off-Ramp & Arrow Hwy. | TS | 0 | 0 | 0 | 1 | 0 | 1>> | 0 | 3 | 0 | 0 | 2 | 0 | 17.7 | 7.6 | B | A | Not Applicable[6] | | | |
| 21 | I-605 SB On-Ramp & Live Oak Av. | TS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1>> | 1 | 2 | 0 | 6.0 | 14.3 | B | B | Not Applicable[6] | | | |
| 22 | I-605 NB On-Ramp/Live Oak Ln. & Arrow Hwy. | CSS | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 0 | 2 | 1 | 11.2 | 16.7 | B | C | Not Applicable[5,6] | | | |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | Not Applicable[5,6] | | | |
| 24 | Rivergrade Rd. & Arrow Hwy. | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 0 | Not Applicable[7] | | | | 0.79 | 0.61 | C | B |
| 25 | Stewart Av./Driveway & Rivergrade Rd. | TS | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | Not Applicable[7] | | | | 0.37 | 0.32 | A | A |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | Not Applicable[7] | | | | 0.71 | **1.04** | C | **F** |
| 27 | Stewart Av. & Live Oak Av. | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | Not Applicable[7] | | | | 0.90 | 0.80 | D | C |
| 28 | Baldwin Park Bl. & Live Oak Av. | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 2 | 0 | Not Applicable[7] | | | | 0.67 | 0.78 | B | C |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | Not Applicable[7] | | | | 0.69 | 0.90 | B | D |
| 30 | Maine Av. & Arrow Hwy. | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 3 | 0 | Not Applicable[7] | | | | 0.86 | 0.82 | D | D |

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

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

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free-Right Turn Lane; d= Defacto Right Turn Lane

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

[3] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio.

[4] TS = Traffic Signal; CSS = Cross-street Stop

[5] ICU not reported for intersections without a signal.

[6] ICU not reported for intersections under Caltrans' jurisdiction.

[7] HCM not reported for signalized intersections.

## 3.10 EXISTING CONDITIONS ROADWAY SEGMENT CAPACITY ANALYSIS

Table 3-2 provides a summary of the Existing (2017) conditions roadway segment capacity analysis based on the City of Irwindale Roadway Segment Capacity Thresholds. As shown on Table 3-2, the following study area roadway segments are currently operating at an unacceptable LOS based on the City's peak hour planning level roadway capacity thresholds:

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS D
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS D
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS F

## 3.11 EXISTING CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. For Existing traffic conditions, the following study area intersection currently warrants a traffic signal (See Appendix 3.3):

- Speedway Drive & Live Oak Avenue (#7)

## 3.11 EXISTING CONDITIONS FREEWAY OFF-RAMP QUEUING ANALYSIS

An off-ramp queuing analysis was performed for the I-605 off-ramp at Arrow Highway and Live Oak Avenue to assess vehicle queues that may potentially impact peak hour operations at the ramp-to-arterial intersections and "spill back" onto the I-605 Freeway mainline. Off-ramp queuing analysis findings are presented in Table 3-3. As shown on Table 3-3, there are no queuing issues on the I-605 Freeway off-ramps during the peak hours. Worksheets for Existing conditions queuing analysis are provided in Appendix 3.4.

## 3.12 EXISTING CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS

Existing mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 3-18 for the I-605 Freeway north of Arrow Highway Avenue to south of Live Oak Avenue. As shown on Table 3-4, the I-605 Freeway segments analyzed for this study were found to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing traffic conditions. Existing basic freeway segment analysis worksheets are provided in Appendix 3.5.

It should be noted that although the I-605 Northbound Freeway mainline is found to operate at an acceptable LOS, according to Caltrans PeMS, the average speed along these freeway segments is 17 mph during the PM peak hour only. However, the reported LOS is acceptable due to constrained traffic flow conditions. In other words, the freeway is slow moving at 17 mph during the PM peak hours, therefore, not as many vehicles are passing by and being reported in the PeMS data. As a result, the LOS is reported as acceptable, however, the freeway is considered at capacity during the evening peak commute hours (i.e., LOS E or worse).

**Table 3-2**

**Roadway Segment Analysis for Existing (2017) Conditions**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | Existing 2017 | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 17,118 | **0.86** | **D** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | 4D | 30,000 | 23,789 | 0.79 | C |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 41,218 | 0.78 | C |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | 4D | 30,000 | 23,304 | 0.78 | C |
| 5 | | Dwy. 1 to Dwy. 3 | 4D | 30,000 | 23,304 | 0.78 | C |
| 6 | | Dwy. 3 to Driveway/Private Drive B | 4D | 30,000 | 23,304 | 0.78 | C |
| 7 | | Driveway/Private Drive B to Dwy. 6 | 5D | 37,500 | 23,304 | 0.62 | B |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | 5D | 37,500 | 23,304 | 0.62 | B |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | 4D | 30,000 | 23,035 | 0.77 | C |
| 10 | | Dwy. 8 to Dwy. 9 | 4D | 30,000 | 23,035 | 0.77 | C |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | 4D | 30,000 | 23,035 | 0.77 | C |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 25,255 | **0.84** | **D** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 24,237 | **0.81** | **D** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 21,137 | 0.70 | B |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 15,981 | 0.80 | C |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | 5D | 46,700 | 35,519 | 0.76 | C |
| 20 | | Dwy. 2 to Speedway Dwy. | 5D | 46,700 | 35,519 | 0.76 | C |
| 21 | | Speedway Dwy. to Dwy. 4 | 5D | 46,700 | 29,664 | 0.64 | B |
| 22 | | Dwy. 4 to Dwy. 5 | 5D | 46,700 | 29,664 | 0.64 | B |
| 23 | | Dwy. 5 to Dwy. 7 | 5D | 46,700 | 29,664 | 0.64 | B |
| 24 | | Dwy. 7 to Private Drive A | 5D | 46,700 | 29,664 | 0.64 | B |
| 25 | | Private Drive A to Dwy. 10 | 5D | 46,700 | 29,664 | 0.64 | B |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | 5D | 46,700 | 29,664 | 0.64 | B |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 29,982 | 0.74 | C |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 27,508 | 0.68 | B |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 32,254 | 0.69 | B |
| 30 | | Stewart Av. to Baldwin Park Bl. | 4D | 40,400 | 29,466 | 0.73 | C |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | 4D | 40,400 | 26,310 | 0.65 | B |
| 32 | | Arrow Hwy. to Maine Av. | 4D | 40,400 | 44,296 | **1.10** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 5,363 | 0.27 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 3,699 | 0.18 | A |

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

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

**Table 3-3**

**Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2017) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 95th Percentile Queue (Feet) | | Acceptable? [1] | |
|---|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | AM | PM |
| I-605 SB Off-Ramp / Arrow Hwy. | SBLT | 960 | 377 | 151 | Yes | Yes |
| I-605 NB Off-Ramps / Live Oak Av. | NBR | 1,920 | 148 | 588 | Yes | Yes |
| | SBR | 2,650 | 488 | 328 | Yes | Yes |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

**Table 3-4**

**Basic Freeway Segment Analysis for Existing (2017) Conditions**

| Freeway | Direction | Mainline Segment | Lanes[1] | Volume | | Truck % | Truck % | Density[2] | | LOS[3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM | PM | AM | PM | AM | PM | AM | PM |
| I-605 | SB | North of Arrow Hwy. | 4 | 5,922 | 4,987 | 5% | 4% | 25.1 | 20.3 | C | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 4,897 | 4,449 | 5% | 4% | 20.1 | 18.0 | C | B |
| | | South of Live Oak Av. | 4 | 5,820 | 6,130 | 8% | 5% | 25.5 | 26.3 | C | D |
| | NB | North of Arrow Hwy. | 4 | 4,568 | 4,330 | 10% | 14% | 19.6 | 19.2 | C | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 3,981 | 3,977 | 10% | 15% | 17.0 | 17.7 | B | B |
| | | South of Live Oak Av. | 4 | 4,883 | 5,121 | 10% | 13% | 21.1 | 23.0 | C | C |

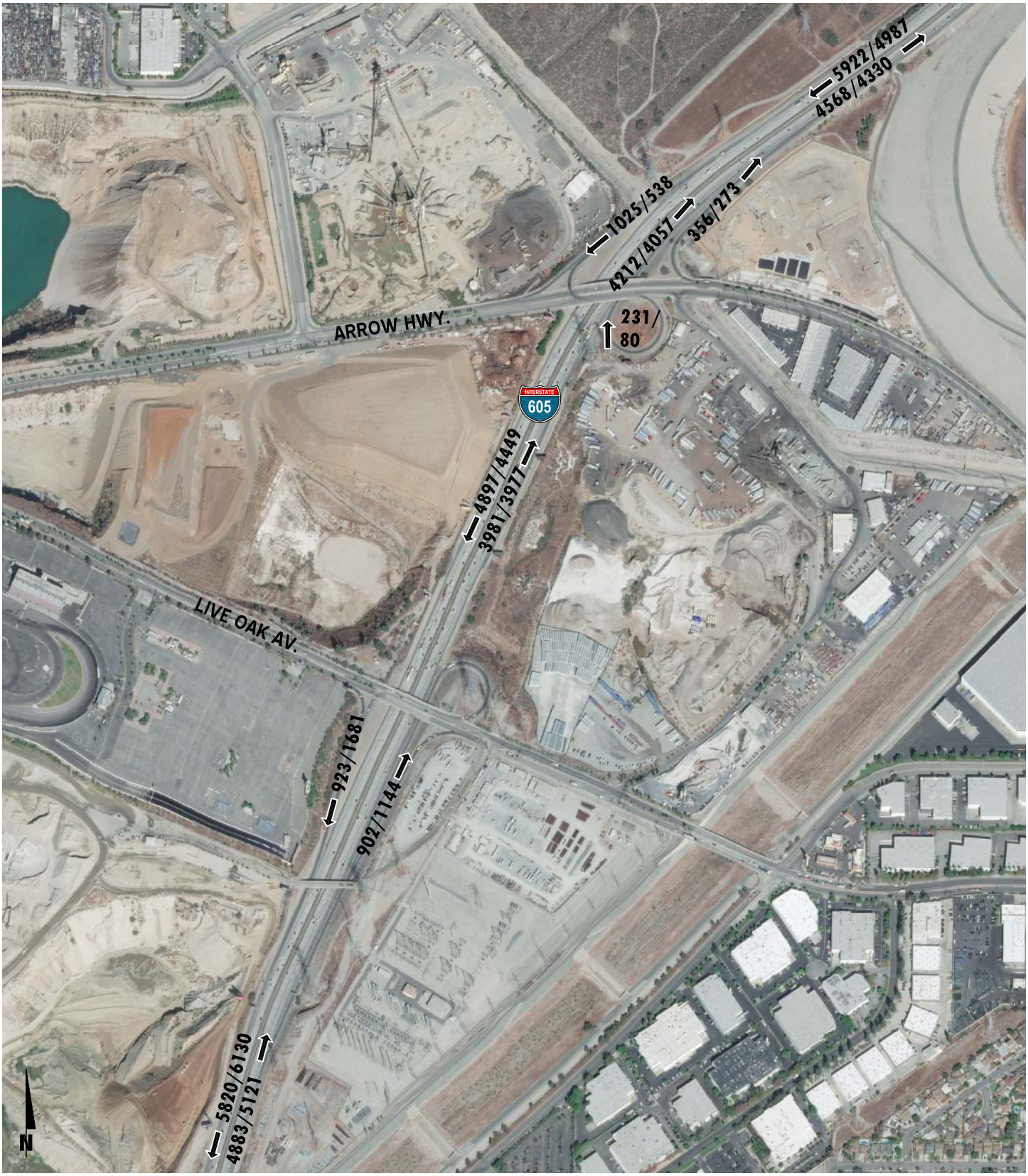
* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

## EXHIBIT 3-18: EXISTING (2017) FREEWAY MAINLINE VOLUMES



## 3.13 EXISTING CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing conditions and the results of this analysis are presented in Table 3-5. As shown in Table 3-5, the I-605Freeway ramp merge/diverge ramp junctions are currently operating at LOS D or better during the peak hours under Existing traffic conditions. Existing freeway ramp junction operations worksheets are provided in Appendix 3.6.

**Table 3-5**

**Freeway Ramp Junction Merge/Diverge Analysis for Existing (2017) Conditions**

| Freeway | Direction | Ramp or Segment | Lanes on Freeway[1] | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|
| | | | | Density[2] | LOS[3] | Density[2] | LOS[3] |
| I-605 | SB | Off-Ramp at Arrow Hwy. | 4 | 25.6 | D | 20.7 | C |
| | | On-Ramp at Live Oak Av. | 4 | 25.9 | D | 27.2 | D |
| | NB | On-Ramp at Arrow Hwy. | 4 | 20.2 | C | 19.8 | C |
| | | Loop On-Ramp at Arrow Hwy. | 4 | 18.6 | B | 18.5 | B |
| | | Off-Ramp at Live Oak Av. | 4 | 22.0 | D | 24.0 | D |

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

# 4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. For purposes of this TIA, the Project is assumed to include the following mix of land uses within four PAs:

- PA 1: 412,500 square feet High-Cube Fulfillment Center Warehouse[1]
- PA 1: 412,500 square feet of High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)
- PA 1A: 8,700 square feet of Fast Food Restaurant with Drive-through Window
- PA 1A: 12,000 square feet of Fast Food Restaurant without Drive-through Window
- PA 1A: 12,000 square feet of Shopping Center use
- PA 1A: 8 vehicle fueling position Gas Station with Convenience Market
- PA 2/PA 2A: 218,400 square feet of High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)
- PA 2/PA 2A: 54,600 square feet of General Light Industrial
- PA 2/PA 2A: 60,000 square feet of Warehousing
- PA 3: 102,000 square feet of Manufacturing
- PA 3: 191,400 square feet of Warehousing
- PA 3A: 3,000 square feet of Coffee-shop with Drive-Through Window
- PA 3A: 7,000 square feet of Fast Food Restaurant without Drive-through Window
- PA 3A: 10,500 square feet of Shopping Center use
- PA 4: 47,000 square feet of Shopping Center use

[1] It should be noted that up to 387,500 square feet of High-Cube Warehouse (With Cold Storage) may be developed in lieu of 387,500 square feet of High-Cube Fulfillment Center Warehouse use or a combination of High-Cube Fulfillment Center Warehouse, Warehousing, and/or Manufacturing uses. The uses identified above have been evaluated for the purposes of this TIA.

The land use assumptions are based on the list of permitted uses specified for each PA by the Specific Plan. This TIA is focused on the evaluation of potential traffic impacts based on trip generation estimates that were developed to be conservative and provide flexibility for the placement, sizing, and design of specific buildings that will be developed in the Specific Plan area. Actual development proposals for the Project may differ slightly from that listed here, but would be required to adhere to the overall trip generation cap identified and evaluated by this TIA. Land use assumptions evaluated for the purposes of this TIA are conservative in nature in order to evaluate the maximum potential impacts. It should be noted that although for the purposes of this TIA the total commercial retail square footage totals 53,200 square feet, the Specific Plan identifies a maximum square footage of 51,600 square feet within PA 1A, PA 2A, and PA 3A.

The anticipated Opening Year for the Project is 2020. The Project is proposed to access to both Arrow Highway and Live Oak Avenue. Regional access to the Project site will be provided by the I-605 Freeway via Arrow Highway and Live Oak Avenue.

## 4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon

forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

The Institute of Transportation Engineers (ITE)Trip Generation Manual is a nationally recognized source for estimating site specific trip generation. The trip generation rates used for the Project are based upon data collected by ITE in their Trip Generation Manual, 10th Edition, 2017. [3]

Brief descriptions of the proposed Project land uses are provided below:

General Light Industrial (ITE 110): A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space.

Manufacturing (ITE 140): A manufacturing facility is an area where the primary activity is the conversion of raw materials or parts into finished products. Size and type of activity may vary substantially from one facility to another. In addition to the actual production of goods, manufacturing facility generally also have office, warehouse, research, and associated functions.

Warehousing (ITE 150): Warehouses are primarily devoted to the storage of materials, but they may also include office and maintenance areas. High-cube warehouse/distribution center and business park are related uses.

A high-cube warehouse is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24-feet or more, and is used primarily for the storage and/or consolidation of manufactured goods prior to their distribution to retail locations or other warehouses. A typical high-cube warehouse has a high level of on-site automation and logistics management which enable highly efficient process of goods.

High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage) (ITE 154): Transload facilities have a primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. They typically have little storage duration, high throughput, and are high-efficiency facilities. Short-term high-cube warehouses are high-efficiency distribution facilities often with custom/special features built into structure movement of large volumes of freight with only short-term storage of products.

High-Cube Fulfillment Center Warehouse (ITE 155): High-cube fulfillment center warehouses include warehouses characterized by a significant storage function and direct distribution of ecommerce product to end users. These facilities typically handle smaller packages and quantities than other types of high-cube warehouses and often contain multiple mezzanine levels.

Shopping Center (ITE 820): Shopping centers are an integrated group of commercial establishments that are planned, developed, and owned and managed as a unit. Shopping centers include neighborhood centers, community centers, regional centers, and super regional centers. These centers often include non-merchandising facilities such as office buildings, movie theaters, restaurants, post offices, banks, health clubs, and recreational facilities.

Fast-Food Restaurant without Drive-Through Window (ITE 933): This land use includes fast-food restaurants without drive-through windows. These types of restaurants are characterized by a large carry-out clientele, long hours of service, and high turnover rates for dine-in customers. They generally do not provide table service.

Fast-Food Restaurant with Drive-Through Window (ITE 934): This category includes fast-food restaurants with drive-through windows. This type of restaurant is characterized by a large drive-through clientele, long hours of service, and high turnover rates for eat-in customers.

Coffee/Donut Shop with Drive-Through Window (ITE 937): This land use includes single-tenant coffee and donut restaurants with drive-through windows. Freshly brewed coffee and a variety of coffee-related accessories are the primary retail products sold at these sites. The coffee and donut shops contained in this land use typically hold long store hours with an early morning opening.

Gasoline Station with Convenience Market (ITE 945): This land use includes gasoline/service stations with convenience markets where the primary business is the fueling of motor vehicles. These service stations may also have ancillary facilities for servicing and repairing motor vehicles and may have a car wash.

PCE factors have been applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). Consistent with standard traffic engineering practice in Southern California, PCE factors have been utilized due to the expected heavy truck component for the proposed Project land use. PCE factors allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, for the purposes of capacity and level of service analyses. PCE factors are applied to large truck types such as large two-axles, three-axles, 4+-axles. A PCE factor of 1.5 has been applied to large 2-axle trucks, a factor of 2.0 for 3-axle trucks and a factor of 3.0 for 4+-axle trucks.

Pass-by trips are defined as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. These types of trips are many times associated with retail uses such as fast-food restaurants and gas stations. As the Project is proposed to include these types of land uses, pass-by percentages have been obtained from the ITE Trip Generation Handbook for each applicable land use. [12]

Trip generation rates used to estimate traffic generated by the Project in terms of PCE and actual vehicles are shown in Table 4-1. As shown on Table 4-2, the Project would generate a net total of approximately 15,867 PCE trip ends per day with 1,280 PCE AM peak hour trips and 1,644 PCE PM peak hour trips. A summary of trip generation for the Project in terms of actual vehicles is shown in Table 4-3; which indicates the Project would generate a net total of approximately 14,607 trip-ends per day with 1,198 AM peak hour trips and 1,562 PM peak hour trips.

**Table 4-1**



**Project Trip Generation Rates**

| Land Use[1] | Units[2] | ITE LU Code | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Actual Vehicle Trip Generation Rates** | | | | | | | | | |
| General Light Industrial[5] | TSF | 110 | 0.616 | 0.084 | 0.700 | 0.082 | 0.548 | 0.630 | 4.960 |
| Passenger Cars (78.6%) | | | 0.484 | 0.066 | 0.550 | 0.064 | 0.431 | 0.495 | 3.899 |
| 2-Axle Trucks (8.0%) | | | 0.049 | 0.007 | 0.056 | 0.007 | 0.044 | 0.050 | 0.397 |
| 3-Axle Trucks (3.9%) | | | 0.024 | 0.003 | 0.027 | 0.003 | 0.021 | 0.025 | 0.193 |
| 4-Axle+ Trucks (9.5%) | | | 0.059 | 0.008 | 0.067 | 0.008 | 0.052 | 0.060 | 0.471 |
| Manufacturing[5] | TSF | 140 | 0.477 | 0.143 | 0.620 | 0.208 | 0.462 | 0.670 | 3.930 |
| Passenger Cars (79.57%) | | | 0.380 | 0.113 | 0.493 | 0.165 | 0.368 | 0.533 | 3.127 |
| 2-Axle Trucks (3.46%) | | | 0.017 | 0.005 | 0.021 | 0.007 | 0.016 | 0.023 | 0.136 |
| 3-Axle Trucks (4.64%) | | | 0.022 | 0.007 | 0.029 | 0.010 | 0.021 | 0.031 | 0.182 |
| 4-Axle+ Trucks (12.33%) | | | 0.059 | 0.018 | 0.076 | 0.026 | 0.057 | 0.083 | 0.485 |
| Warehousing[3] | TSF | 150 | 0.131 | 0.039 | 0.170 | 0.051 | 0.139 | 0.190 | 1.740 |
| Passenger Cars (80.0%) | | | 0.105 | 0.031 | 0.136 | 0.041 | 0.111 | 0.152 | 1.392 |
| 2-Axle Trucks (3.34%) | | | 0.004 | 0.001 | 0.005 | 0.002 | 0.005 | 0.007 | 0.058 |
| 3-Axle Trucks (4.14%) | | | 0.005 | 0.002 | 0.007 | 0.002 | 0.006 | 0.008 | 0.072 |
| 4-Axle+ Trucks (12.52%) | | | 0.016 | 0.005 | 0.021 | 0.006 | 0.017 | 0.023 | 0.218 |
| High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)[4] | TSF | 154 | 0.062 | 0.018 | 0.080 | 0.028 | 0.072 | 0.100 | 1.400 |
| Passenger Cars (AM-69.2%; PM-78.3%; Daily-67.8%) | | | 0.043 | 0.013 | 0.055 | 0.022 | 0.056 | 0.078 | 0.949 |
| 2-Axle Trucks (AM-5.14%; PM-3.62%; Daily-5.38%) | | | 0.003 | 0.001 | 0.004 | 0.001 | 0.003 | 0.004 | 0.075 |
| 3-Axle Trucks (AM-6.38%; PM-4.49%; Daily-6.67%) | | | 0.004 | 0.001 | 0.005 | 0.001 | 0.003 | 0.004 | 0.093 |
| 4-Axle+ Trucks (AM-19.25%; PM-13.56%; Daily-20.13%) | | | 0.012 | 0.004 | 0.015 | 0.004 | 0.010 | 0.014 | 0.282 |
| High-Cube Fulfillment Center Warehouse[4] | TSF | 155 | 0.454 | 0.136 | 0.590 | 0.384 | 0.986 | 1.370 | 8.180 |
| Passenger Cars (AM-97.2%; PM-98.2%; Daily-91.2%) | | | 0.442 | 0.132 | 0.573 | 0.377 | 0.969 | 1.345 | 7.460 |
| 2-Axle Trucks (AM-0.47%; PM-0.30%; Daily-1.47%) | | | 0.002 | 0.001 | 0.003 | 0.001 | 0.003 | 0.004 | 0.120 |
| 3-Axle Trucks (AM-0.58%; PM-0.37%; Daily-1.82%) | | | 0.003 | 0.001 | 0.003 | 0.001 | 0.004 | 0.005 | 0.149 |
| 4-Axle+ Trucks (AM-1.75%; PM-1.13%; Daily-5.50%) | | | 0.008 | 0.002 | 0.010 | 0.004 | 0.011 | 0.015 | 0.450 |
| Retail | TSF | 820 | 0.583 | 0.357 | 0.940 | 1.829 | 1.981 | 3.810 | 37.750 |
| Retail[6] | TSF | 820 | 2.310 | 1.420 | 3.730 | 3.170 | 3.440 | 6.610 | 76.550 |
| Fast Food w/o Drive Thru | TSF | 933 | 15.060 | 10.040 | 25.100 | 14.170 | 14.170 | 28.340 | 346.230 |
| Fast Food w/ Drive Thru | TSF | 934 | 20.497 | 19.693 | 40.190 | 16.988 | 15.682 | 32.670 | 470.950 |
| Coffee/Donut Shop w/ Drive Thru | TSF | 937 | 45.385 | 43.605 | 88.990 | 21.690 | 21.690 | 43.380 | 820.380 |
| Gasoline Station w/ Market | VFP | 945 | 10.135 | 10.130 | 20.270 | 11.180 | 11.180 | 22.360 | 198.160 |

**Table 4-1**



**Project Trip Generation Rates**

| Land Use[1] | Units[2] | ITE LU Code | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| **Passenger Car Equivalent (PCE) Trip Generation Rates[5]** | | | | | | | | | |
| General Light Industrial[5] | TSF | 110 | 0.616 | 0.084 | 0.700 | 0.082 | 0.548 | 0.630 | 4.960 |
| Passenger Cars (78.6%) | | | 0.484 | 0.066 | 0.550 | 0.064 | 0.431 | 0.495 | 3.899 |
| 2-Axle Trucks (8.0%) (PCE = 1.5) | | | 0.074 | 0.010 | 0.084 | 0.010 | 0.066 | 0.076 | 0.595 |
| 3-Axle Trucks (3.9%) (PCE = 2.0) | | | 0.048 | 0.007 | 0.055 | 0.006 | 0.043 | 0.049 | 0.387 |
| 4-Axle+ Trucks (9.5%) (PCE = 3.0) | | | 0.176 | 0.024 | 0.200 | 0.023 | 0.156 | 0.180 | 1.414 |
| Manufacturing[5] | TSF | 140 | 0.477 | 0.143 | 0.620 | 0.208 | 0.462 | 0.670 | 3.930 |
| Passenger Cars (79.57%) | | | 0.380 | 0.113 | 0.493 | 0.165 | 0.368 | 0.533 | 3.127 |
| 2-Axle Trucks (3.46%) (PCE = 1.5) | | | 0.025 | 0.007 | 0.032 | 0.011 | 0.024 | 0.035 | 0.204 |
| 3-Axle Trucks (4.64%) (PCE = 2.0) | | | 0.044 | 0.013 | 0.058 | 0.019 | 0.043 | 0.062 | 0.365 |
| 4-Axle+ Trucks (12.33%) (PCE = 3.0) | | | 0.177 | 0.053 | 0.229 | 0.077 | 0.171 | 0.248 | 1.454 |
| Warehousing[3] | TSF | 150 | 0.131 | 0.039 | 0.170 | 0.051 | 0.139 | 0.190 | 1.740 |
| Passenger Cars (80.0%) | | | 0.105 | 0.031 | 0.136 | 0.041 | 0.111 | 0.152 | 1.392 |
| 2-Axle Trucks (3.34%) (PCE = 1.5) | | | 0.006 | 0.002 | 0.008 | 0.003 | 0.008 | 0.011 | 0.087 |
| 3-Axle Trucks (4.14%) (PCE = 2.0) | | | 0.010 | 0.004 | 0.014 | 0.004 | 0.012 | 0.016 | 0.144 |
| 4-Axle+ Trucks (12.52%) (PCE = 3.0) | | | 0.048 | 0.015 | 0.063 | 0.018 | 0.051 | 0.069 | 0.654 |
| High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage)[4] | TSF | 154 | 0.062 | 0.018 | 0.080 | 0.028 | 0.072 | 0.100 | 1.400 |
| Passenger Cars (AM-69.2%; PM-78.3%; Daily-67.8%) | | | 0.043 | 0.013 | 0.055 | 0.022 | 0.056 | 0.078 | 0.949 |
| 2-Axle Trucks (AM-5.14%; PM-3.62%; Daily-5.38%) (PCE = 1.5) | | | 0.005 | 0.001 | 0.006 | 0.002 | 0.004 | 0.005 | 0.113 |
| 3-Axle Trucks (AM-6.38%; PM-4.49%; Daily-6.67%) (PCE = 2.0) | | | 0.008 | 0.002 | 0.010 | 0.003 | 0.006 | 0.009 | 0.187 |
| 4-Axle+ Trucks (AM-19.25%; PM-13.56%; Daily-20.13%) (PCE = 3.0) | | | 0.036 | 0.011 | 0.046 | 0.011 | 0.029 | 0.041 | 0.845 |
| High-Cube Fulfillment Center Warehouse[4] | TSF | 155 | 0.454 | 0.136 | 0.590 | 0.384 | 0.986 | 1.370 | 8.180 |
| Passenger Cars (AM-97.2%; PM-98.2%; Daily-91.2%) | | | 0.442 | 0.132 | 0.573 | 0.377 | 0.969 | 1.345 | 7.460 |
| 2-Axle Trucks (AM-0.47%; PM-0.30%; Daily-1.47%) (PCE = 1.5) | | | 0.003 | 0.001 | 0.004 | 0.002 | 0.004 | 0.006 | 0.180 |
| 3-Axle Trucks (AM-0.58%; PM-0.37%; Daily-1.82%) (PCE = 2.0) | | | 0.007 | 0.002 | 0.009 | 0.004 | 0.009 | 0.013 | 0.373 |
| 4-Axle+ Trucks (AM-1.75%; PM-1.13%; Daily-5.50%) (PCE = 3.0) | | | 0.024 | 0.007 | 0.031 | 0.013 | 0.033 | 0.046 | 1.350 |

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

[2] TSF = thousand square feet; VFP = Vehicle Fueling Position

[3] Vehicle Mix Source: Truck mix (by axle type) source from City of Fontana Truck Trip Generation Study (August 2003). PCE rates are per SBCTA.

[4] Vehicle Mix Source: High Cube Warehouse Vehicle Trip Generation Analysis, October 2016, ITE.

Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type for high-cube warehouse. PCE rates are per SBCTA.

[5] Vehicle Mix Source: Truck mix (by axle type) source from City of Fontana Truck Trip Generation Study (August 2003). PCE rates are per SBCTA.

[6] Trip generation rates based on the regression equation for the commercial retail site in PA 4.

**Table 4-2**



**Project Trip Generation Summary (PCE)**

| Land Use | Quantity | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| Planning Area 1: High-Cube Fulfillment Center Warehouse | 412.500 | TSF | | | | | | | |
| Passenger Cars: | | | 182 | 54 | 236 | 155 | 400 | 555 | 3,077 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 1 | 2 | 3 | 74 |
| 3-axle: | | | 3 | 1 | 4 | 1 | 4 | 5 | 154 |
| 4+-axle: | | | 10 | 3 | 13 | 5 | 14 | 19 | 557 |
| - Net Truck Trips | | | 14 | 4 | 18 | 7 | 20 | 27 | 785 |
| Planning Area 1: High-Cube Warehouse (Without Cold Storage) | 412.500 | TSF | | | | | | | |
| Passenger Cars: | | | 18 | 5 | 23 | 9 | 23 | 32 | 392 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 2 | 1 | 3 | 1 | 2 | 3 | 47 |
| 3-axle: | | | 3 | 1 | 4 | 1 | 3 | 4 | 77 |
| 4+-axle: | | | 15 | 4 | 19 | 5 | 12 | 17 | 349 |
| - Net Truck Trips | | | 20 | 6 | 26 | 7 | 17 | 24 | 473 |
| ***PLANNING AREA 1 TOTAL NET TRIPS (PCE)*** [2] | | | **234** | **69** | **303** | **178** | **460** | **638** | **4,727** |
| Planning Area 1A: Fast Food With Drive-Thru | 8.700 | TSF | 178 | 171 | 349 | 148 | 136 | 284 | 4,097 |
| Pass-By (49% AM, 50% PM/Daily): | | | -84 | -84 | -168 | -68 | -68 | -136 | -2,049 |
| Planning Area 1A: Fast Food Without Drive-Thru | 12.000 | TSF | 181 | 120 | 301 | 170 | 170 | 340 | 4,155 |
| Pass-By (49% AM, 50% PM/Daily): | | | -59 | -59 | -118 | -83 | -83 | -166 | -2,078 |
| Planning Area 1A: Commercial Retail | 12.000 | TSF | 7 | 4 | 11 | 22 | 24 | 46 | 453 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -7 | -7 | -14 | -154 |
| Planning Area 1A: Gas Station w/ Market | 8 | VFP | 81 | 81 | 162 | 89 | 89 | 178 | 1,585 |
| Pass-By (62% am, 56% PM/Daily): | | | -50 | -50 | -100 | -50 | -50 | -100 | -888 |
| ***PLANNING AREA 1A TOTAL NET TRIPS*** | | | **254** | **183** | **437** | **221** | **211** | **432** | **5,122** |
| Planning Area 2: High-Cube Warehouse (Without Cold Storage) | 218.400 | TSF | | | | | | | |
| Passenger Cars: | | | 9 | 3 | 12 | 5 | 12 | 17 | 207 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 25 |
| 3-axle: | | | 2 | 1 | 3 | 1 | 1 | 2 | 41 |
| 4+-axle: | | | 8 | 2 | 10 | 2 | 6 | 8 | 185 |
| - Net Truck Trips | | | 11 | 3 | 14 | 3 | 8 | 11 | 251 |
| Planning Area 2: General Light Industrial | 54.600 | TSF | | | | | | | |
| Passenger Cars: | | | 26 | 4 | 30 | 4 | 24 | 28 | 213 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 4 | 1 | 5 | 1 | 4 | 5 | 32 |
| 3-axle: | | | 3 | 0 | 3 | 0 | 2 | 2 | 21 |
| 4+-axle: | | | 10 | 1 | 11 | 1 | 9 | 10 | 77 |
| - Net Truck Trips | | | 17 | 2 | 19 | 2 | 15 | 17 | 130 |
| Planning Area 2: Warehouse | 60.000 | TSF | | | | | | | |
| Passenger Cars: | | | 6 | 2 | 8 | 2 | 7 | 9 | 84 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 3-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 9 |
| 4+-axle: | | | 3 | 1 | 4 | 1 | 3 | 4 | 39 |
| - Net Truck Trips | | | 4 | 1 | 5 | 1 | 4 | 5 | 53 |
| ***PLANNING AREA 2 TOTAL NET TRIPS (PCE)*** [2] | | | **73** | **15** | **88** | **17** | **70** | **87** | **938** |

**Table 4-2**



**Project Trip Generation Summary (PCE)**

| Land Use | Quantity | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| Planning Area 3: Manufacturing | 102.000 | TSF | | | | | | | |
| Passenger Cars: | | | 39 | 12 | 51 | 17 | 38 | 55 | 319 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 3 | 1 | 4 | 1 | 2 | 3 | 21 |
| 3-axle: | | | 5 | 1 | 6 | 2 | 4 | 6 | 37 |
| 4+-axle: | | | 18 | 5 | 23 | 8 | 17 | 25 | 148 |
| - Net Truck Trips | | | 26 | 7 | 33 | 11 | 23 | 34 | 206 |
| Planning Area 3: Warehouse | 191.400 | TSF | | | | | | | |
| Passenger Cars: | | | 20 | 6 | 26 | 8 | 21 | 29 | 266 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 1 | 1 | 2 | 17 |
| 3-axle: | | | 2 | 1 | 3 | 1 | 2 | 3 | 28 |
| 4+-axle: | | | 9 | 3 | 12 | 3 | 10 | 13 | 125 |
| - Net Truck Trips | | | 12 | 4 | 16 | 5 | 13 | 18 | 170 |
| ***PLANNING AREA 3 TOTAL NET TRIPS (PCE)*** [2] | | | **97** | **29** | **126** | **41** | **95** | **136** | **961** |
| Planning Area 3A: Coffee Shop | 3.000 | TSF | 136 | 131 | 267 | 65 | 65 | 130 | 2,461 |
| Pass-By (89% AM/PM/Daily): | | | -117 | -117 | -234 | -58 | -58 | -116 | -2,190 |
| Planning Area 3A: Fast Food Without Drive-Thru | 7.000 | TSF | 105 | 70 | 175 | 99 | 99 | 198 | 2,424 |
| Pass-By (49% AM, 50% PM/Daily): | | | -34 | -34 | -68 | -49 | -49 | -98 | -1,212 |
| Planning Area 3A: Commercial Retail | 10.500 | TSF | 6 | 4 | 10 | 19 | 21 | 40 | 396 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -6 | -6 | -12 | -135 |
| ***PLANNING AREA 3A TOTAL NET TRIPS*** [2] | | | **96** | **54** | **150** | **70** | **72** | **142** | **1,744** |
| Planning Area 4: Commercial Retail | 47.000 | TSF | 109 | 67 | 176 | 149 | 162 | 311 | 3598 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -51 | -51 | -102 | -1,223 |
| ***PLANNING AREA 4 TOTAL NET TRIPS*** [2] | | | **109** | **67** | **176** | **98** | **111** | **209** | **2,375** |
| ***Total Proposed Project*** | | | **863** | **417** | **1,280** | **625** | **1,019** | **1,644** | **15,867** |

[1] TSF = thousand square feet; VFP = Vehicle Fueling Position

[2] TOTAL NET TRIPS = Passenger Cars + Net Truck Trips.

**Table 4-3**



**Project Trip Generation Summary (Actual)**

| Land Use | Quantity | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| Planning Area 1: High-Cube Fulfillment Center Warehouse | 412.500 | TSF | | | | | | | |
| Passenger Cars: | | | 182 | 54 | 236 | 155 | 400 | 555 | 3,077 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 50 |
| 3-axle: | | | 1 | 0 | 1 | 1 | 2 | 3 | 61 |
| 4+-axle: | | | 3 | 1 | 4 | 2 | 5 | 7 | 186 |
| - Net Truck Trips | | | 5 | 1 | 6 | 3 | 8 | 11 | 297 |
| Planning Area 1: High-Cube Warehouse (Without Cold Storage) | 412.500 | TSF | | | | | | | |
| Passenger Cars: | | | 18 | 5 | 23 | 9 | 23 | 32 | 392 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 31 |
| 3-axle: | | | 2 | 0 | 2 | 1 | 1 | 2 | 38 |
| 4+-axle: | | | 5 | 1 | 6 | 2 | 4 | 6 | 116 |
| - Net Truck Trips | | | 8 | 1 | 9 | 3 | 6 | 9 | 185 |
| ***PLANNING AREA 1 TOTAL NET TRIPS (Actual)*** [2] | | | **213** | **61** | **274** | **170** | **437** | **607** | **3,951** |
| Planning Area 1A: Fast Food With Drive-Thru | 8.700 | TSF | 178 | 171 | 349 | 148 | 136 | 284 | 4,097 |
| Pass-By (49% AM, 50% PM/Daily): | | | -84 | -84 | -168 | -68 | -68 | -136 | -2,049 |
| Planning Area 1A: Fast Food Without Drive-Thru | 12.000 | TSF | 181 | 120 | 301 | 170 | 170 | 340 | 4,155 |
| Pass-By (49% AM, 50% PM/Daily): | | | -59 | -59 | -118 | -83 | -83 | -166 | -2,078 |
| Planning Area 1A: Commercial Retail | 12.000 | TSF | 7 | 4 | 11 | 22 | 24 | 46 | 453 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -7 | -7 | -14 | -154 |
| Planning Area 1A: Gas Station w/ Market & Carwash | 8 | VFP | 81 | 81 | 162 | 89 | 89 | 179 | 1,585 |
| Pass-By (62% am, 56% PM/Daily): | | | -50 | -50 | -100 | -50 | -50 | -100 | -888 |
| ***PLANNING AREA 1A TOTAL NET TRIPS*** | | | **254** | **183** | **437** | **221** | **211** | **433** | **5,122** |
| Planning Area 2: High-Cube Warehouse (Without Cold Storage) | 218.400 | TSF | | | | | | | |
| Passenger Cars: | | | 9 | 3 | 12 | 5 | 12 | 17 | 207 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 16 |
| 3-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 20 |
| 4+-axle: | | | 3 | 1 | 4 | 1 | 2 | 3 | 62 |
| - Net Truck Trips | | | 5 | 1 | 6 | 1 | 4 | 5 | 98 |
| Planning Area 2: General Light Industrial | 54.600 | TSF | | | | | | | |
| Passenger Cars: | | | 26 | 4 | 30 | 4 | 24 | 28 | 213 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 3 | 0 | 3 | 0 | 2 | 2 | 22 |
| 3-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 11 |
| 4+-axle: | | | 3 | 0 | 3 | 0 | 3 | 3 | 26 |
| - Net Truck Trips | | | 7 | 0 | 7 | 0 | 6 | 6 | 59 |
| Planning Area 2: Warehouse | 60.000 | TSF | | | | | | | |
| Passenger Cars: | | | 6 | 2 | 8 | 2 | 7 | 9 | 84 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 3-axle: | | | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 4+-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 13 |
| - Net Truck Trips | | | 1 | 0 | 1 | 0 | 1 | 1 | 20 |
| ***PLANNING AREA 2 TOTAL NET TRIPS (Actual)*** [2] | | | **54** | **10** | **64** | **12** | **54** | **66** | **681** |

**Table 4-3**



**Project Trip Generation Summary (Actual)**

| Land Use | Quantity | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| Planning Area 3: Manufacturing | 102.000 | TSF | | | | | | | |
| Passenger Cars: | | | 39 | 12 | 51 | 17 | 38 | 55 | 319 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 2 | 1 | 3 | 1 | 2 | 3 | 14 |
| 3-axle: | | | 2 | 1 | 3 | 1 | 2 | 3 | 19 |
| 4+-axle: | | | 6 | 2 | 8 | 3 | 6 | 9 | 49 |
| - Net Truck Trips | | | 10 | 4 | 14 | 5 | 10 | 15 | 82 |
| Planning Area 3: Warehouse | 191.400 | TSF | | | | | | | |
| Passenger Cars: | | | 20 | 6 | 26 | 8 | 21 | 29 | 266 |
| Truck Trips: | | | | | | | | | |
| 2-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 11 |
| 3-axle: | | | 1 | 0 | 1 | 0 | 1 | 1 | 14 |
| 4+-axle: | | | 3 | 1 | 4 | 1 | 3 | 4 | 42 |
| - Net Truck Trips | | | 5 | 1 | 6 | 1 | 5 | 6 | 67 |
| ***PLANNING AREA 3 TOTAL NET TRIPS (Actual)*** [2] | | | **74** | **23** | **97** | **31** | **74** | **105** | **734** |
| Planning Area 3A: Coffee Shop | 3.000 | TSF | 136 | 131 | 267 | 65 | 65 | 130 | 2,461 |
| Pass-By (89% AM/PM/Daily): | | | -117 | -117 | -234 | -58 | -58 | -116 | -2,190 |
| Planning Area 3A: Fast Food Without Drive-Thru | 7.000 | TSF | 105 | 70 | 175 | 99 | 99 | 198 | 2,424 |
| Pass-By (49% AM, 50% PM/Daily): | | | -34 | -34 | -68 | -49 | -49 | -98 | -1,212 |
| Planning Area 3A: Commercial Retail | 10.500 | TSF | 6 | 4 | 10 | 19 | 21 | 40 | 396 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -6 | -6 | -12 | -135 |
| ***PLANNING AREA 3A TOTAL NET TRIPS*** [2] | | | **96** | **54** | **150** | **70** | **72** | **142** | **1,744** |
| Planning Area 4: Commercial Retail | 47.000 | TSF | 109 | 67 | 176 | 149 | 162 | 311 | 3598 |
| Pass-By (34% PM/Daily): | | | 0 | 0 | 0 | -51 | -51 | -102 | -1,223 |
| ***PLANNING AREA 4 TOTAL NET TRIPS*** [2] | | | **109** | **67** | **176** | **98** | **111** | **209** | **2,375** |
| ***Total Proposed Project*** | | | **800** | **398** | **1,198** | **602** | **959** | **1,562** | **14,607** |

[1] TSF = thousand square feet; VFP = Vehicle Fueling Position

[2] TOTAL NET TRIPS = Passenger Cars + Net Truck Trips.

## 4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land use and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The Project trip distribution was developed based on anticipated travel patterns to and from the Project site. The existing roadway network and location of regional destinations have been reviewed to develop the Project trip distribution pattern.

Exhibit 4-1 and Exhibit 4-2 illustrate the outbound and inbound warehouse/industrial truck trip distribution patterns for the Project, respectively. Exhibit 4-3 and Exhibit 4-4 illustrate the outbound and inbound warehouse/industrial passenger car trip distribution patterns for the Project, respectively. Lastly, Exhibit 4-5 and Exhibit 4-6 illustrate the outbound and inbound commercial retail trip distribution patterns for the Project, respectively. The same trip distribution patterns are utilized for E+P, Opening Year Cumulative, and Horizon Year traffic conditions as the study area roadway network is similar for these analysis scenarios.

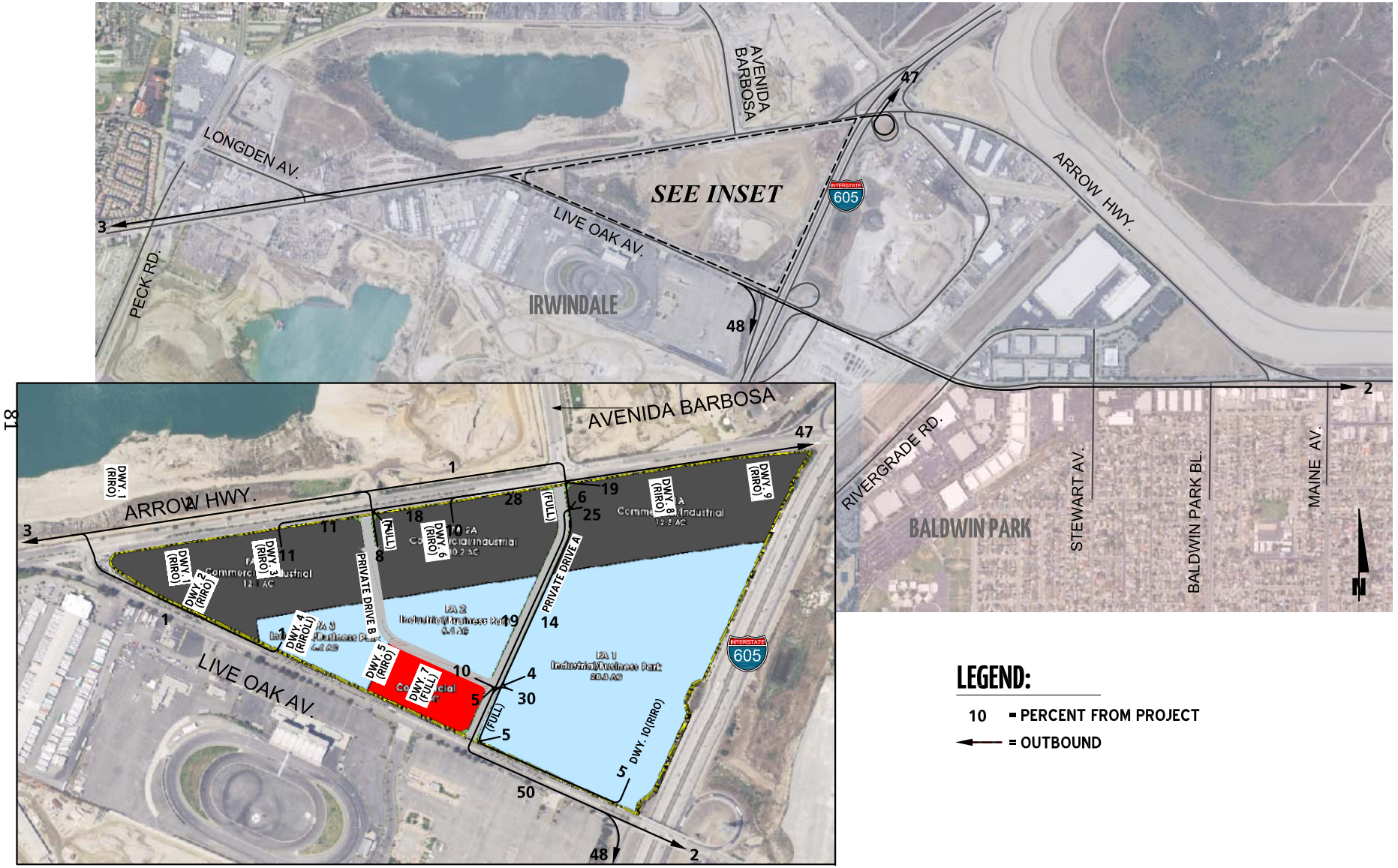
## 4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking or bicycling have not been considered in this TIA, in an effort to conduct a conservative analysis. However, this Project is located approximately four miles from the Irwindale Metro Gold Line Station on Irwindale Avenue (near the I-210 Freeway).

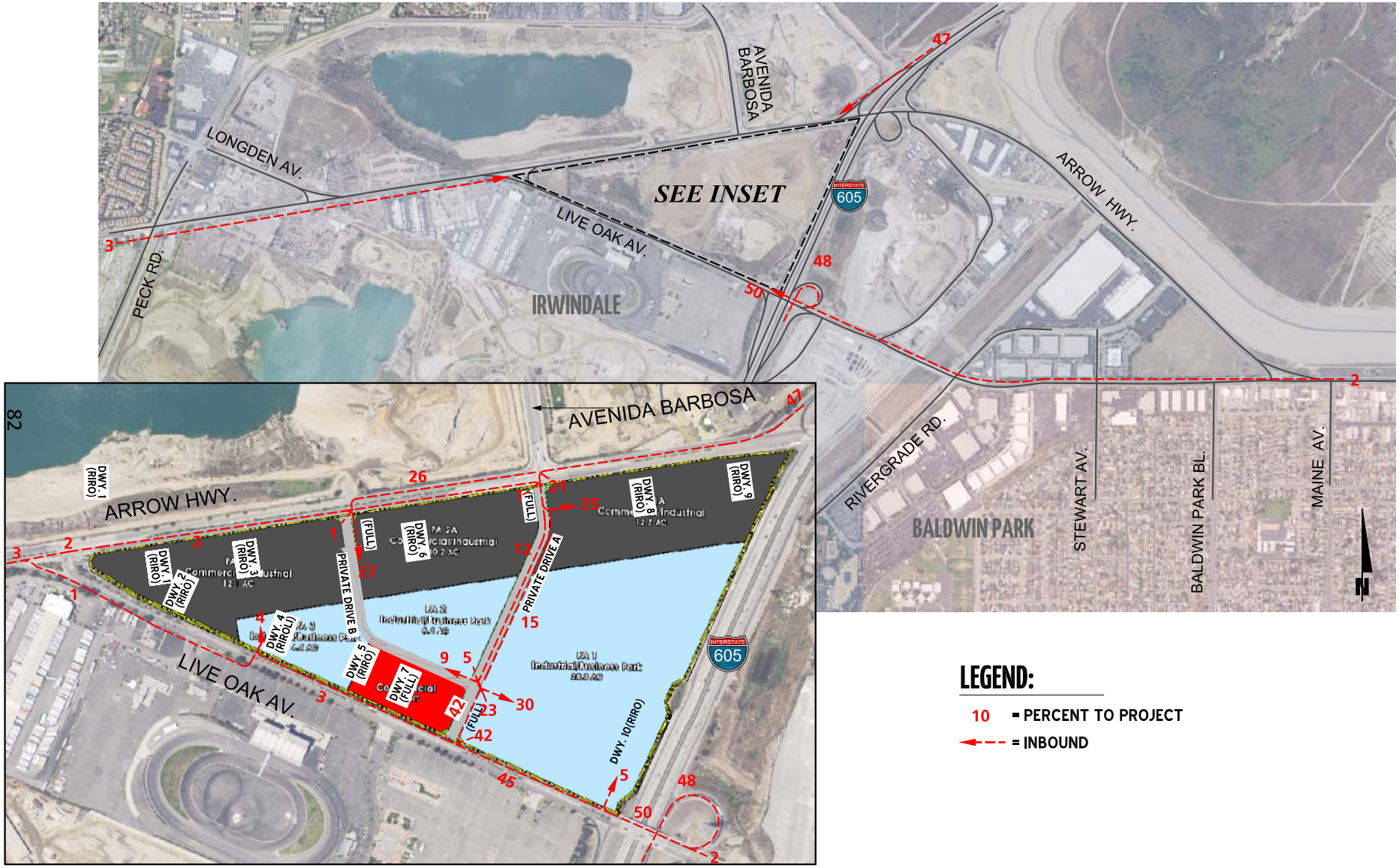
## 4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT, AM and PM peak hour traffic volumes are shown on Exhibit 4-7 and Exhibit 4-8, respectively.

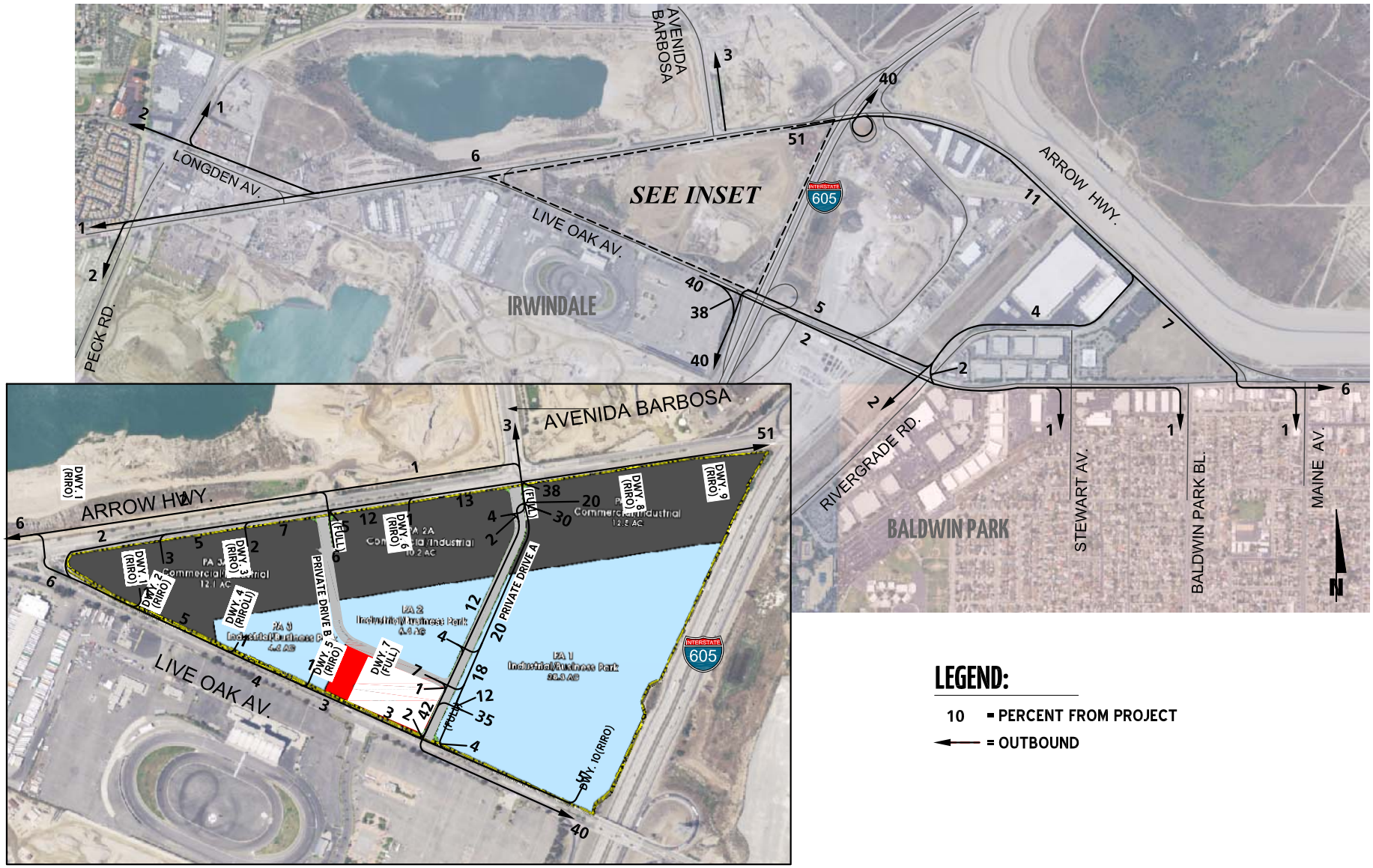
## EXHIBIT 4-1: PROJECT (OUTBOUND TRUCK) TRIP DISTRIBUTION



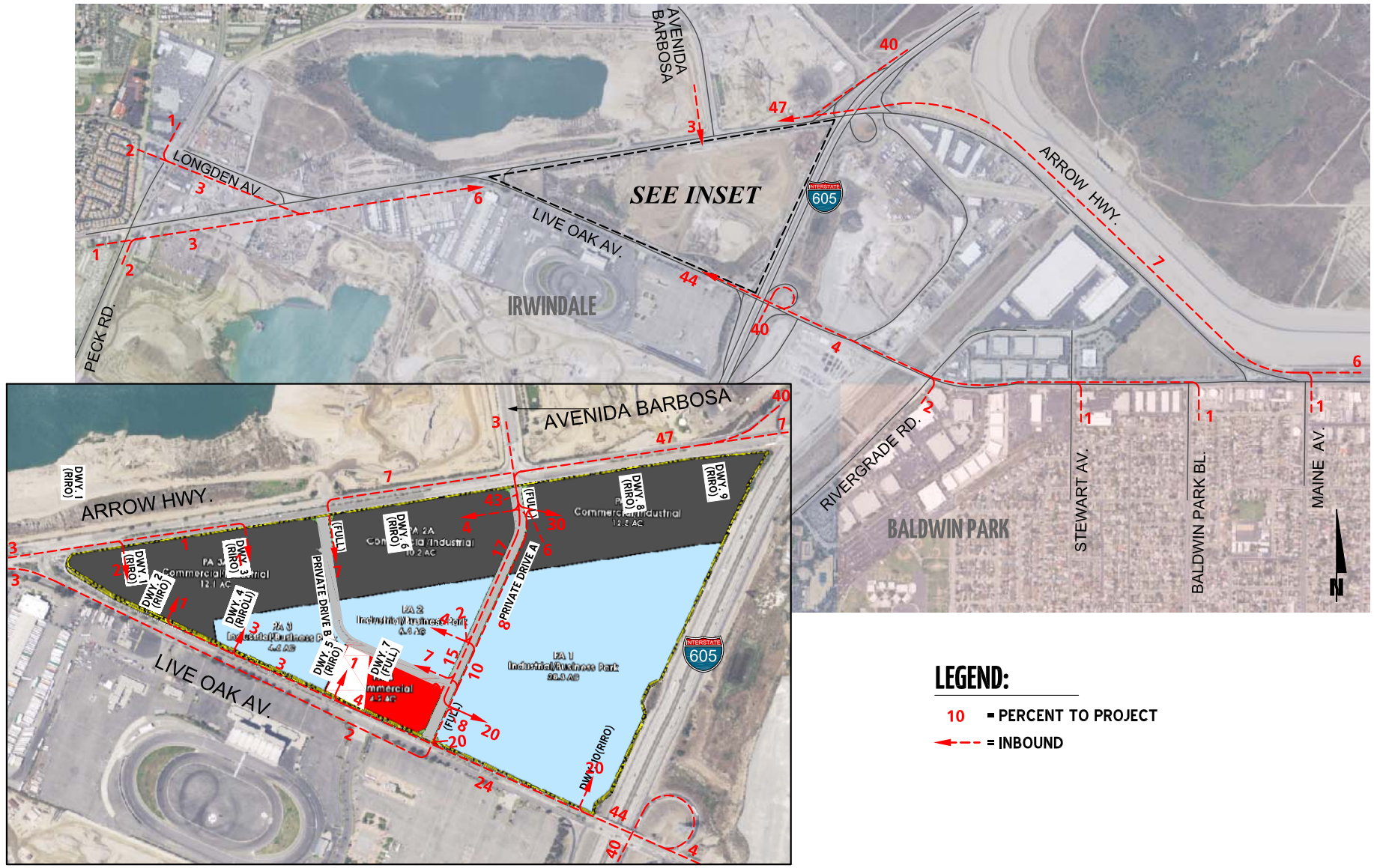
## EXHIBIT 4-2: PROJECT (INBOUND TRUCK) TRIP DISTRIBUTION



## EXHIBIT 4-3: PROJECT (OUTBOUND WAREHOUSE PASSENGER CAR) TRIP DISTRIBUTION



## EXHIBIT 4-4: PROJECT (INBOUND WAREHOUSE PASSENGER CAR) TRIP DISTRIBUTION





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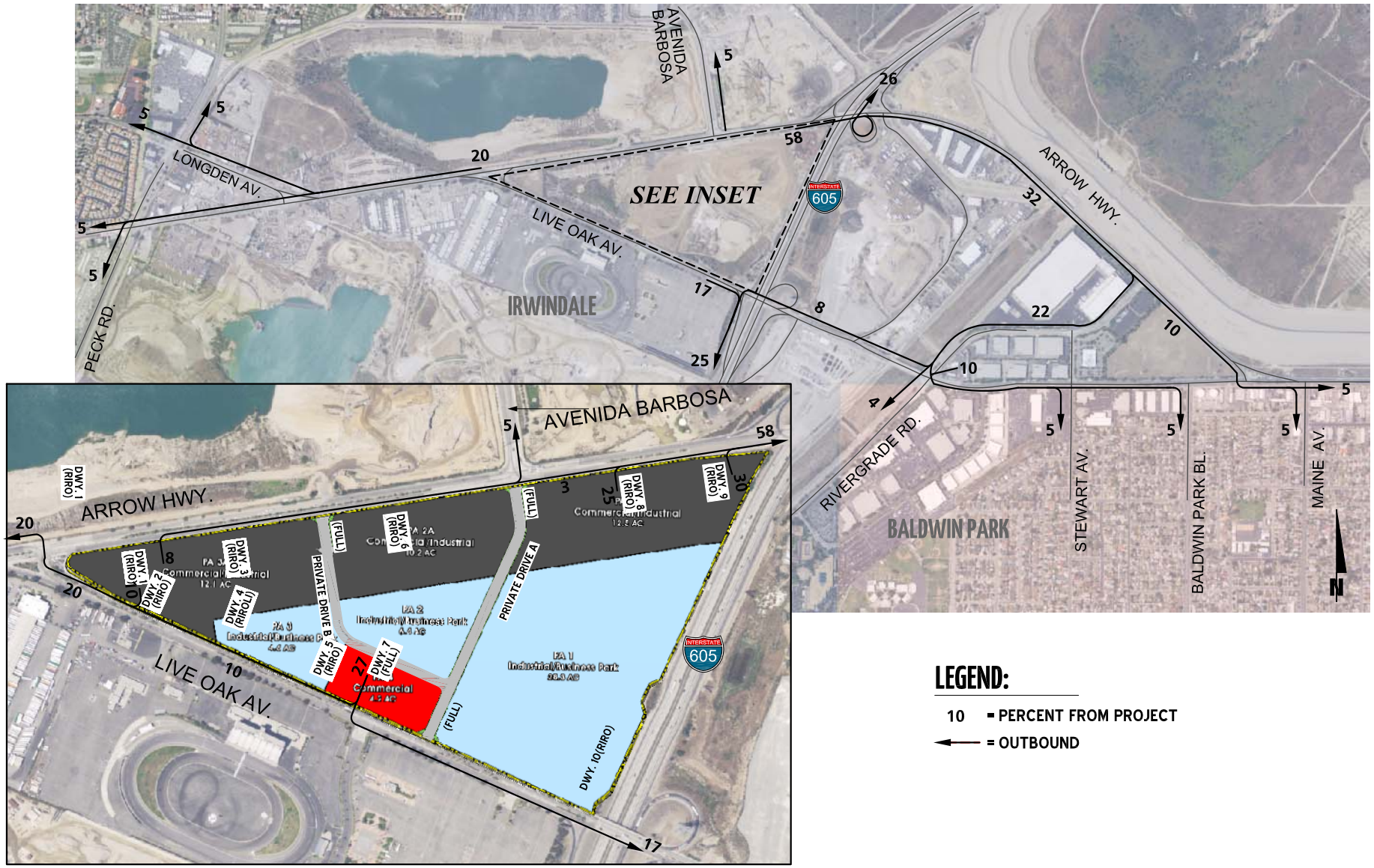
## EXHIBIT 4-5: PROJECT (OUTBOUND COMMERCIAL RETAIL PASSENGER CAR) TRIP DISTRIBUTION





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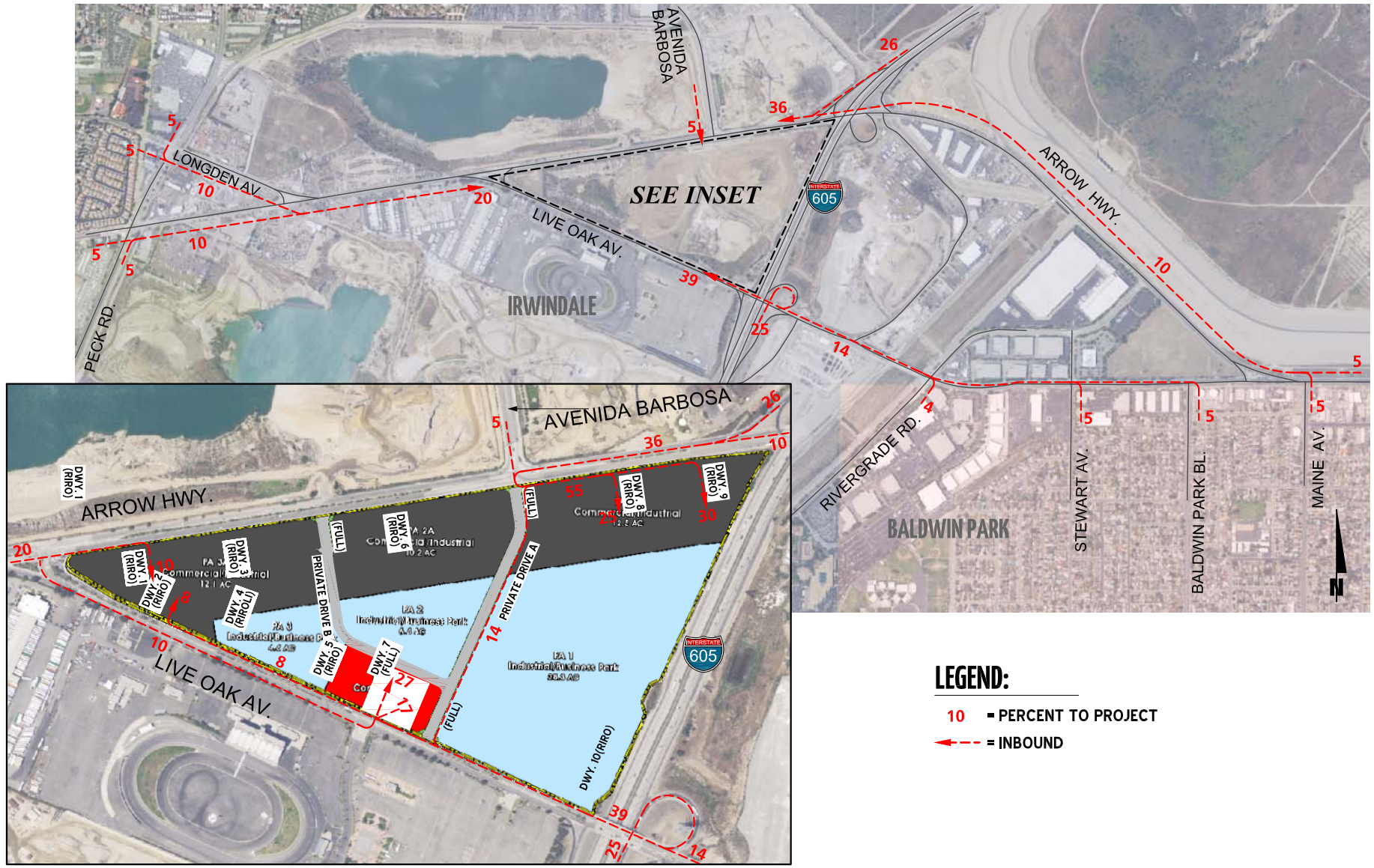
## EXHIBIT 4-6: PROJECT (INBOUND COMMERCIAL RETAIL PASSENGER CAR) TRIP DISTRIBUTION





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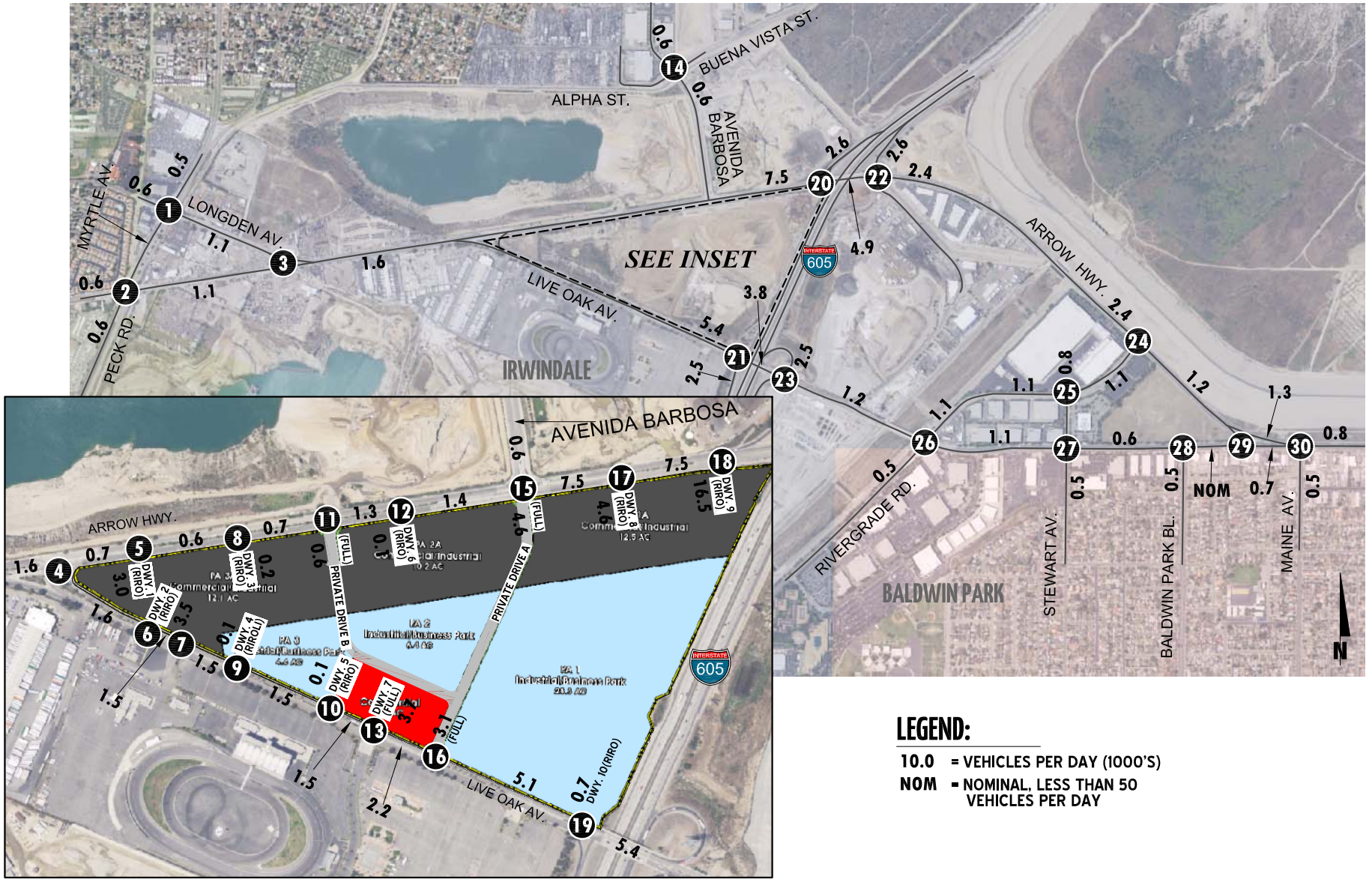
## EXHIBIT 4-7: PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)




**LEGEND:**

**10.0** = VEHICLES PER DAY (1000'S)
**NOM** = NOMINAL, LESS THAN 50 VEHICLES PER DAY





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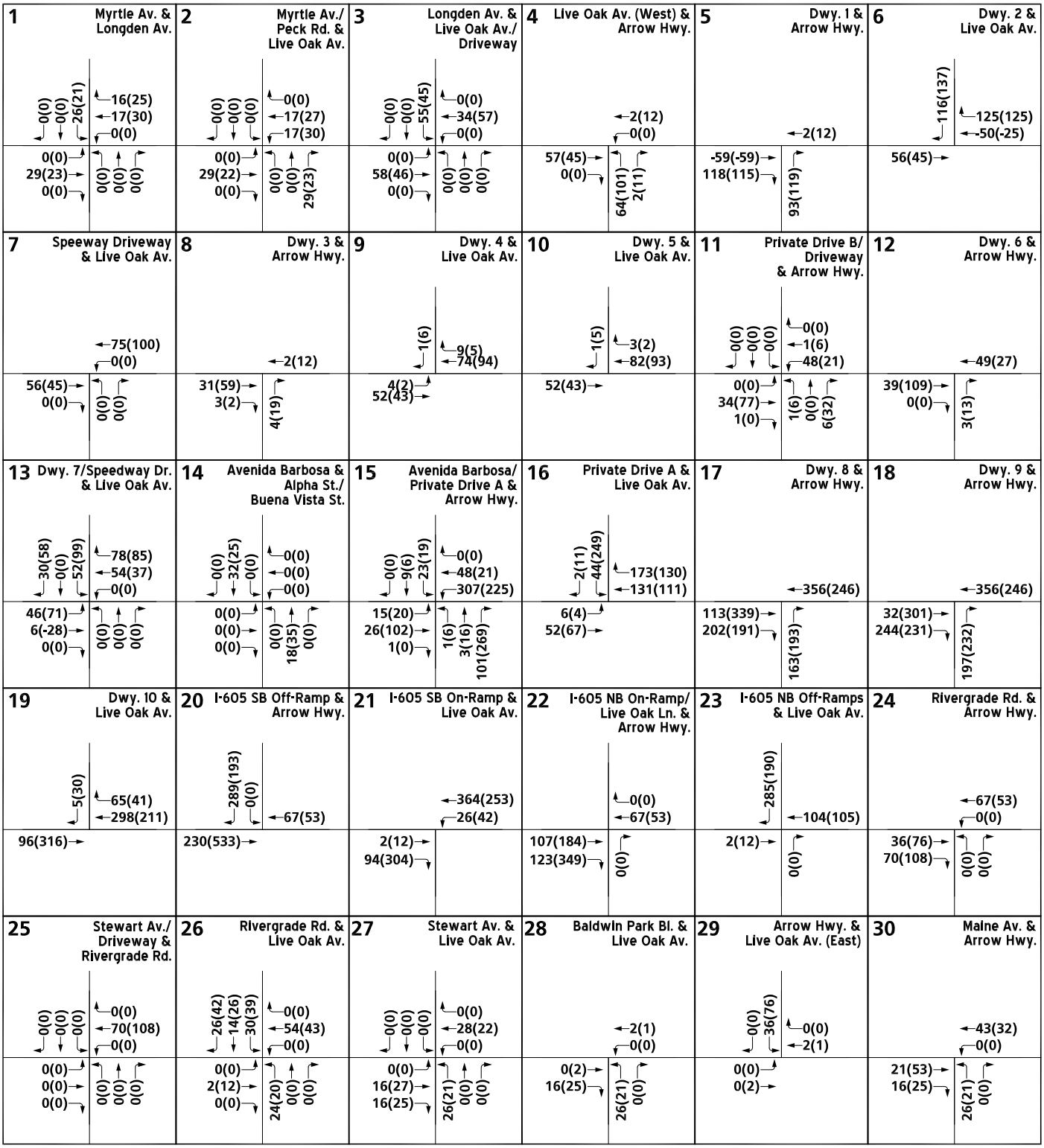
## EXHIBIT 4-8: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)




## LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## 4.5 BACKGROUND TRAFFIC

### 4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

The Opening Year Cumulative conditions analysis determines the Project's contribution to near-term cumulative traffic impacts based on a comparison of the "with Project" traffic scenario to the "without Project" traffic scenario. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth from Existing (2017) conditions of 6.12% (2% per year over three years) is included for Opening Year Cumulative, as well as traffic generated by cumulative projects that could affect the study intersections.

The generalized growth factors provided in 2010 Los Angeles (LA) County Congestion Management Program (CMP) indicates a growth factor of 1.046 for ten years (2010 to 2020) or 0.45% per year for the Regional Statistical Area (RSA) 26 (West Covina) in which the Project is located. [4] As such, the analysis is in excess of the CMP guidelines and consistent with the City's traffic study guidelines.

### 4.5.2 HORIZON YEAR CUMULATIVE CONDITIONS

Horizon Year Without Project traffic conditions include an ambient traffic growth factor of 12.78% (0.524% / year over 23 years) based on the growth factors provided in LA County CMP for RSA 26. A growth factor of 1.106 was estimated for 25 years (from 2010 to 2035) in LA County CMP, which is equivalent to 0.404% per year growth. This annual growth was compounded over 5 years and added to the 1.106 from the LA County CMP to determine the growth factor for Horizon Year (2040) traffic conditions. Lastly, traffic generated by cumulative projects that could affect the study intersections was added on top of the ambient growth.

The RSA map for the San Gabriel Valley and the General Traffic Volume Growth Factors from Appendix *D – Guidelines for CMP Transportation Impact Analysis* from the 2010 LA County CMP is included in Appendix 4.1 of this report. [4]

## 4.6 CUMULATIVE DEVELOPMENT TRAFFIC

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. Exhibit 4-9 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-4. If applicable (i.e. if the cumulative projects would contribute trips to study area intersections), the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative and Horizon Year forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-4 are reflected as part of the background traffic. Traffic from other cumulative developments farther away from the study area are not anticipated to add significant traffic and are accounted for by the ambient growth rate applied to forecast the background traffic. Cumulative ADT, AM and PM peak hour traffic volumes are shown on Exhibit 4-10 and Exhibit 4-11, respectively.

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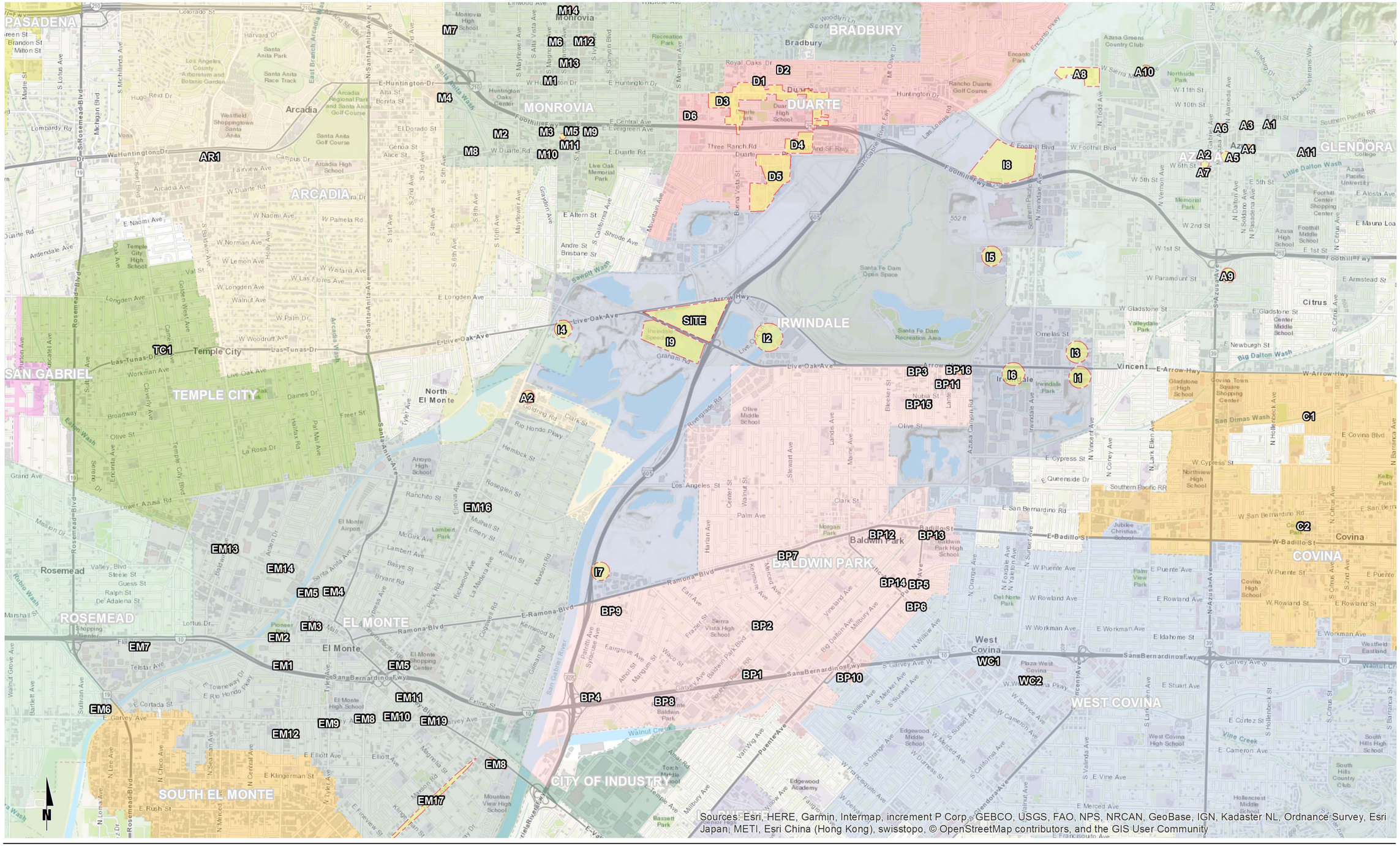
## EXHIBIT 4-9: CUMULATIVE DEVELOPMENT PROJECTS LOCATION MAP



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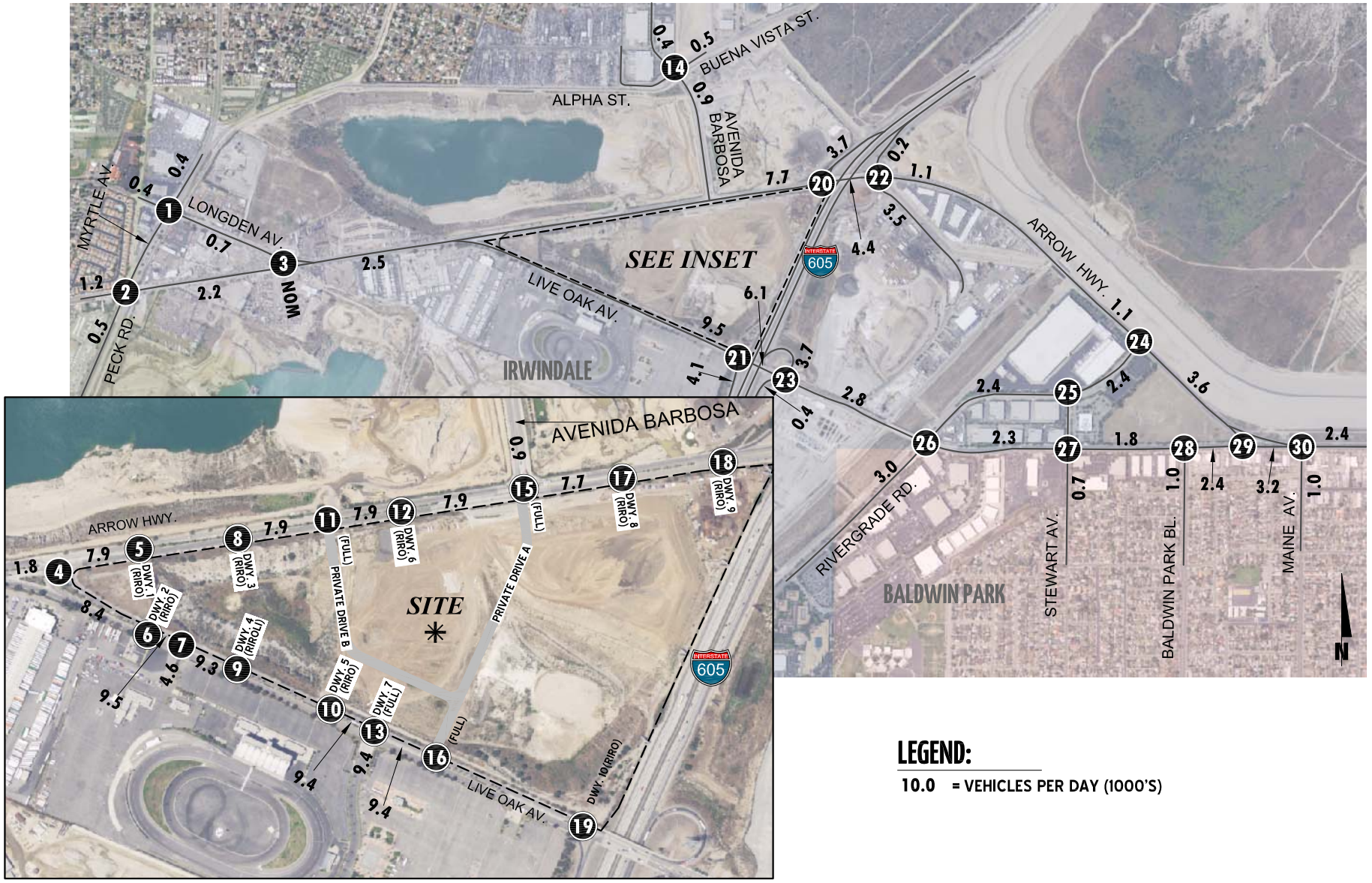
## EXHIBIT 4-10: CUMULATIVE PROJECT AVERAGE DAILY TRAFFIC (ADT)




**LEGEND:**

**10.0** = VEHICLES PER DAY (1000'S)





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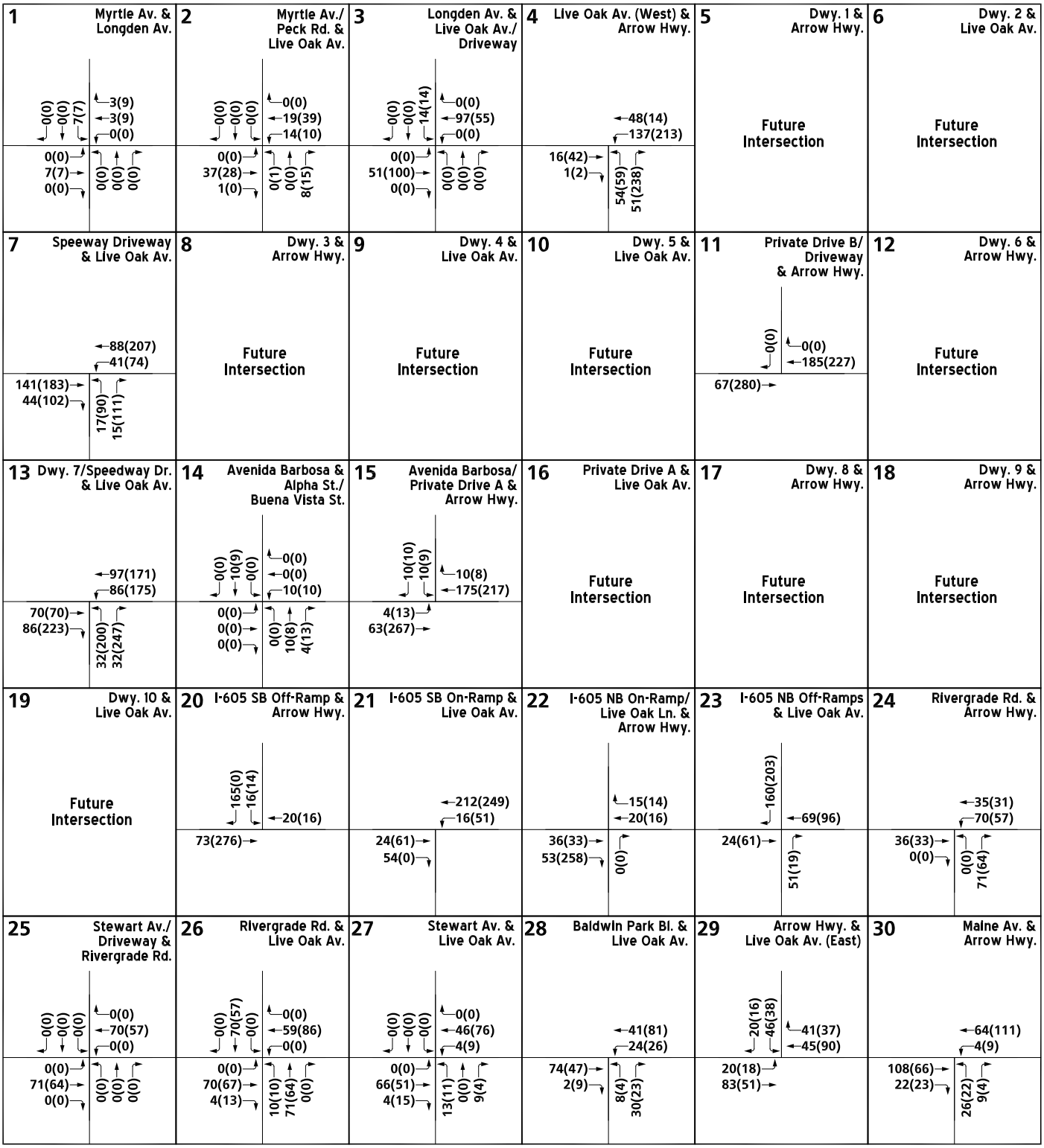
## EXHIBIT 4-11: CUMULATIVE PROJECT TRAFFIC VOLUMES (IN PCE)




## LEGEND:

**10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES**

**Table 4-4**



**Cumulative Development Land Use Summary**

| ID | Project Name/Location | Land Use | Quantity[1] |
|---|---|---|---|
| **City of Irwindale** | | | |
| I1 | Manning Pit (SWC of Vincent Av. & Arrow Hwy.) | Industrial | 545.735 TSF |
| I2 | Nu-Way Pit (13620 Live Oak Lane) | Pilot Flying J Travel Center | 15.000 TSF |
| | | New Truck Sales Dealership | 3.000 TSF |
| I3 | Panatonni (16203-16233 Arrow Highway) | Industrial | 133.800 TSF |
| I4 | Panatonni (242 Live Oak Avenue) | Industrial | 85.400 TSF |
| I5 | Ayala Industrial Building (5589 Ayala Avenue) | Industrial | 80.000 TSF |
| I6 | Irwindale Med Clinic (15768 Arrow Highway) | Medical Office Building | 13.300 TSF |
| | Wendy's Restaurant (15768 Arrow Highway) | Fast-food Restaurant with Drive-Thru | 2.300 TSF |
| I7 | Kaiser Medical Office Building (12761 Schabarum Av.) | Medical Office Building | 90.000 TSF |
| I8 | Irwindale Reliance II Business Park | Warehouse | 1,241.442 TSF |
| | | Industrial Park | 612.058 TSF |
| | | Commercial Retail | 5.000 TSF |
| | | Fast-Food without Drive-Thru | 5.000 TSF |
| I9 | Regional Shopping Center (500 Speedway Dr.) | Shopping Center | 640.000 TSF |
| **City of Baldwin Park** | | | |
| BP1 | Retail/Restaurant - 003 Garvey | Restaurant | 6.800 TSF |
| BP2 | SP Modification 8552-017-004 | SFDR | 51 DU |
| BP3 | Warehouse - 5014 Heintz St. | Warehouse | 1.500 TSF |
| BP4 | Residential - 12762-70 Torch St. | Condos | 24 DU |
| BP5 | Residential - 3726 Puente Av. | Condos | 4 DU |
| BP6 | Commercial/Residential - 14911 Pacific | Commercial | 1.740 TSF |
| | | Apartments | 4 DU |
| BP7 | Residential - 3913 Stewart Av. | Multi-Family Residential | 4 DU |
| BP8 | Medical - 1011 Baldwin Park Bl. | Medical Office | 60.000 TSF |
| BP9 | Residential - 3540 Barnes Av. | SFDR | 8 DU |
| BP10 | Office - 14622 Dalewood St. | Office | 60.000 TSF |
| BP11 | Warehouse - 5044 Gayhurst Av. | Warehouse | 2.600 TSF |
| BP12 | Residential - 15000 Badillo St. | Condos | 16 DU |
| BP13 | Residential - 15110-20 Badillo St. | Condos | 12 DU |
| BP14 | Residential - 3715-3725 Puente Av. | SFDR | 47 DU |
| BP15 | Residential - 4923-4929 Fortin St. | SFDR | 15 DU |
| BP16 | Residential/Warehouse - 5115 Azusa Canyon Rd. | Condos | 10 DU |
| | | Warehouse | 90.000 TSF |
| **City of Duarte** | | | |
| D1 | The Huntington-Duarte Town Center Mixed Use Project (1405-37 Huntington Dr., Residential/Retail Hybrid) | Retail | 3.500 TSF |
| | | Apartments | 161 DU |
| | | Live/Work | 2.100 TSF |
| D2 | 3rd & Oak Residential Development | Townhomes | 18 DU |
| D3 | Town Center Specific Plan | Retail | 703.000 TSF |
| | | Residential | 800 DU |
| | | Hotel | 450 RM |
| D4 | Duarte Station Specific Plan | Office | 400.000 TSF |
| | | Residential | 475 DU |
| | | Hotel | 250 RM |
| D5 | City of Hope Specific Plan | Core Medical | 1,030.500 TSF |
| D6 | 928 Huntington Dr. | Apartments | 22 DU |

**Table 4-4**



**Cumulative Development Land Use Summary**

| ID | Project Name/Location | Land Use | Quantity[1] |
|---|---|---|---|
| **City of West Covina** | | | |
| WC1 | Porto's Bakery & Café (1360 W. Garvey Av.) | Restaurant | 21.943 TSF |
| WC2 | Gaucho Grill Argentinean Steakhouse (1129 W. Covina Pkwy.) | Restaurant | 4.356 TSF |
| **City of Azusa** | | | |
| A1 | Promenade at Citrus (Promenade and Citrus) | Retail | 8.250 TSF |
| A2 | 525 N. Azusa Av. (Residential/Retail Hybrid) | Apartments | 102 DU |
| | | Retail | 4.600 TSF |
| A3 | Metro Walk (803-813 N. Dalton Av.) | Condo/Townhomes | 30 DU |
| A4 | Smart & Final Extra (303 E. Foothill Bl.) | Discount Store | 29.429 TSF |
| A5 | Block 36 (S. of Foothill Bl. between Azusa Av. & Alameda Av.) | Condo/Townhomes | 108 DU |
| | | Commercial Retail | 33.000 TSF |
| | | Movie Theater | 10.000 TSF |
| A6 | A-2 Property (Azusa Av. & 9th St.) | Apartments | 350 DU |
| | | Commercial Retail | 15.000 TSF |
| A7 | Azusa Regency Villas (618 N. San Gabriel Av., Residential/Retail Hybrid) | Apartments | 70 DU |
| | | Commercial Retail | 14.840 TSF |
| A8 | Azusa Business Center (1025 N. Todd Av.) | Industrial | 462.491 TSF |
| A9 | Gladstone Senior Villas (360 E. Gladstone St.) | Senior Apartments | 60 DU |
| A10 | 619 N. San Gabriel Av. (Residential/Retail Hybrid) | Apartments | 6 DU |
| | | Commercial Retail | 0.965 TSF |
| A11 | Popeyes Louisiana Kitchen (994 E. Alosta Av.) | Fast Food w/ Drive-Thru | 2.279 TSF |
| **City of Monrovia** | | | |
| M1 | Marriott (102-140 W. Huntington Dr.) | Hotel | 109 RM |
| M2 | 530 Fano St. | Condos | 12 DU |
| M3 | MODA (Pomona Av. between Primrose & Magnolia) | Multi-Family Residential | 261 DU |
| | | Gym | 225.220 TSF |
| M4 | 1110-1212 S. Fifth Av. | Multi-Family Residential | 154 DU |
| | | Gym | 1.340 TSF |
| M5 | Artisan Food Village (137 W. Pomona Av.) | Restaurant | 12.617 TSF |
| | | Coffee Shop | 2.165 TSF |
| | | Brewery | 3.477 TSF |
| | | Retail | 2.675 TSF |
| M6 | 239 W. Chestnut Av. | Condos | 10 DU |
| M7 | 303 S. Madison Av. | SFDR | 6 DU |
| M8 | 717-721 W. Duarte Rd. | Condos | 11 DU |
| M9 | 1601 S. Myrtle Av. | Multi-Family Residential | 103 DU |
| M10 | Northeast Corner of Magnolia Av. & Duarte Rd. | Apartments | 296 DU |
| M11 | 1625 S. Magnolia Av. | Apartments | 392 DU |
| M12 | 825 S. Myrtle Av. | Multi-Family Residential | 154 DU |
| M13 | Starbucks (239 W. Huntington Dr.) | Coffee Shop w/Drive-Thru | 2.200 TSF |
| M14 | Corner of Myrtle & Lime | Multi-Family Residential | 140 DU |

**Table 4-4**



**Cumulative Development Land Use Summary**

| ID | Project Name/Location | Land Use | Quantity[1] |
|---|---|---|---|
| **City of El Monte** | | | |
| EM1 | Gateway Specific Plan | High-Density Residential | 485 DU |
| EM2 | El Monte Gateway | Apartments | 420 DU |
| | | Affordable Apartments | 132 DU |
| | | Retail | 25.000 TSF |
| EM3 | Valley Walk (NW of Valley & Ramona) | Townhomes | 62 DU |
| EM4 | Santa Fe Trail Plaza (NEC Santa Anita & Valley) | Retail | 115.000 TSF |
| EM5 | Norms (SEC of Valley & Santa Anita) | Restaurant | 6.800 TSF |
| EM6 | China Press Media Center (Garvey west of Rosemead) | Office | 60.000 TSF |
| EM7 | Flair Spectrum (SEC of Rio Hondo & Flair) | Hotel | 250 RM |
| | | Apartments | 600 DU |
| | | Restaurant | 50.000 TSF |
| | | Retail | 640.000 TSF |
| EM8 | Garvey Square (NEC of Garvey & Peck) | Apartments | 114 DU |
| | | Retail | 2.800 TSF |
| EM9 | Garvey Walk (SEC of Garvey & Tyler) | Apartments | 70 DU |
| | | Retail | 2.100 TSF |
| EM10 | Garvey Senior Homes (NEC of Garvey & La Madera, Retail/Residential Hybrid) | Memory Care | 20 DU |
| | | Assisted Living | 78 DU |
| | | Retail | 19.500 TSF |
| EM11 | La Madera Senior Homes (NWC of Garvey & La Madera, Retail/Residential Hybrid) | Senior Housing | 30 DU |
| | | Retail | 6.100 TSF |
| EM12 | Santa Anita & Owens Project (South of the Garvey Mixed-Use Corridor) | Townhomes | 36 DU |
| | | SFDR | 2 DU |
| EM13 | Baldwin Rose Veterans Village (Baldwin between Rose & railroad) | Affordable Housing | 55 DU |
| EM14 | Hickson Campus (Arden between Hickson & railroad) | Industrial | 165.000 TSF |
| EM15 | Valley Mixed Use (Valley east of I-10 Freeway, Retail/Residential Hybrid) | Apartments | 78 DU |
| | | Retail | 30.000 TSF |
| EM16 | Palo Verde Housing (NWC of Peck & Ranchito( | Affordable Housing | 49 DU |
| EM17 | Durfee Mixed-Use Projects (Durfee between Fineview & Magnolia | Apartments w/Ground Retail | 49 DU |
| EM18 | East Valley Hotel Projects (Valley between Durfee & I-605) | Hotel | 140-160 RM |
| EM19 | Valley Center (Mountain View between Valley & Garvey) | Retail | 29.600 TSF |
| **City of Temple City** | | | |
| TC1 | Terraces at Temple City (5935 Temple City Bl.) | Restaurant | 7.250 TSF |
| **City of Arcadia** | | | |
| AR1 | Bowlero (400 S. Baldwin Av.) | Bowling Alley | 41.804 TSF |
| AR2 | TTM No. 77169 (11700 Goldring Rd.) | Warehouse | 16.360 TSF |
| **City of Covina** | | | |
| C1 | Corona Innovation, Technology and Event Center (NEC of Citrus & Covina) | Condos | 120 DU |
| | | Event Center | 21.000 TSF |
| | | Office | 17.200 TSF |
| C2 | Hassen Development Project (Near North Citrus/West Orange & East San Bernardino/Park) | Multi-Family Residential | 18 DU |
| | | Retail | 4.400 TSF |

[1] TSF = Thousand Square Feet; DU = Dwelling Unit; RM = Rooms

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# 5 E+P TRAFFIC CONDITIONS

In an effort to satisfy the CEQA Guidelines section 15125(a), an analysis of existing traffic volumes plus traffic generated by the proposed Project (E+P) has been included in this analysis. This section discusses the traffic forecasts for E+P conditions and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations analyses.

## 5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of Project driveways and those facilities assumed to be constructed by the Project to provide site access, which are also assumed to be in place for E+P conditions. In other words, no other off-site improvements are assumed beyond those that currently exist with the exception of the intersections and roadways that would be improved by the Project for access.

## 5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 and Exhibit 5-2 show the ADT, AM and PM peak hour traffic volumes which can be expected for E+P traffic conditions, respectively.

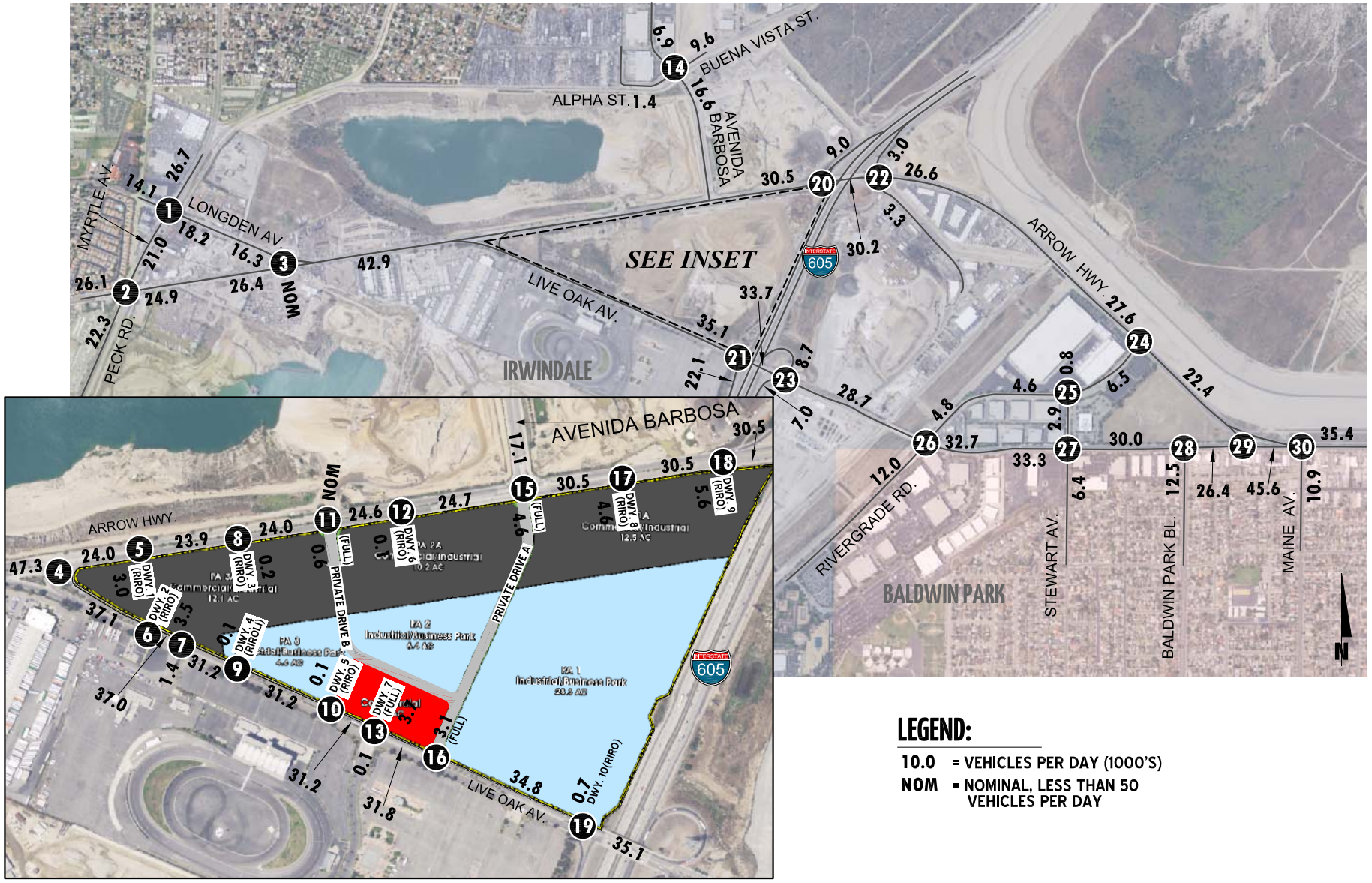
## 5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicates the addition of Project traffic would cause the following additional intersections to operate at unacceptable LOS based on applicable jurisdiction's LOS standards, in addition to those previously identified for Existing traffic conditions:

- Longden Avenue & Live Oak Avenue/Driveway (#3) – LOS E PM peak hour only
- Stewart Avenue & Live Oak Avenue (#27) – LOS E AM peak hour only
- Arrow Highway & Live Oak Avenue (East) (#29) – LOS E PM peak hour only

Consistent with Table 5-1, a summary of the peak hour intersection LOS for E+P conditions are shown on Exhibit 5-3. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

## EXHIBIT 5-1: E+P AVERAGE DAILY TRAFFIC (ADT)

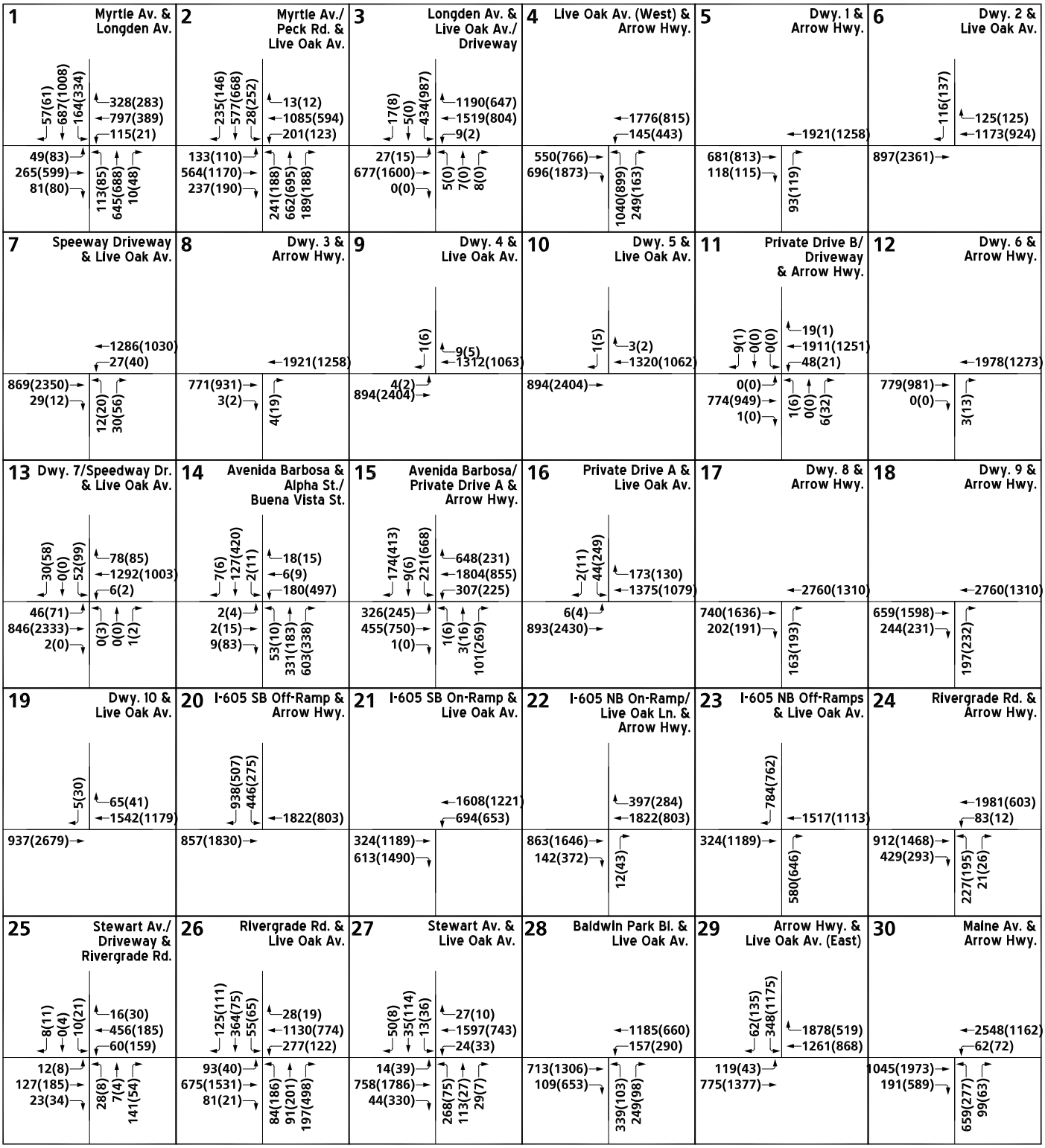







URBAN CROSSROADS

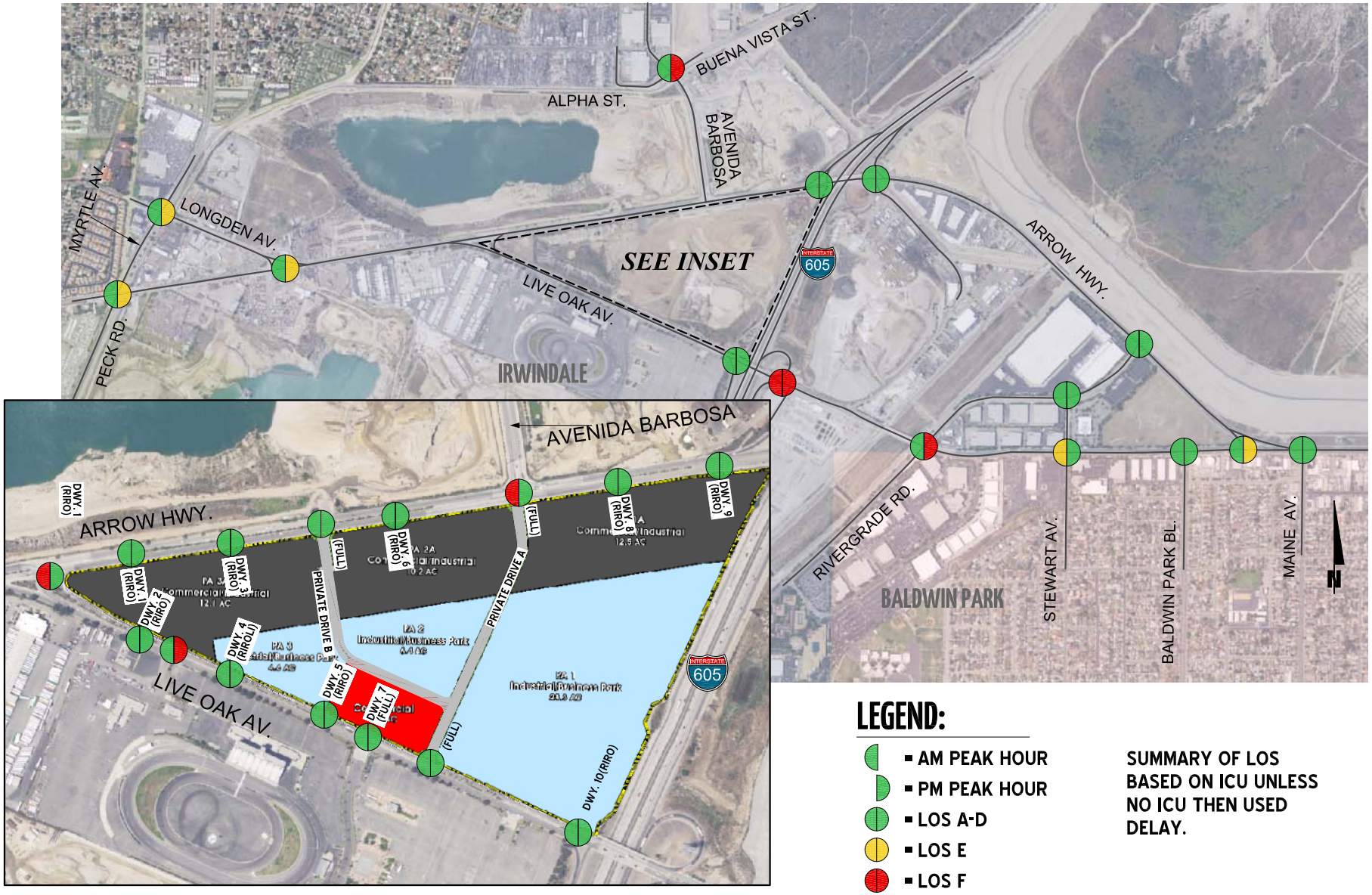
## EXHIBIT 5-2: E+P TRAFFIC VOLUMES (IN PCE)




## LEGEND:

**10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES**

## EXHIBIT 5-3: E+P SUMMARY OF LOS




**LEGEND:**

- AM PEAK HOUR
- PM PEAK HOUR
- LOS A-D
- LOS E
- LOS F

SUMMARY OF LOS BASED ON ICU UNLESS NO ICU THEN USED DELAY.





URBAN CROSSROADS

# Table 5-1

**Intersection Analysis for E+P Conditions**

| # | Intersection | Traffic Control[3] | Existing (2017) | | | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.81 | **0.92** | D | **E** | --[6] | --[6] | --[6] | --[6] | 0.84 | **0.95** | D | **E** |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.88 | **0.94** | D | **E** | --[6] | --[6] | --[6] | --[6] | 0.88 | **0.97** | D | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | --[6] | --[6] | --[6] | --[6] | 0.74 | 0.88 | C | D | --[6] | --[6] | --[6] | --[6] | 0.77 | **0.91** | C | **E** |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | --[6] | --[6] | --[6] | --[6] | **0.99** | 0.69 | **E** | B | --[6] | --[6] | --[6] | --[6] | **1.01** | 0.74 | **F** | C |
| 5 | Dwy. 1 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 14.2 | 16.4 | B | C | --[4] | --[4] | --[4] | --[4] |
| 6 | Dwy. 2 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 22.7 | 19.1 | C | C | --[4] | --[4] | --[4] | --[4] |
| 7 | Speedway Dwy. & Live Oak Av. | CSS | 20.8 | **>100.0** | C | **F** | --[4] | --[4] | --[4] | --[4] | 18.6 | **>100.0** | C | **F** | --[4] | --[4] | --[4] | --[4] |
| 8 | Dwy. 3 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 12.2 | 13.6 | B | B | --[4] | --[4] | --[4] | --[4] |
| 9 | Dwy. 4 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 20.0 | 15.9 | C | C | --[4] | --[4] | --[4] | --[4] |
| 10 | Dwy. 5 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 16.2 | 14.2 | C | B | --[4] | --[4] | --[4] | --[4] |
| 11 | Driveway/Private Drive B & Arrow Hwy. | CSS | 0.0 | 15.0 | A | C | --[4] | --[4] | --[4] | --[4] | 24.4 | 16.2 | C | C | --[4] | --[4] | --[4] | --[4] |
| 12 | Dwy. 6 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 12.3 | 13.8 | B | B | --[4] | --[4] | --[4] | --[4] |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.49 | 0.59 | A | A | --[6] | --[6] | --[6] | --[6] | 0.47 | 0.68 | A | B |
| 14 | Avenida Barbosa & Alpha St./Buena Vista St. | TS | --[6] | --[6] | --[6] | --[6] | 0.51 | 0.72 | A | C | --[6] | --[6] | --[6] | --[6] | 0.55 | 0.76 | A | C |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | **1.02** | 0.69 | **F** | B | --[6] | --[6] | --[6] | --[6] | **1.12** | 0.89 | **F** | D |
| 16 | Private Drive A & Live Oak Av. | **TS** | Future Intersection | | | | | | | | --[6] | --[6] | --[6] | --[6] | 0.49 | 0.80 | A | C |
| 17 | Dwy. 8 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 10.7 | 17.6 | B | C | --[4] | --[4] | --[4] | --[4] |
| 18 | Dwy. 9 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 10.7 | 19.1 | B | C | --[4] | --[4] | --[4] | --[4] |
| 19 | Dwy. 10 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 17.3 | 14.6 | C | B | --[4] | --[4] | --[4] | --[4] |
| 20 | I-605 SB Off-Ramp & Arrow Hwy. | TS | 17.7 | 7.6 | B | A | --[5] | --[5] | --[5] | --[5] | 18.3 | 8.3 | B | A | --[5] | --[5] | --[5] | --[5] |
| 21 | I-605 SB On-Ramp & Live Oak Av. | TS | 6.0 | 14.3 | B | B | --[5] | --[5] | --[5] | --[5] | 7.7 | 14.5 | A | B | --[5] | --[5] | --[5] | --[5] |
| 22 | I-605 NB On-Ramp/Live Oak Ln. & Arrow Hwy. | CSS | 11.2 | 16.7 | B | C | --[5] | --[5] | --[5] | --[5] | 11.8 | 18.9 | B | C | --[5] | --[5] | --[5] | --[5] |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | CSS | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] |
| 24 | Rivergrade Rd. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | 0.79 | 0.61 | C | B | --[6] | --[6] | --[6] | --[6] | 0.81 | 0.63 | D | B |
| 25 | Stewart Av./Driveway & Rivergrade Rd. | TS | --[6] | --[6] | --[6] | --[6] | 0.37 | 0.32 | A | A | --[6] | --[6] | --[6] | --[6] | 0.39 | 0.32 | A | A |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.71 | **1.04** | C | **F** | --[6] | --[6] | --[6] | --[6] | 0.75 | **1.07** | C | **F** |
| 27 | Stewart Av. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.90 | 0.80 | D | C | --[6] | --[6] | --[6] | --[6] | **0.93** | 0.82 | **E** | D |
| 28 | Baldwin Park Bl. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.67 | 0.78 | B | C | --[6] | --[6] | --[6] | --[6] | 0.67 | 0.78 | B | C |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | --[6] | --[6] | --[6] | --[6] | 0.69 | 0.90 | B | D | --[6] | --[6] | --[6] | --[6] | 0.70 | **0.92** | C | **E** |
| 30 | Maine Av. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | 0.86 | 0.82 | D | D | --[6] | --[6] | --[6] | --[6] | 0.87 | 0.84 | D | D |

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

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

[2] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio.

[3] CSS = Cross-street Stop; TS = Traffic Signal

[4] ICU not reported for intersections without a signal.

[5] ICU not reported for intersections under Caltrans' jurisdiction.

[6] HCM not reported for signalized intersections.

## 5.4 ROADWAY SEGMENT CAPACITY ANALYSIS

Table 5-2 provides a summary of the E+P conditions roadway segment capacity analysis based on the City of Irwindale Roadway Segment Capacity Thresholds. The following additional roadway segments would operate at a deficient LOS with the addition of Project traffic in addition to those previously identified for Existing (2017) traffic conditions:

- Live Oak Avenue, Peck Road to Longden Avenue (#2) – LOS D
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS D
- Arrow Highway, Driveway 3 to Driveway/Private Drive B (#6) – LOS D
- Arrow Highway, Avenida Barbosa/Private Drive A to Driveway 8 (#9) – LOS E
- Arrow Highway, Driveway 8 to Driveway 9 (#10) – LOS F
- Arrow Highway, Driveway 9 to I-605 Southbound Off-Ramp (#11) – LOS F
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramps (#27) – LOS D

## 5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

For E+P conditions, the intersection of Private Drive A and Live Oak Avenue would meet the planning level traffic signal warrant (see Appendix 5.2).

## 5.6 FREEWAY OFF-RAMP QUEUING ANALYSIS

Ramp queuing analysis findings are presented in Table 5-3 for E+P traffic conditions. As shown on Table 5-3, there are no queuing issues on the study area freeway off-ramps during the peak hours for E+P traffic conditions, consistent with Existing traffic conditions. Worksheets for E+P conditions queuing analysis are provided in Appendix 5.3.

## 5.7 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 5-4. As shown on Table 5-4 and consistent with Existing conditions, the study area freeway mainline segments would continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for E+P traffic conditions. E+P basic freeway segment analysis worksheets are provided in Appendix 5.4.

## 5.8 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for E+P traffic conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5, the following additional freeway merge/diverge ramp junctions would operate at unacceptable LOS (i.e., LOS E or worse) during the peak hours under E+P traffic conditions:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only

E+P freeway ramp junction operations analysis worksheets are provided in Appendix 5.5.

**Table 5-2**

**Roadway Segment Analysis for E+P Conditions**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | Existing 2017 | V/C[2] | LOS[3] | E+P | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 17,118 | **0.86** | **D** | 18,180 | **0.91** | **E** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | 4D | 30,000 | 23,789 | 0.79 | C | 24,907 | **0.83** | **D** |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 41,218 | 0.78 | C | 42,864 | **0.81** | **D** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | 4D | 30,000 | 23,304 | 0.78 | C | 23,964 | 0.80 | C |
| 5 | | Dwy. 1 to Dwy. 3 | 4D | 30,000 | 23,304 | 0.78 | C | 23,894 | 0.80 | C |
| 6 | | Dwy. 3 to Driveway/Private Drive B | 4D | 30,000 | 23,304 | 0.78 | C | 24,017 | **0.80** | **D** |
| 7 | | Driveway/Private Drive B to Dwy. 6 | 5D | 37,500 | 23,304 | 0.62 | B | 24,557 | 0.65 | B |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | 5D | 37,500 | 23,304 | 0.62 | B | 24,675 | 0.66 | B |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | 4D | 30,000 | 23,035 | 0.77 | C | 28,822 | **0.96** | **E** |
| 10 | | Dwy. 8 to Dwy. 9 | 4D | 30,000 | 23,035 | 0.77 | C | 30,485 | **1.02** | **F** |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | 4D | 30,000 | 23,035 | 0.77 | C | 30,486 | **1.02** | **F** |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 25,255 | **0.84** | **D** | 30,156 | **1.01** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 24,237 | **0.81** | **D** | 26,589 | **0.89** | **D** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 21,137 | 0.70 | B | 22,381 | 0.75 | C |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 15,981 | 0.80 | C | 16,579 | 0.83 | A |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | 5D | 46,700 | 35,519 | 0.76 | C | 37,130 | 0.80 | C |
| 20 | | Dwy. 2 to Speedway Dwy. | 5D | 46,700 | 35,519 | 0.76 | C | 37,037 | 0.79 | C |
| 21 | | Speedway Dwy. to Dwy. 4 | 5D | 46,700 | 29,664 | 0.64 | B | 31,182 | 0.67 | B |
| 22 | | Dwy. 4 to Dwy. 5 | 5D | 46,700 | 29,664 | 0.64 | B | 31,191 | 0.67 | B |
| 23 | | Dwy. 5 to Dwy. 7 | 5D | 46,700 | 29,664 | 0.64 | B | 31,191 | 0.67 | B |
| 24 | | Dwy. 7 to Private Drive A | 5D | 46,700 | 29,664 | 0.64 | B | 31,838 | 0.68 | B |
| 25 | | Private Drive A to Dwy. 10 | 5D | 46,700 | 29,664 | 0.64 | B | 34,751 | 0.74 | C |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | 5D | 46,700 | 29,664 | 0.64 | B | 35,097 | 0.75 | C |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 29,982 | 0.74 | C | 33,731 | **0.83** | **D** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 27,508 | 0.68 | B | 28,744 | 0.71 | C |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 32,254 | 0.69 | B | 33,306 | 0.71 | C |
| 30 | | Stewart Av. to Baldwin Park Bl. | 4D | 40,400 | 29,466 | 0.73 | C | 30,012 | 0.74 | C |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | 4D | 40,400 | 26,310 | 0.65 | B | 26,348 | 0.65 | C |
| 32 | | Arrow Hwy. to Maine Av. | 4D | 40,400 | 44,296 | **1.10** | **F** | 45,576 | **1.13** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 5,363 | 0.27 | A | 6,471 | 0.32 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 3,699 | 0.18 | A | 4,807 | 0.24 | A |

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

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

**Table 5-3**

**Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 95th Percentile Queue (Feet) | | Acceptable? [1] | |
|---|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | AM | PM |
| I-605 SB Off-Ramp / Arrow Hwy. | SBLT | 960 | 377 | 226 | Yes | Yes |
| I-605 NB Off-Ramps / Live Oak Av. | NBR | 1,920 | 148 | 595 | Yes | Yes |
| | SBR | 2,650 | 1,425 | 848 | Yes | Yes |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

## Table 5-4

### Basic Freeway Segment Analysis for E+P Conditions

| Freeway | Direction | Mainline Segment | Lanes[1] | Existing (2017) | | | | E+P | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Density[2] | | LOS[3] | | Density[2] | | LOS[3] | |
| | | | | AM | PM | AM | PM | AM | PM | AM | PM |
| I-605 | SB | North of Arrow Hwy. | 4 | 25.1 | 20.3 | C | C | 26.6 | 21.1 | D | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 20.1 | 18.0 | C | B | 20.1 | 18.0 | C | B |
| | | South of Live Oak Av. | 4 | 25.5 | 26.3 | C | D | 25.8 | 28.3 | C | D |
| | NB | North of Arrow Hwy. | 4 | 19.6 | 19.2 | C | C | 20.1 | 20.6 | C | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 17.0 | 17.7 | B | B | 17.0 | 17.7 | B | B |
| | | South of Live Oak Av. | 4 | 21.1 | 23.0 | C | C | 22.4 | 24.0 | C | C |

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

## Table 5-5

**Freeway Ramp Junction Merge/Diverge Analysis for E+P Conditions**

| Freeway | Direction | Ramp or Segment | Lanes on Freeway[1] | Existing (2017) | | | | E+P | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] |
| I-605 | SB | Off-Ramp at Arrow Hwy. | 4 | 25.6 | D | 20.7 | C | **27.1** | **E** | 21.7 | C |
| | | On-Ramp at Live Oak Av. | 4 | 25.9 | D | 27.2 | D | 26.6 | D | **-** | **F** |
| | NB | On-Ramp at Arrow Hwy. | 4 | 20.2 | C | 19.8 | C | 20.7 | C | 21.2 | C |
| | | Loop On-Ramp at Arrow Hwy. | 4 | 18.6 | B | 18.5 | B | 19.1 | C | 20.0 | C |
| | | Off-Ramp at Live Oak Av. | 4 | 22.0 | D | 24.0 | D | 23.6 | D | 25.1 | D |

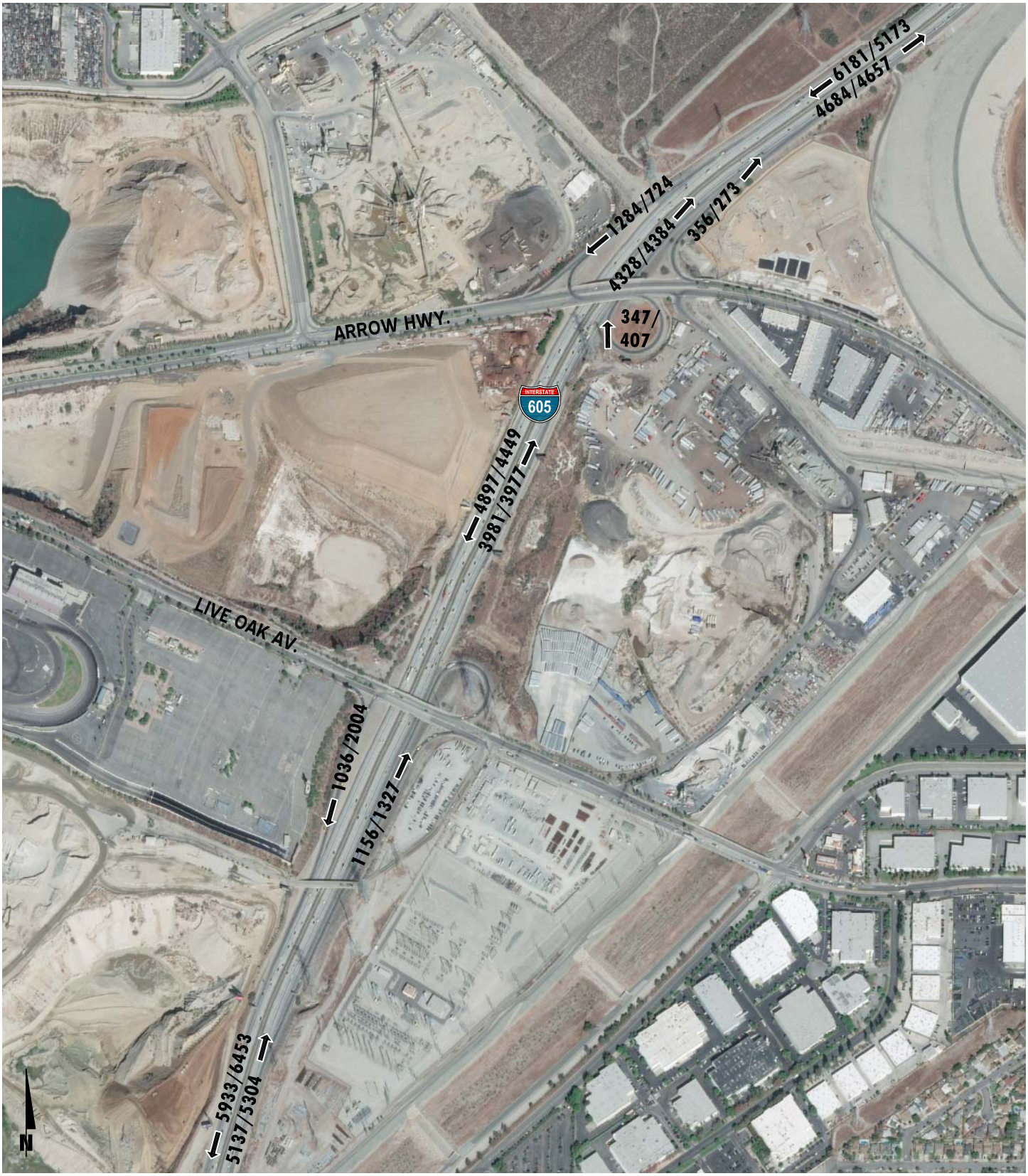
* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

## EXHIBIT 5-4: E+P FREEWAY MAINLINE VOLUMES



## 5.9 E+P IMPACTS

Based on the applicable jurisdiction's significance criteria as discussed in Section 2.9 *Thresholds of Significance*, the following study area intersections were found to be significantly impacted by the Project for E+P traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)

The determination of significant impacts is shown on Table 5-6.

## 5.10 E+P RECOMMENDED IMPROVEMENTS

### 5.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies are recommended at intersections that this report identifies as significantly impacted by the Project in an effort to reduce each location's peak hour delay and improve the associated LOS grade to pre-project traffic conditions, or better, for E+P traffic conditions. The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. The effectiveness of the recommended improvement strategies discussed below to address E+P traffic deficiencies is presented in Table 5-7. HCM calculation worksheets for E+P conditions, with improvements, are provided in Appendix 5.6.

***Mitigation Measure 1.1 – Myrtle Avenue & Longden Avenue (#1)***

- Contribute fair share towards restriping a 2nd eastbound through lane (this improvement may require the overcrossing to the east to be widened to accommodate the 2nd receiving lane).

***Mitigation Measure 2.1 – Myrtle Avenue/Peck Road & Live Oak Avenue (#2)***

- Contribute fair share towards a 2nd southbound left turn lane.

***Mitigation Measure 3.1 – Longden Avenue & Live Oak Avenue/Driveway (#3)***

- Project to restripe a 3rd eastbound through lane.

***Mitigation Measure 4.1 – Live Oak Avenue & Arrow Highway (West) (#4)***

- Contribute fair share towards a 3rd westbound through lane.

## Table 5-6

### Determination of Significant Impacts for E+P Conditions

| # | Intersection | Traffic Control[2] | Existing (2017) V/C Ratio or Delay[1] | | E+P V/C Ratio or Delay[1] | | Difference in V/C or Delay | | Significant Impact?[3,4] |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM | PM | AM | PM | AM | PM | |
| 1 | Myrtle Av. & Longden Av. | TS | 0.81 | **0.92** | 0.84 | **0.95** | -- | **0.028** | Yes |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | 0.88 | **0.94** | 0.88 | **0.97** | -- | **0.028** | Yes |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | 0.74 | 0.88 | 0.77 | **0.91** | -- | **0.029** | Yes |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | **0.99** | 0.69 | **1.01** | 0.74 | **0.021** | -- | Yes |
| 7 | Speedway Dwy. & Live Oak Av.[6] | CSS | 20.8 | **1177.1** | 18.6 | **758.0** | -- | 782.2 | No |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | **1.02** | 0.69 | **1.12** | 0.89 | **0.100** | -- | Yes |
| 23 | I-605 NB Off-Ramps & Live Oak Av. | CSS | **119.3** | **123.9** | **449.0** | **187.6** | 329.7 | 63.7 | Yes[5] |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | 0.71 | **1.04** | 0.75 | **1.07** | -- | **0.030** | Yes |
| 27 | Stewart Av. & Live Oak Av. | TS | 0.90 | 0.80 | **0.93** | 0.82 | **0.027** | -- | Yes |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | 0.69 | 0.90 | 0.70 | **0.92** | -- | **0.025** | Yes |

[1] V/C calculated using the TRAFFIX operation analysis software, based on the ICU methodology. Delay based on HCM (6th Edition) methodology.

[2] TS = Traffic Signal; CSS = Cross-Street Stop

[3] Significant impact occurs when V/C is increased by 0.02 or more for either peak hour.

[4] Significant impact occurs when the delay is increased by more than 2 seconds.

[5] Caltrans facility does not have significance threshold. However, Project will contribute to the existing deficiency. As such, impact is cumulatively considerable.

[6] Intersection includes additional 3rd westbound through lane along Project's frontage on Live Oak Avenue for With Project traffic conditions.

## Table 5-7

**Intersection Analysis for E+P Conditions With Improvements**

| # | Intersection | Traffic Control[4] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | Level of Service | | ICU[3] (v/c) | | Level of Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | | | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.810 | **0.923** | D | **E** |
| | - E+P | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.839 | **0.951** | D | **E** |
| | - With Improvements | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | **2** | **0** | 1 | 2 | 0 | -- | -- | -- | -- | 0.839 | 0.822 | D | D |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.878 | **0.940** | D | **E** |
| | - E+P | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.883 | **0.968** | D | **E** |
| | - With Improvements | TS | 1 | 2 | d | **2** | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.883 | **0.916** | D | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | 0.736 | 0.881 | C | D |
| | - E+P | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | 0.765 | **0.910** | C | **E** |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | **3** | **0** | 1 | 2 | 1>> | -- | -- | -- | -- | 0.765 | 0.743 | C | C |
| 4 | Live Oak Av. & Arrow Hwy. (West) | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **0.989** | 0.692 | **E** | B |
| | - E+P | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **1.010** | 0.738 | **F** | C |
| | - With Improvements | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | **3** | 0 | -- | -- | -- | -- | 0.819 | 0.738 | D | C |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.016** | 0.689 | **F** | B |
| | - E+P | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.116** | 0.887 | **F** | D |
| | - With Improvements | TS | **1** | **1** | **1** | 2 | **1** | 1 | 1 | **3** | 0 | **1** | **3** | 1 | -- | -- | -- | -- | 0.897 | 0.797 | D | C |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - E+P | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - With Improvements | **TS** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0.9 | 1.0 | A | A | -- | -- | -- | -- |
| 26 | Rivergrade Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.711 | **1.042** | C | **F** |
| | - E+P | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.752 | **1.072** | C | **F** |
| | - With Improvements | TS | 1 | 1 | **1>** | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.752 | **0.990** | C | **E** |
| 27 | Stewart Av. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | 0.898 | 0.795 | D | C |
| | - E+P | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | **0.925** | 0.818 | **E** | D |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | **3** | **0** | -- | -- | -- | -- | 0.753 | 0.818 | C | D |
| 29 | Arrow Hwy. & Live Oak Av. (East) | | | | | | | | | | | | | | | | | | | | | |
| | - Existing | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.691 | 0.897 | B | D |
| | - E+P | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.703 | **0.922** | C | **E** |
| | - With Improvements | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | **3** | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.703 | 0.786 | C | C |

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

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d= Defacto Right Turn Lane; **1** = Improvement

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

[3] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio. ICU not reported for unsignalized intersections or at Caltrans facilities.

[4] TS = Traffic Signal; CSS = Cross-Street Stop; **TS** = Improvement

[5] Remove the southbound cross-walk (west leg).

***Mitigation Measure 5.1 – Avenida Barbosa/Private Drive A & Arrow Highway (#15)***

- Project to construct a northbound left turn lane, through lane, and right turn lane (needed for site access).
- Project to construct a southbound through lane (needed for site access).
- Project to restripe a 3rd eastbound through lane (site adjacent improvement).
- Project to construct a westbound left turn lane (needed for site access) and contribute fair share towards a 3rd westbound through lane.

***Mitigation Measure 6.1 – I-605 Northbound Off-Ramp & Live Oak Avenue (#23)***

- Contribute fair share towards the installation of a traffic signal.

***Mitigation Measure 7.1 – Rivergrade Road & Live Oak Avenue (#26)***

- Contribute fair share towards modifying the traffic signal and implement overlap phasing on the northbound right turn lane.

***Mitigation Measure 8.1 – Stewart Avenue & Live Oak Avenue (#27)***

- Project to restripe a 3rd westbound through lane.

***Mitigation Measure 9.1 – Arrow Highway & Live Oak Avenue (East) (#29)***

- Project to restripe a 3rd eastbound through lane.

### 5.10.2 Recommended Improvements to Address Deficiencies on Roadway Segments

With the implementation of the intersection improvements listed above in conjunction with the Project's site adjacent improvements, only the following roadway segments would continue to operate at a deficient LOS for E+P traffic conditions (see Table 5-8):

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS E
- Live Oak Avenue, Peck Road to Longden Avenue (#2) – LOS D
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS D
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS F
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS D
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramps (#27) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS E

However, additional roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS during the peak hours with the recommended improvements.

### 5.10.3 Recommended Improvements to Address Deficiencies on Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale (or other neighboring jurisdictions) on SHS facilities. As such, no improvements have been recommended to address E+P deficiencies on the SHS, because there is no feasible mitigation available.

## Table 5-8

**Roadway Segment Analysis for E+P Conditions With Improvements**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | Existing 2017 | V/C[2] | LOS[3] | E+P | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 17,118 | **0.86** | **D** | 18,180 | **0.91** | **E** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | 4D | 30,000 | 23,789 | 0.79 | C | 24,907 | **0.83** | **D** |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 41,218 | 0.78 | C | 42,864 | **0.81** | **D** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | **6D** | **53,000** | 23,304 | 0.44 | A | 23,964 | 0.45 | A |
| 5 | | Dwy. 1 to Dwy. 3 | **6D** | **53,000** | 23,304 | 0.44 | A | 23,894 | 0.45 | A |
| 6 | | Dwy. 3 to Driveway/Private Drive B | **6D** | **53,000** | 23,304 | 0.44 | A | 24,017 | 0.45 | A |
| 7 | | Driveway/Private Drive B to Dwy. 6 | **6D** | **53,000** | 23,304 | 0.44 | A | 24,557 | 0.46 | A |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | **6D** | **53,000** | 23,304 | 0.44 | A | 24,675 | 0.47 | A |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | **6D** | **53,000** | 23,035 | 0.43 | A | 28,822 | 0.54 | A |
| 10 | | Dwy. 8 to Dwy. 9 | **6D** | **53,000** | 23,035 | 0.43 | A | 30,485 | 0.58 | A |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | **6D** | **53,000** | 23,035 | 0.43 | A | 30,486 | 0.58 | A |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 25,255 | **0.84** | **D** | 30,156 | **1.01** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 24,237 | **0.81** | **D** | 26,589 | **0.89** | **D** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 21,137 | 0.70 | B | 22,381 | 0.75 | C |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 15,981 | 0.80 | C | 16,579 | 0.83 | A |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | **6D** | **53,000** | 35,519 | 0.67 | B | 37,130 | 0.70 | C |
| 20 | | Dwy. 2 to Speedway Dwy. | **6D** | **53,000** | 35,519 | 0.67 | B | 37,037 | 0.70 | B |
| 21 | | Speedway Dwy. to Dwy. 4 | **6D** | **53,000** | 29,664 | 0.56 | A | 31,182 | 0.59 | A |
| 22 | | Dwy. 4 to Dwy. 5 | **6D** | **53,000** | 29,664 | 0.56 | A | 31,191 | 0.59 | A |
| 23 | | Dwy. 5 to Dwy. 7 | **6D** | **53,000** | 29,664 | 0.56 | A | 31,191 | 0.59 | A |
| 24 | | Dwy. 7 to Private Drive A | **6D** | **53,000** | 29,664 | 0.56 | A | 31,838 | 0.60 | B |
| 25 | | Private Drive A to Dwy. 10 | **6D** | **53,000** | 29,664 | 0.56 | A | 34,751 | 0.66 | B |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | **6D** | **53,000** | 29,664 | 0.56 | A | 35,097 | 0.66 | B |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 29,982 | 0.74 | C | 33,731 | **0.83** | **D** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 27,508 | 0.68 | B | 28,744 | 0.71 | C |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 32,254 | 0.69 | B | 33,306 | 0.71 | C |
| 30 | | Stewart Av. to Baldwin Park Bl. | **5D** | **46,700** | 29,466 | 0.63 | B | 30,012 | 0.64 | B |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | **5D** | **46,700** | 26,310 | 0.56 | A | 26,348 | 0.56 | A |
| 32 | | Arrow Hwy. to Maine Av. | **5D** | **46,700** | 44,296 | **0.95** | **E** | 45,576 | **0.98** | **E** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 5,363 | 0.27 | A | 6,471 | 0.32 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 3,699 | 0.18 | A | 4,807 | 0.24 | A |

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

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

# 6 OPENING YEAR CUMULATIVE (2020) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative Without and With Project traffic forecasts, and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations analyses.

## 6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative conditions are consistent with those shown previously on Exhibit 3-1, with the exception of Project driveways and those facilities assumed to be constructed by the Project to provide site access, which would be in place for Opening Year Cumulative traffic conditions.

## 6.2 OPENING YEAR CUMULATIVE WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT, AM and PM peak hour volumes which can be expected for Opening Year Cumulative Without Project traffic conditions are shown on Exhibit 6-1 and Exhibit 6-2, respectively.

## 6.3 OPENING YEAR CUMULATIVE WITH PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT, AM and PM peak hour volumes which can be expected for Opening Year Cumulative With Project traffic conditions are shown on Exhibit 6-3 and Exhibit 6-4, respectively.

## 6.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative Without Project conditions, with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the following intersections were identified to operate at a deficient LOS for Opening Year Cumulative Without Project traffic conditions in addition to those previously identified under Existing traffic conditions:

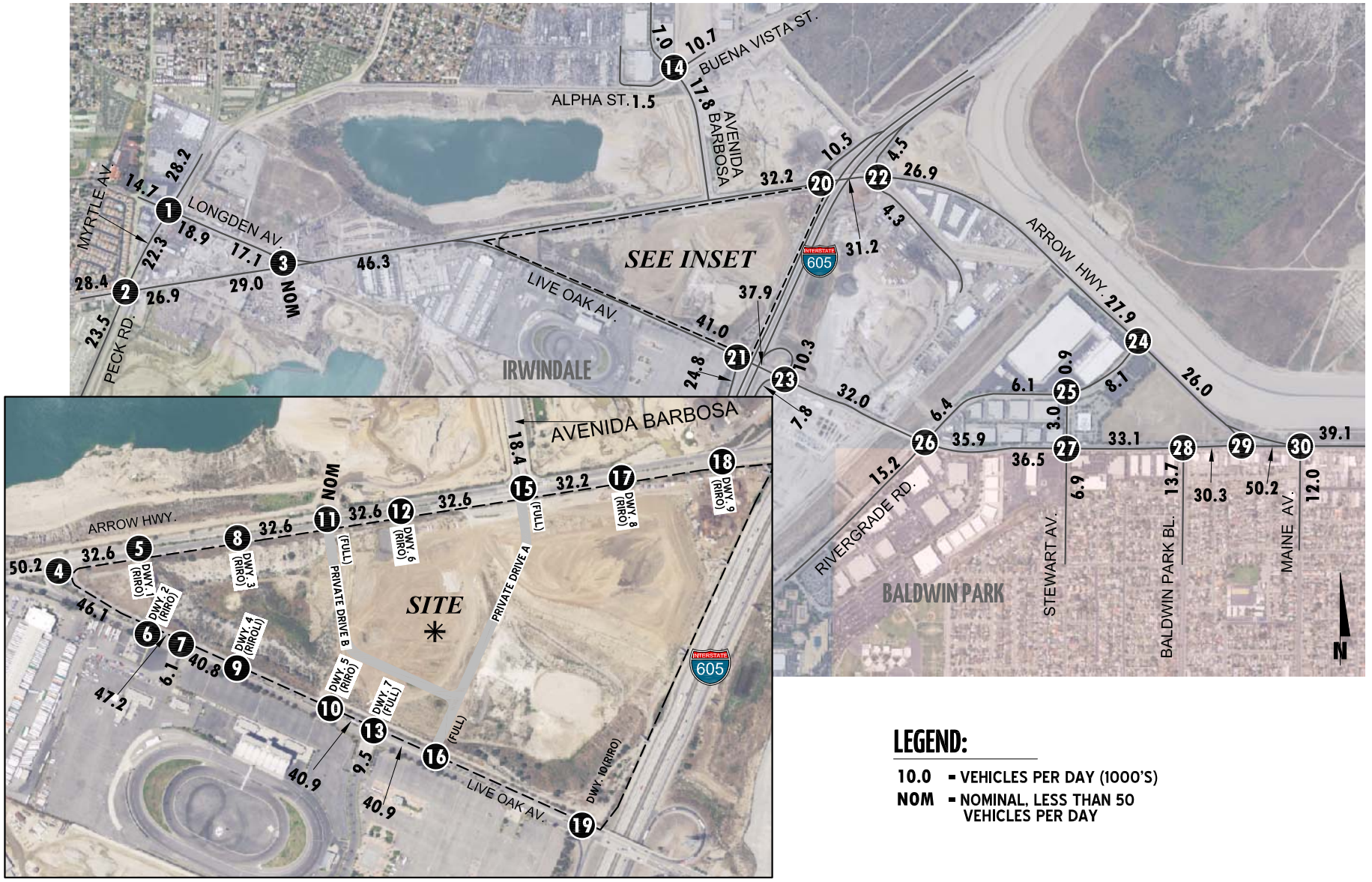
- Longden Avenue & Live Oak Avenue/Driveway (#3) – LOS E PM peak hour only
- Stewart Avenue & Live Oak Avenue (#27) – LOS E AM peak hour only
- Arrow Highway & Live Oak Avenue (East) (#29) – LOS E PM peak hour only

The following additional intersection would operate at unacceptable level of service with the addition of Project traffic:

- Maine Avenue & Arrow Highway (#30) – LOS E AM peak hour only

A summary of the peak hour intersection LOS for Opening Year Cumulative Without and With Project conditions are shown on Exhibits 6-5 and 6-6, respectively. The intersection operations analysis worksheets for Opening Year Cumulative Without and With Project traffic conditions are included in Appendix 6.1 and Appendix 6.2 of this TIA, respectively.

## EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)




**LEGEND:**

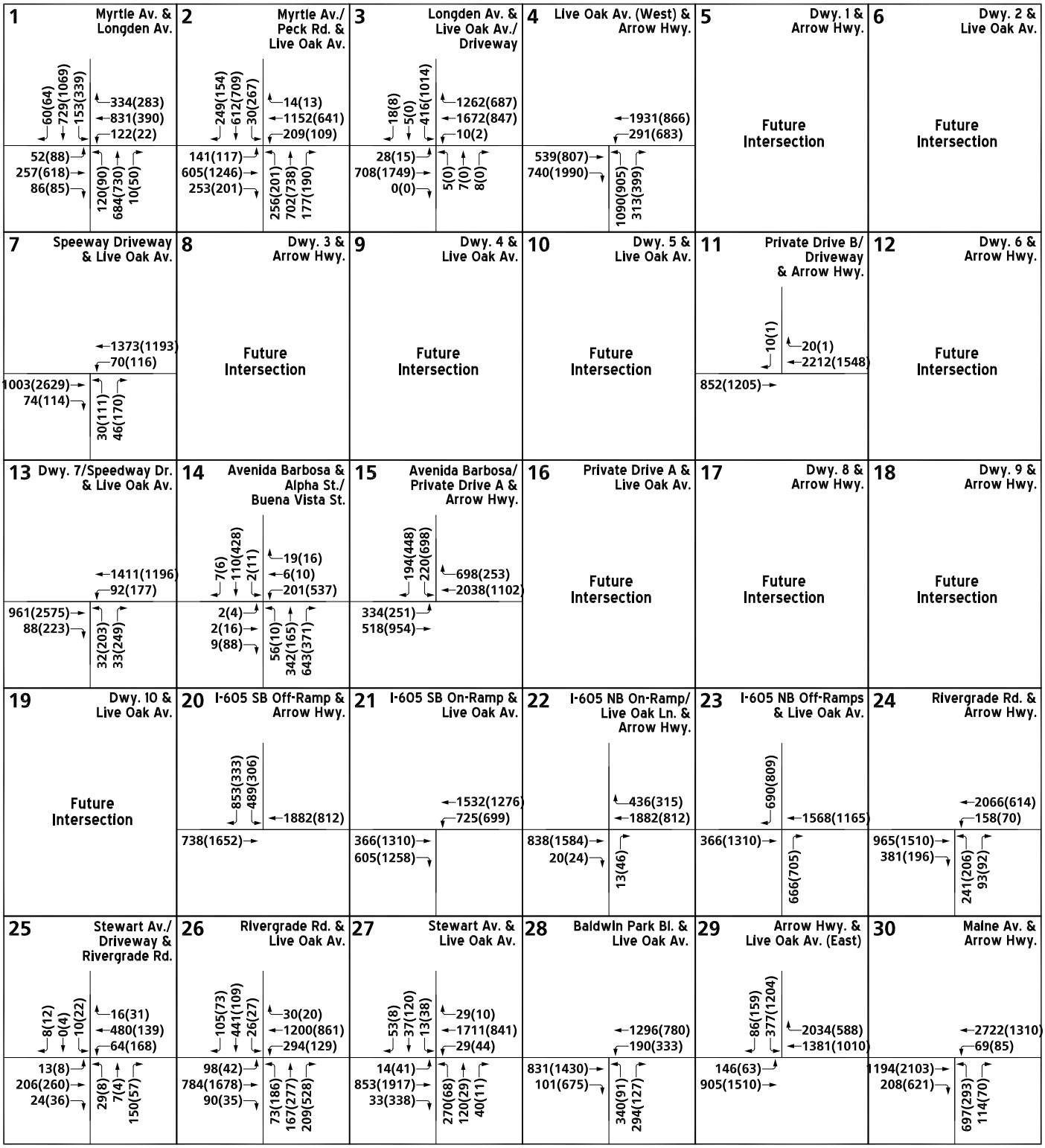
**10.0** = VEHICLES PER DAY (1000'S)
**NOM** = NOMINAL, LESS THAN 50 VEHICLES PER DAY





URBAN CROSSROADS

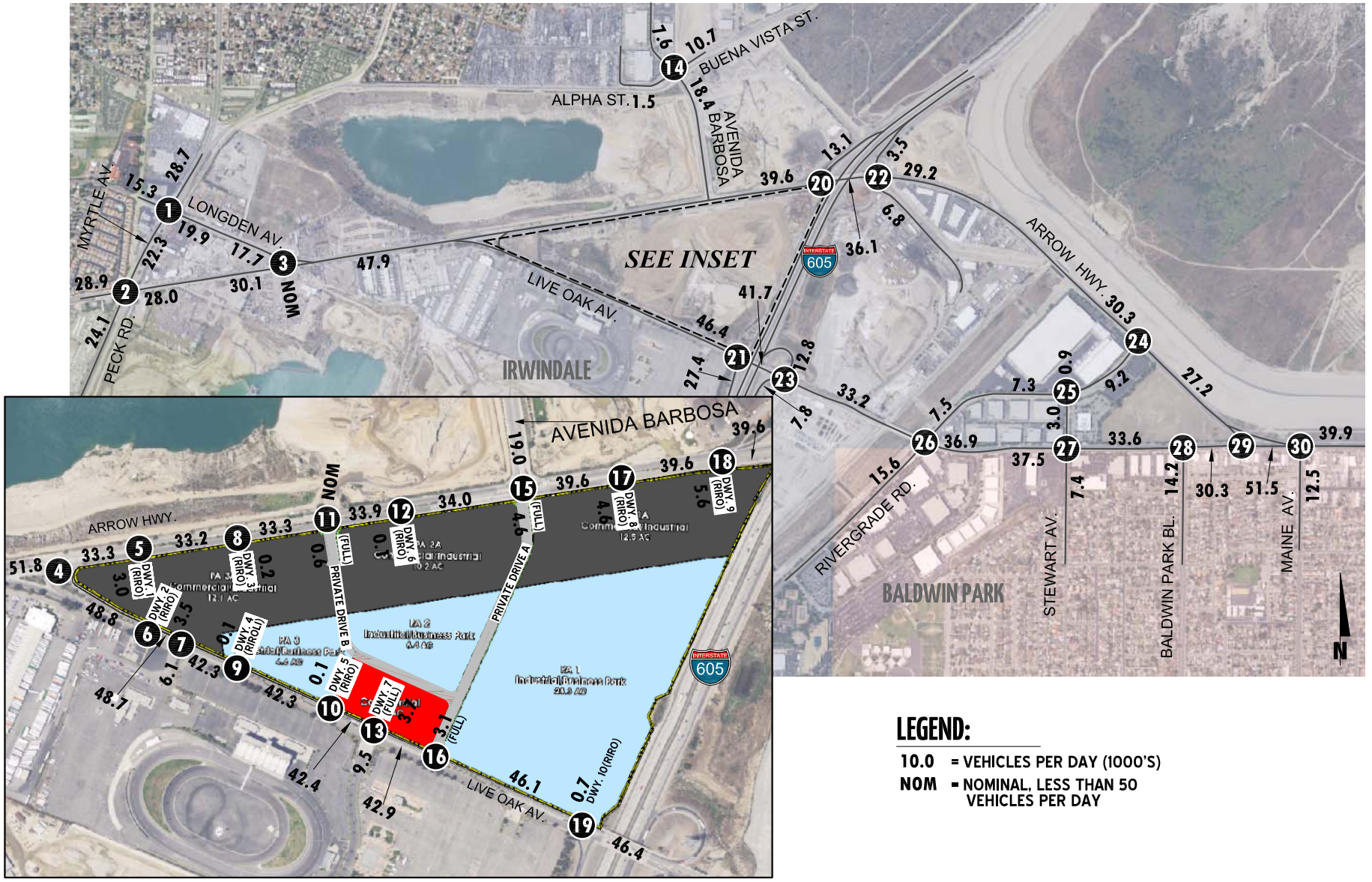
## EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)




## LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2020) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)




**LEGEND:**

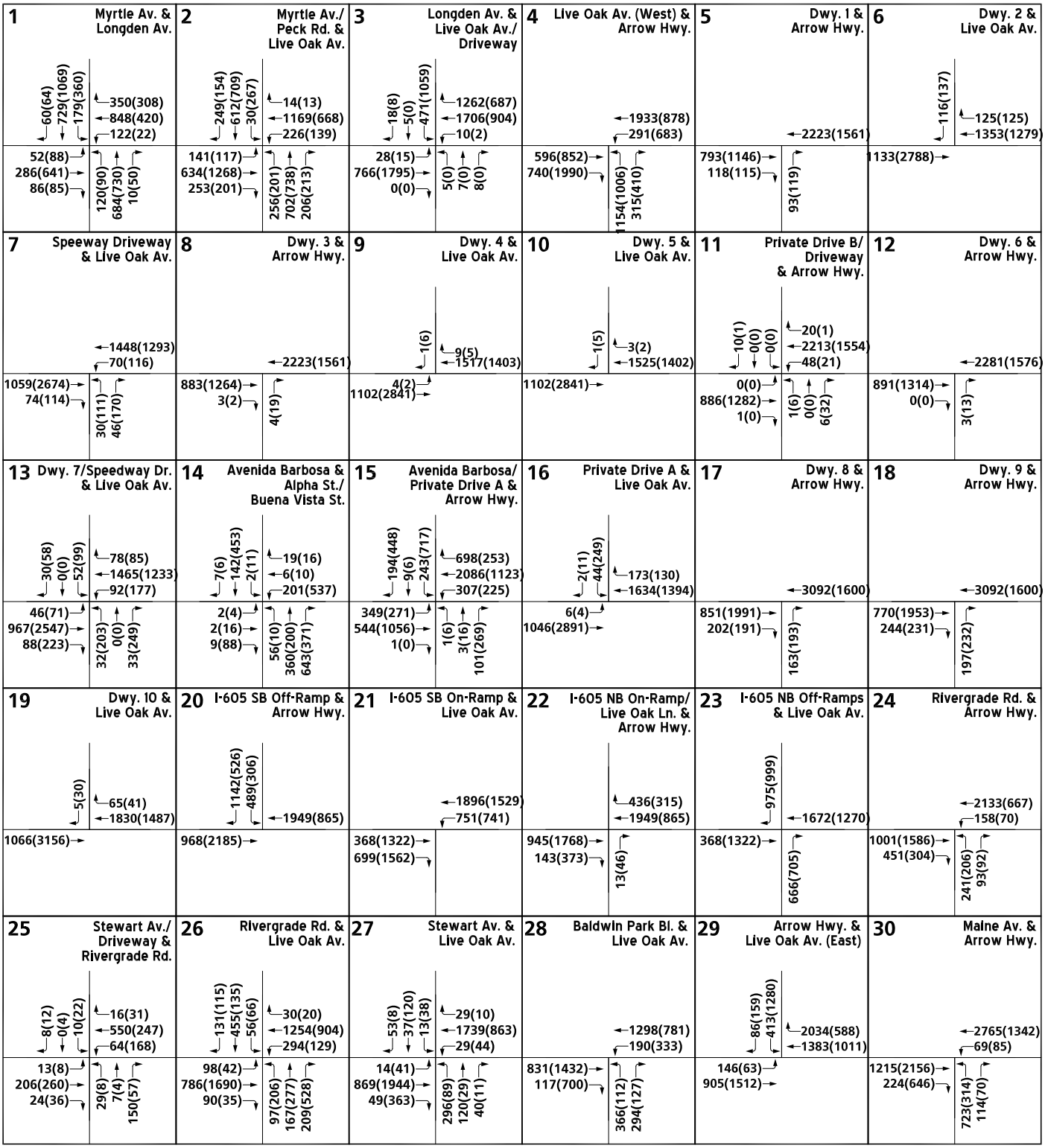
**10.0** = VEHICLES PER DAY (1000'S)
**NOM** = NOMINAL, LESS THAN 50 VEHICLES PER DAY





URBAN CROSSROADS

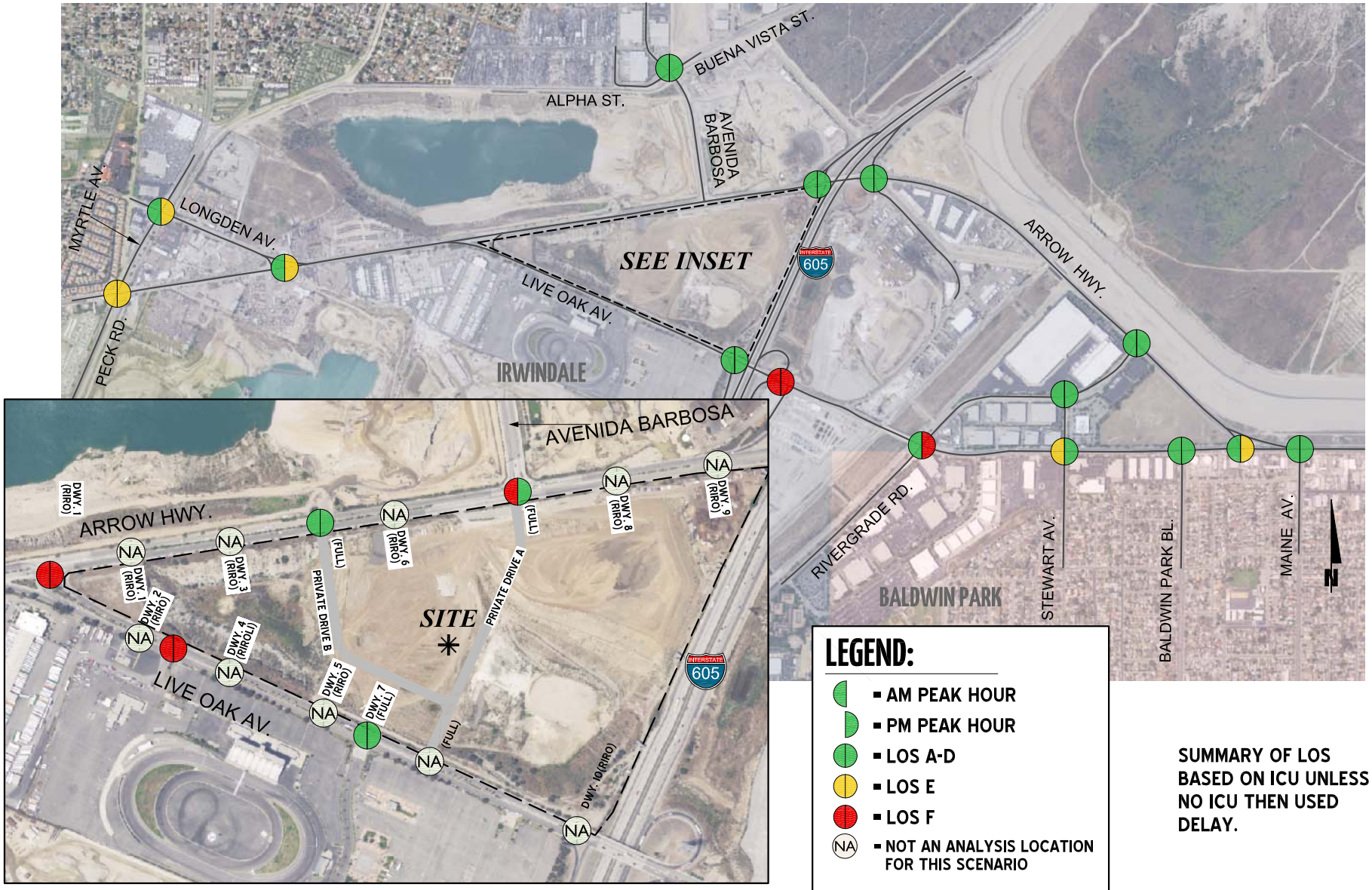
## EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES (IN PCE)




## LEGEND:

**10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES**

## EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT SUMMARY OF LOS

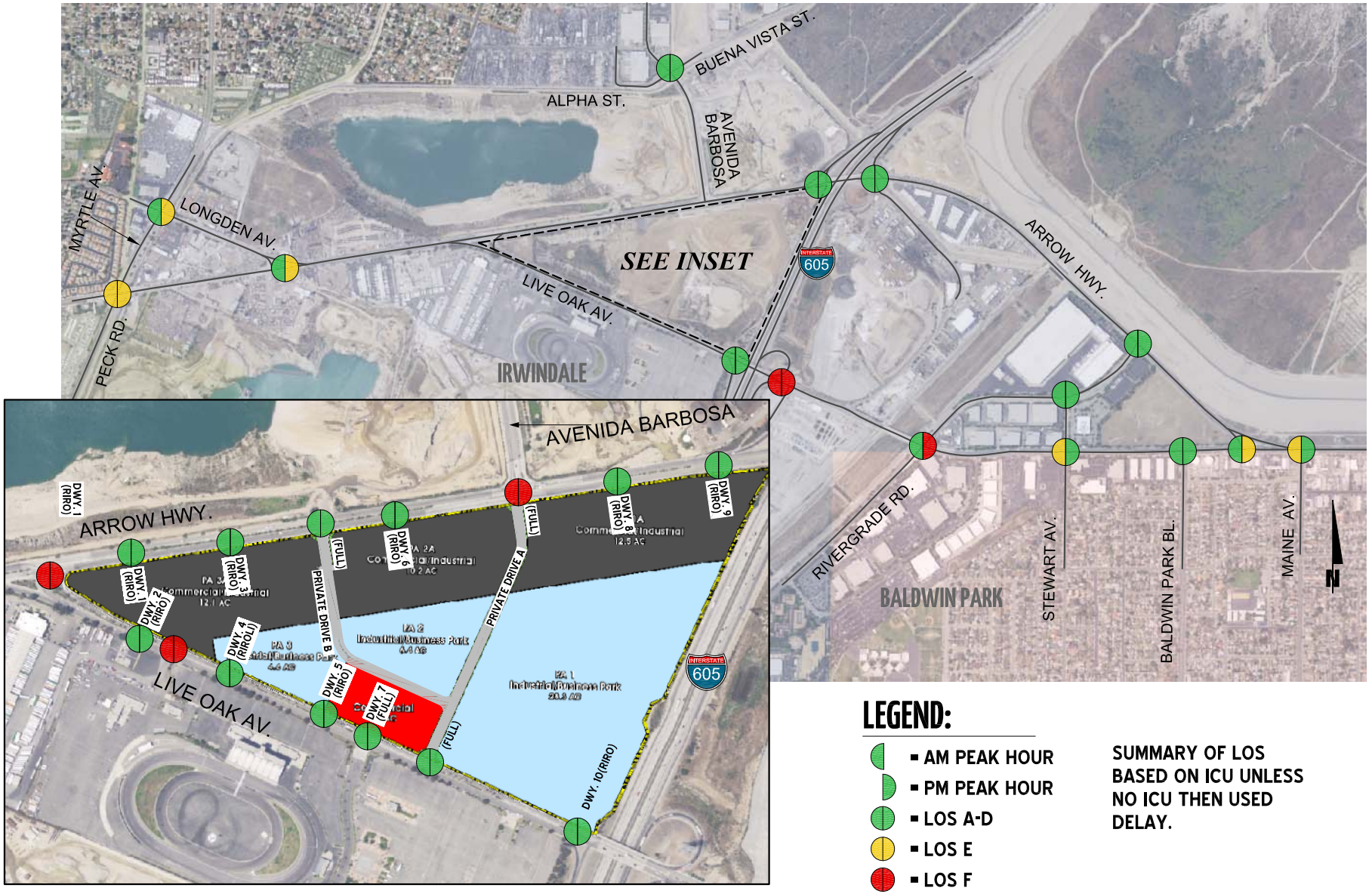







URBAN CROSSROADS

## EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2020) WITH PROJECT SUMMARY OF LOS




**LEGEND:**

- AM PEAK HOUR
- PM PEAK HOUR
- LOS A-D
- LOS E
- LOS F

SUMMARY OF LOS BASED ON ICU UNLESS NO ICU THEN USED DELAY.





URBAN CROSSROADS

## Table 6-1

**Intersection Analysis for Opening Year Cumulative (2020) Conditions**

| # | Intersection | Traffic Control[3] | 2020 Without Project | | | | | | | | 2020 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.81 | **0.96** | D | **E** | --[6] | --[6] | --[6] | --[6] | 0.84 | **0.98** | D | **E** |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | **0.90** | **0.96** | **E** | **E** | --[6] | --[6] | --[6] | --[6] | **0.91** | **0.98** | **E** | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | --[6] | --[6] | --[6] | --[6] | 0.78 | **0.97** | C | **E** | --[6] | --[6] | --[6] | --[6] | 0.81 | **0.99** | D | **E** |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | --[6] | --[6] | --[6] | --[6] | **1.04** | **1.82** | **F** | **F** | --[6] | --[6] | --[6] | --[6] | **1.07** | **1.85** | **F** | **F** |
| 5 | Dwy. 1 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 15.3 | 22.1 | C | C | --[4] | --[4] | --[4] | --[4] |
| 6 | Dwy. 2 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 27.6 | 28.1 | D | D | --[4] | --[4] | --[4] | --[4] |
| 7 | Speedway Dwy. & Live Oak Av. | CSS | **68.8** | **>100.0** | **F** | **F** | --[4] | --[4] | --[4] | --[4] | **44.7** | **>100.0** | **E** | **F** | --[4] | --[4] | --[4] | --[4] |
| 8 | Dwy. 3 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 12.9 | 16.4 | B | C | --[4] | --[4] | --[4] | --[4] |
| 9 | Dwy. 4 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 24.4 | 21.5 | C | C | --[4] | --[4] | --[4] | --[4] |
| 10 | Dwy. 5 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 18.3 | 17.2 | C | C | --[4] | --[4] | --[4] | --[4] |
| 11 | Driveway/Private Drive B & Arrow Hwy. | CSS | 30.5 | 16.9 | D | C | --[4] | --[4] | --[4] | --[4] | 30.7 | 22.0 | D | C | --[4] | --[4] | --[4] | --[4] |
| 12 | Dwy. 6 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 12.9 | 16.6 | B | C | --[4] | --[4] | --[4] | --[4] |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.56 | 0.79 | A | C | --[6] | --[6] | --[6] | --[6] | 0.52 | 0.88 | A | D |
| 14 | Avenida Barbosa & Alpha St./Buena Vista St. | TS | --[6] | --[6] | --[6] | --[6] | 0.49 | 0.71 | A | C | --[6] | --[6] | --[6] | --[6] | 0.52 | 0.74 | A | C |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | **1.07** | 0.86 | **F** | D | --[6] | --[6] | --[6] | --[6] | **1.16** | **1.05** | **F** | **F** |
| 16 | Private Drive A & Live Oak Av. | **TS** | Future Intersection | | | | | | | | --[6] | --[6] | --[6] | --[6] | 0.51 | 0.84 | A | D |
| 17 | Dwy. 8 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 11.2 | 23.1 | B | C | --[4] | --[4] | --[4] | --[4] |
| 18 | Dwy. 9 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 11.2 | 26.3 | B | D | --[4] | --[4] | --[4] | --[4] |
| 19 | Dwy. 10 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 20.8 | 17.7 | C | C | --[4] | --[4] | --[4] | --[4] |
| 20 | I-605 SB Off-Ramp & Arrow Hwy. | TS | 23.8 | 8.5 | C | A | --[5] | --[5] | --[5] | --[5] | 25.5 | 10.0 | C | A | --[5] | --[5] | --[5] | --[5] |
| 21 | I-605 SB On-Ramp & Live Oak Av. | TS | 7.5 | 20.1 | A | C | --[5] | --[5] | --[5] | --[5] | 9.2 | 21.6 | A | C | --[5] | --[5] | --[5] | --[5] |
| 22 | I-605 NB On-Ramp/Live Oak Ln. & Arrow Hwy. | CSS | 11.6 | 18.2 | B | C | --[5] | --[5] | --[5] | --[5] | 12.2 | 20.8 | B | C | --[5] | --[5] | --[5] | --[5] |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | CSS | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] |
| 24 | Rivergrade Rd. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | 0.82 | 0.68 | D | B | --[6] | --[6] | --[6] | --[6] | 0.84 | 0.70 | D | C |
| 25 | Stewart Av./Driveway & Rivergrade Rd. | TS | --[6] | --[6] | --[6] | --[6] | 0.37 | 0.35 | A | A | --[6] | --[6] | --[6] | --[6] | 0.39 | 0.35 | A | A |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.72 | **1.05** | C | **F** | --[6] | --[6] | --[6] | --[6] | 0.76 | **1.08** | C | **F** |
| 27 | Stewart Av. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | **0.92** | 0.84 | **E** | D | --[6] | --[6] | --[6] | --[6] | **0.95** | 0.87 | **E** | D |
| 28 | Baldwin Park Bl. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.69 | 0.83 | B | D | --[6] | --[6] | --[6] | --[6] | 0.69 | 0.84 | B | D |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | --[6] | --[6] | --[6] | --[6] | 0.74 | **0.95** | C | **E** | --[6] | --[6] | --[6] | --[6] | 0.75 | **0.97** | C | **E** |
| 30 | Maine Av. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | 0.89 | 0.46 | D | A | --[6] | --[6] | --[6] | --[6] | **0.90** | 0.48 | **E** | A |

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

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

[2] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio.

[3] TS = Traffic Signal; CSS = Cross-street Stop

[4] ICU not reported for intersections without a signal.

[5] ICU not reported for intersections under Caltrans' jurisdiction.

[6] HCM not reported for signalized intersections.

## 6.5 ROADWAY SEGMENT CAPACITY ANALYSIS

Table 6-2 provides a summary of the Opening Year Cumulative (2020) Without Project traffic conditions roadway segment capacity analysis based on the City of Irwindale Roadway Segment Capacity Thresholds. The following study area roadway segments would operate at an unacceptable LOS for Opening Year Cumulative (2020) Without Project traffic conditions:

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS E
- Live Oak Avenue, Peck Road to Longden Avenue (#2) – LOS D
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS D
- Arrow Highway, Live Oak Avenue to Driveway 1 (#4) – LOS F
- Arrow Highway, Driveway 1 to Driveway 3 (#5) – LOS F
- Arrow Highway, Driveway 3 to Driveway/Private Drive B (#6) – LOS F
- Arrow Highway, Driveway/Private Drive B to Driveway 6 (#7) – LOS D
- Arrow Highway, Driveway 6 to Avenida Barbosa/Private Drive A (#8) – LOS D
- Arrow Highway, Avenida Barbosa/Private Drive A to Driveway 8 (#9) – LOS F
- Arrow Highway, Driveway 8 to Driveway 9 (#10) – LOS F
- Arrow Highway, Driveway 9 to I-605 Southbound Off-Ramp (#11) – LOS F
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS F
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS D
- Arrow Highway, Rivergrade Road to Live Oak Avenue (#14) – LOS D
- Avenida Barbosa, Alpha Street/Buena Vista Street to Arrow Highway (#16) – LOS D
- Live Oak Avenue, Live Oak Avenue/Arrow Highway to Driveway 2 (#19) – LOS E
- Live Oak Avenue, Driveway 2 to Speedway Driveway (#20) – LOS F
- Live Oak Avenue, Speedway Driveway to Driveway 4 (#21) – LOS D
- Live Oak Avenue, Driveway 4 to Driveway 5 (#22) – LOS D
- Live Oak Avenue, Driveway 5 to Driveway 7 (#23) – LOS D
- Live Oak Avenue, Driveway 7 to Private Drive A (#24) – LOS D
- Live Oak Avenue, Private Drive A to Driveway 10 (#25) – LOS D
- Live Oak Avenue, Driveway 10 to I-605 Southbound On-Ramp (#26) – LOS D
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramp (#27) – LOS E
- Live Oak Avenue, Stewart Avenue to Baldwin Park Boulevard (#30) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS F

The following roadway segments would operate at a deficient LOS with the addition of Project traffic in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Rivergrade Road to Stewart Avenue (#29) – LOS D

**Table 6-2**

**Roadway Segment Analysis for Opening Year Cumulative (2020) Conditions**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | 2020 Without Project | V/C[2] | LOS[3] | 2020 With Project | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 18,878 | **0.94** | **E** | 19,940 | **1.00** | **E** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | 4D | 30,000 | 26,917 | **0.90** | **D** | 28,035 | **0.93** | **E** |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 46,253 | **0.87** | **D** | 47,899 | **0.90** | **E** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | 4D | 30,000 | 32,633 | **1.09** | **F** | 33,293 | **1.11** | **F** |
| 5 | | Dwy. 1 to Dwy. 3 | 4D | 30,000 | 32,631 | **1.09** | **F** | 33,221 | **1.11** | **F** |
| 6 | | Dwy. 3 to Driveway/Private Drive B | 4D | 30,000 | 32,631 | **1.09** | **F** | 33,344 | **1.11** | **F** |
| 7 | | Driveway/Private Drive B to Dwy. 6 | 5D | 37,500 | 32,631 | **0.87** | **D** | 33,884 | **0.90** | **E** |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | 5D | 37,500 | 32,631 | **0.87** | **D** | 34,002 | **0.91** | **E** |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | 4D | 30,000 | 32,158 | **1.07** | **F** | 37,945 | **1.26** | **F** |
| 10 | | Dwy. 8 to Dwy. 9 | 4D | 30,000 | 32,158 | **1.07** | **F** | 39,608 | **1.32** | **F** |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | 4D | 30,000 | 32,158 | **1.07** | **F** | 39,609 | **1.32** | **F** |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 31,213 | **1.04** | **F** | 36,114 | **1.20** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 26,846 | **0.89** | **D** | 29,198 | **0.97** | **E** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 25,978 | **0.87** | **D** | 27,222 | **0.91** | **E** |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 17,839 | **0.89** | **D** | 18,437 | **0.92** | **E** |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | 5D | 46,700 | 45,596 | **0.98** | **E** | 47,207 | **1.01** | **F** |
| 20 | | Dwy. 2 to Speedway Dwy. | 5D | 46,700 | 47,170 | **1.01** | **F** | 48,688 | **1.04** | **F** |
| 21 | | Speedway Dwy. to Dwy. 4 | 5D | 46,700 | 40,779 | **0.87** | **D** | 42,297 | **0.91** | **E** |
| 22 | | Dwy. 4 to Dwy. 5 | 5D | 46,700 | 40,779 | **0.87** | **D** | 42,306 | **0.91** | **E** |
| 23 | | Dwy. 5 to Dwy. 7 | 5D | 46,700 | 40,779 | **0.87** | **D** | 42,306 | **0.91** | **E** |
| 24 | | Dwy. 7 to Private Drive A | 5D | 46,700 | 40,842 | **0.87** | **D** | 43,016 | **0.92** | **E** |
| 25 | | Private Drive A to Dwy. 10 | 5D | 46,700 | 40,751 | **0.87** | **D** | 45,838 | **0.98** | **E** |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | 5D | 46,700 | 40,957 | **0.88** | **D** | 46,390 | **0.99** | **E** |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 37,937 | **0.94** | **E** | 41,686 | **1.03** | **F** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 31,969 | 0.79 | C | 33,205 | **0.82** | **D** |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 36,473 | 0.78 | C | 37,525 | **0.80** | **D** |
| 30 | | Stewart Av. to Baldwin Park Bl. | 4D | 40,400 | 33,071 | **0.82** | **D** | 33,617 | **0.83** | **D** |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | 4D | 40,400 | 30,305 | 0.75 | C | 30,343 | 0.75 | C |
| 32 | | Arrow Hwy. to Maine Av. | 4D | 40,400 | 50,172 | **1.24** | **F** | 51,452 | **1.27** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 8,112 | 0.41 | A | 9,220 | 0.46 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 6,346 | 0.32 | A | 7,454 | 0.37 | A |

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

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

## 6.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrant analysis was not performed for Opening Year Cumulative (2020) Without Project traffic conditions as there are no additional unsignalized intersections aside from the location previously warranted under Existing (2017) traffic conditions. No additional study area intersections would meet either peak hour volume-based or the planning level traffic signal warrants for Opening Year Cumulative (2020) With Project traffic conditions (see Appendix 6.3).

## 6.7 FREEWAY OFF-RAMP QUEUING ANALYSIS

Ramp queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative conditions. As shown on Table 6-3, there are no queuing issues on the study area freeway off-ramps during the peak hours for both Opening Year Cumulative Without and With Project traffic conditions. Worksheets for Opening Year Cumulative Without and With Project conditions queuing analysis are provided in Appendix 6.4 and Appendix 6.5, respectively.

## 6.8 BASIC FREEWAY SEGMENT ANALYSIS

Opening Year Cumulative Without and With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibits 6-7 and 6-8 for the I-605 Freeway, respectively. As shown on Table 6-4, the basic freeway segments would continue to operate at an acceptable LOS for both Opening Year Cumulative Without and With Project traffic conditions. Opening Year Cumulative Without Project basic freeway segment analysis worksheets are provided in Appendix 6.6. Opening Year Cumulative With Project basic freeway segment analysis worksheets are provided in Appendix 6.7.

## 6.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative Without and With Project traffic conditions and the results of this analysis are presented in Table 6-5. As shown on Table 6-5, the following freeway ramp junctions would operate at a deficient LOS for Opening Year Cumulative Without traffic conditions:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only
- I-605 Freeway – Northbound, Off-Ramp at Live Oak Avenue (#5) – LOS E PM peak hour only

The addition of Project traffic would not result in any additional deficient freeway ramp junctions, in addition to those identified under Opening Year Cumulative (2020) Without Project traffic conditions. Opening Year Cumulative Without Project freeway ramp junction operations and weaving analysis worksheets are provided in Appendix 6.8. Opening Year Cumulative With Project freeway ramp junction operations analysis worksheets are provided in Appendix 6.9.

**Table 6-3**

**Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2020) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 2020 Without Project | | | | 2020 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet) | | Acceptable? [1] | | 95th Percentile Queue (Feet) | | Acceptable? [1] | |
| | | | AM Peak Hour | PM Peak Hour | AM | PM | AM Peak Hour | PM Peak Hour | AM | PM |
| I-605 SB Off-Ramp / Arrow Hwy. | SBLT | 960 | 422 | 215 | Yes | Yes | 422 | 253 | Yes | Yes |
| I-605 NB Off-Ramps / Live Oak Av. | NBR | 1,920 | 235 | 845 | Yes | Yes | 235 | 853 | Yes | Yes |
| | SBR | 2,650 | 1,158 | 848 | Yes | Yes | 2,173 | 1,695 | Yes | Yes |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

**Table 6-4**

**Basic Freeway Segment Analysis for Opening Year Cumulative (2020) Conditions**

| Freeway | Direction | Mainline Segment | Lanes[1] | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Density[2] | | LOS[3] | | Density[2] | | LOS[3] | |
| | | | | AM | PM | AM | PM | AM | PM | AM | PM |
| I-605 | SB | North of Arrow Hwy. | 4 | 28.2 | 22.7 | D | C | 29.9 | 23.6 | D | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 21.5 | 19.1 | C | C | 21.5 | 19.1 | C | C |
| | | South of Live Oak Av. | 4 | 27.7 | 30.1 | D | D | 28.3 | 32.4 | D | D |
| | NB | North of Arrow Hwy. | 4 | 21.2 | 21.6 | C | C | 21.8 | 23.3 | C | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 18.0 | 18.9 | B | C | 18.0 | 18.9 | B | C |
| | | South of Live Oak Av. | 4 | 23.6 | 25.7 | C | C | 25.0 | 26.8 | C | D |

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

## Table 6-5

**Freeway Ramp Junction Merge/Diverge Analysis for Opening Year Cumulative (2020) Conditions**

| Freeway | Direction | Ramp or Segment | Lanes on Freeway[1] | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] |
| I-605 | SB | Off-Ramp at Arrow Hwy. | 4 | **28.2** | **E** | 23.2 | D | **29.9** | **E** | 24.3 | D |
| | | On-Ramp at Live Oak Av. | 4 | 28.2 | D | **--[4]** | **F** | 32.2 | D | **--[4]** | **F** |
| | NB | On-Ramp at Arrow Hwy. | 4 | 21.8 | C | 22.1 | C | 22.4 | C | 23.8 | C |
| | | Loop On-Ramp at Arrow Hwy. | 4 | 20.0 | C | 20.8 | C | 20.6 | C | 22.4 | C |
| | | Off-Ramp at Live Oak Av. | 4 | 24.6 | D | **26.7** | **E** | **26.3** | **E** | **27.8** | **E** |

* **BOLD** = Unacceptable Level of Service

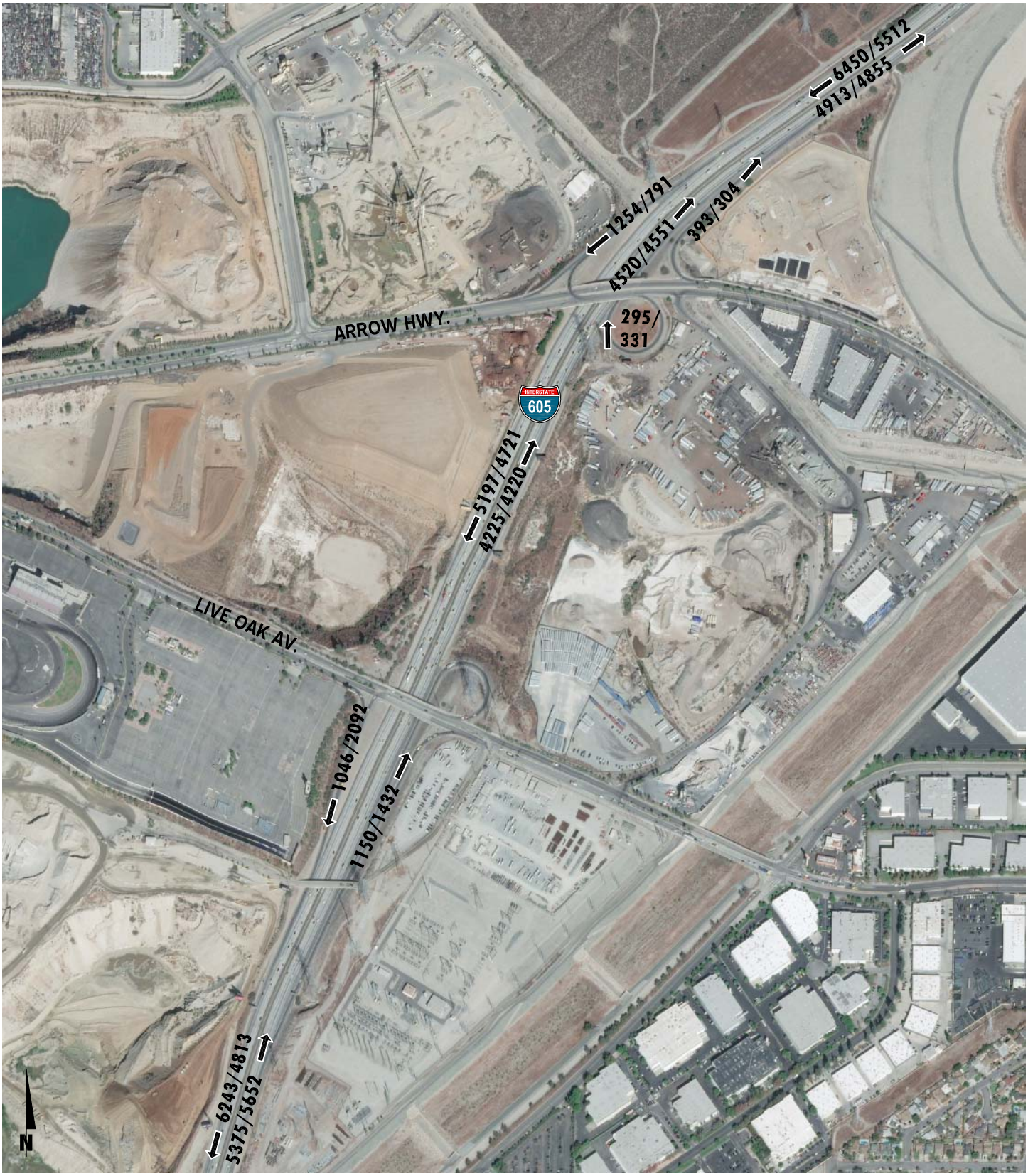
[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

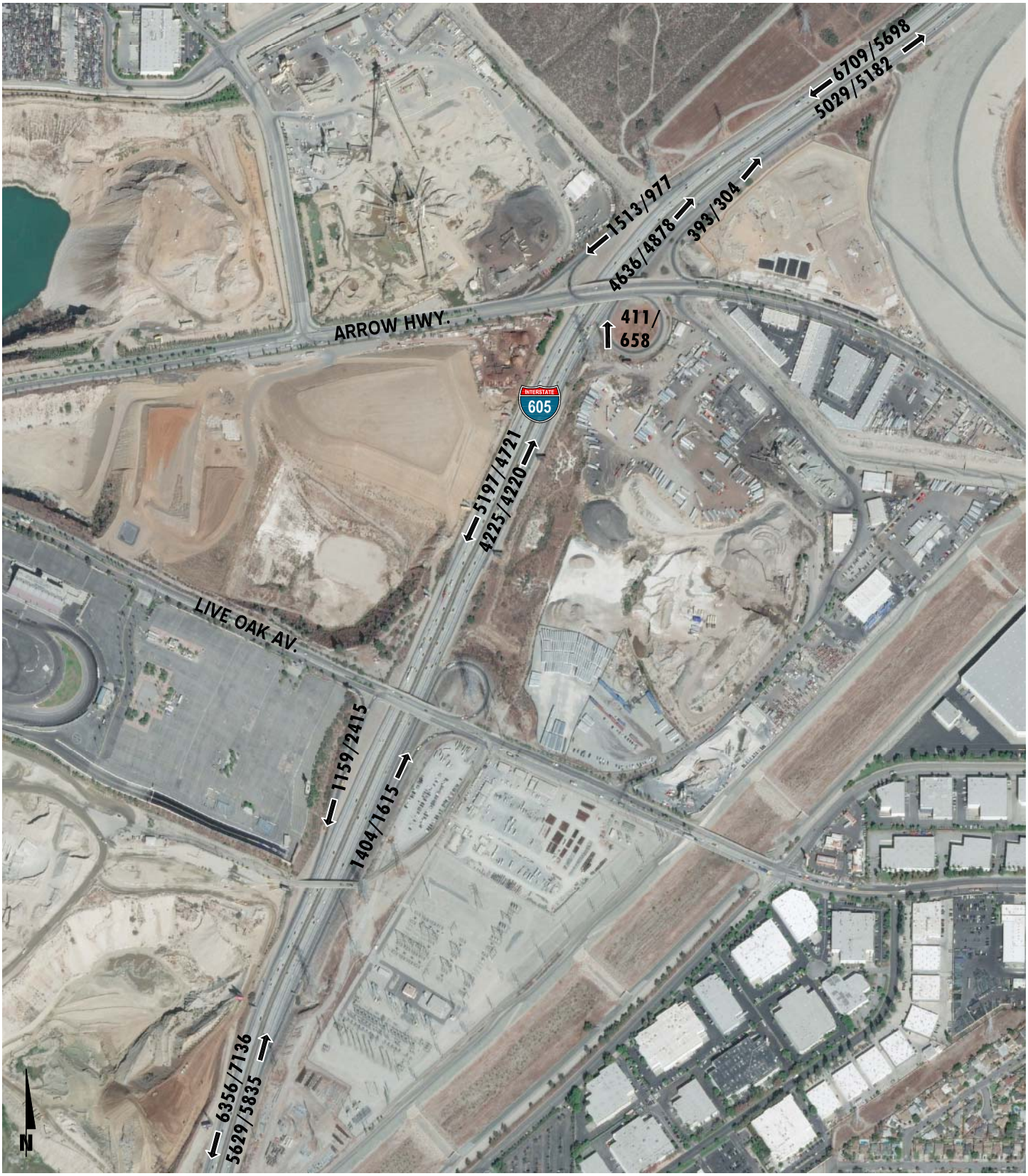
[3] LOS = Level of Service

[4] HCS7 does not report density for freeway facilities operating at LOS F.

## EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



## EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2020) WITH PROJECT FREEWAY MAINLINE VOLUMES



## 6.10 OPENING YEAR CUMULATIVE (2020) IMPACTS

Based on the applicable jurisdiction's significance criteria as discussed in Section 2.9 *Thresholds of Significance*, the following study area intersections were found to be significantly impacted by the Project for Opening Year Cumulative (2020) traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Speedway Drive & Live Oak Avenue (#7)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)
- Maine Avenue & Arrow Highway (#30)

The determination of significant impacts is shown on Table 6-6.

## 6.11 OPENING YEAR CUMULATIVE RECOMMENDED IMPROVEMENTS

### 6.11.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative traffic deficiencies is presented in Table 6-7. It is recommended that the Project Applicant participate in the funding of off-site improvements that are needed to serve cumulative traffic conditions through the payment of City of Irwindale DIF (if the improvements are included in the DIF program) or on a fair share basis (if the improvements are not included in a pre-existing fee program). The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. In conjunction with Mitigation Measures 1.1 through 9.1 identified previously for E+P traffic conditions, the following additional improvements are recommended to improve the impacted intersection's LOS back to pre-project conditions, or better, for Opening Year Cumulative traffic conditions:

***Mitigation Measure 4.2 – Live Oak Avenue & Arrow Highway (West) (#4)***

- Contribute fair share towards restriping a 3rd eastbound through lane.

***Mitigation Measure 10.1 – Speedway Driveway & Live Oak Avenue (#7)***

- Contribute fair share towards the installation of a traffic signal.
- Project to restripe a 3rd westbound through lane as part of the site adjacent improvements.

***Mitigation Measure 11.1 – Maine Avenue & Arrow Highway (#30)***

- Project to restripe a 3rd eastbound through lane.

## Table 6-6

**Determination of Significant Impacts for Opening Year Cumulative (2020) Conditions**

| # | Intersection | Traffic Control[2] | 2020 Without Project V/C Ratio or Delay[1] | | 2020 With Project V/C Ratio or Delay[1] | | Difference in V/C or Delay | | Significant Impact?[3,4] |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM | PM | AM | PM | AM | PM | |
| 1 | Myrtle Av. & Longden Av. | TS | 0.81 | **0.96** | 0.84 | **0.98** | -- | **0.027** | Yes |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | **0.90** | **0.96** | **0.91** | **0.98** | 0.005 | **0.026** | Yes |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | 0.78 | **0.97** | 0.81 | **0.99** | -- | **0.028** | Yes |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | **1.04** | **1.82** | **1.07** | **1.85** | **0.021** | **0.032** | Yes |
| 7 | Speedway Dwy. & Live Oak Av.[6] | CSS | 68.8 | **511.9** | 44.7 | **985.2** | -- | **473.3** | Yes |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | **1.07** | 0.86 | **1.16** | **1.05** | **0.093** | **0.191** | Yes |
| 23 | I-605 NB Off-Ramps & Live Oak Av. | CSS | **370.5** | **211.4** | **767.4** | **444.8** | **396.9** | **233.4** | Yes[5] |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | 0.72 | **1.05** | 0.76 | **1.08** | -- | **0.028** | Yes |
| 27 | Stewart Av. & Live Oak Av. | TS | **0.92** | 0.84 | **0.95** | 0.87 | **0.025** | -- | Yes |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | 0.74 | **0.95** | 0.75 | **0.97** | -- | **0.025** | Yes |
| 30 | Maine Av. & Arrow Hwy. | TS | 0.89 | 0.46 | **0.90** | 0.48 | 0.017 | -- | Yes |

[1] V/C calculated using the TRAFFIX operation analysis software, based on the ICU methodology. Delay based on HCM (6th Edition) methodology.

[2] TS = Traffic Signal; CSS = Cross-Street Stop

[3] Significant impact occurs when V/C is increased by 0.02 or more for either peak hour.

[4] Significant impact occurs when the delay is increased by more than 2 seconds.

[5] Caltrans facility does not have significance threshold. However, Project will contribute to the existing deficiency. As such, impact is cumulatively considerable.

[6] Intersection includes additional 3rd westbound through lane along Project's frontage on Live Oak Avenue for With Project traffic conditions.

## Table 6-7

**Intersection Analysis for Opening Year Cumulative (2020) Conditions With Improvements**

| # | Intersection | Traffic Control[4] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | Level of Service | | ICU[3] (v/c) | | Level of Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | | | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.809 | **0.956** | D | **E** |
| | - 2020 With Project | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.836 | **0.983** | D | **E** |
| | - With Improvements | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | **2** | **0** | 1 | 2 | 0 | -- | -- | -- | -- | 0.836 | 0.851 | D | D |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.904** | **0.955** | **E** | **E** |
| | - 2020 With Project | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.909** | **0.981** | **E** | **E** |
| | - With Improvements | TS | 1 | 2 | d | **2** | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.909** | **0.930** | **E** | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | 0.784 | **0.965** | C | **E** |
| | - 2020 With Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | 0.812 | **0.993** | D | **E** |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | **3** | **0** | 1 | 2 | 1>> | -- | -- | -- | -- | 0.812 | 0.806 | D | D |
| 4 | Live Oak Av. & Arrow Hwy. (West) | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **1.044** | **1.816** | **F** | **F** |
| | - 2020 With Project | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **1.065** | **1.848** | **F** | **F** |
| | - With Improvements | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | **3** | 1>> | 2 | **3** | 0 | -- | -- | -- | -- | 0.863 | 0.781 | D | C |
| 7 | Speedway Dwy. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | CSS | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | **68.8** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - 2020 With Project | CSS | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | **44.7** | **>100.0** | **E** | **F** | -- | -- | -- | -- |
| | - With Improvements | **TS** | 1 | 0 | d | 0 | 0 | 0 | 0 | 3 | 0 | 1 | **3** | 0 | -- | -- | -- | -- | 0.116 | 0.121 | A | A |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.067** | 0.857 | **F** | D |
| | - 2020 With Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.160** | **1.048** | **F** | **F** |
| | - With Improvements | TS | **1** | **1** | **1** | 2 | **1** | 1 | 1 | **3** | 0 | **1** | **3** | 1 | -- | -- | -- | -- | 0.893 | 0.879 | D | D |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - 2020 With Project | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - With Improvements | **TS** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0.9 | 1.0 | A | A | -- | -- | -- | -- |
| 26 | Rivergrade Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.720 | **1.052** | C | **F** |
| | - 2020 With Project | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.756 | **1.080** | C | **F** |
| | - With Improvements | TS | 1 | 1 | **1>** | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.756 | **0.999** | C | **E** |
| 27 | Stewart Av. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | **0.920** | 0.844 | **E** | D |
| | - 2020 With Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | **0.945** | 0.866 | **E** | D |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | **3** | **0** | -- | -- | -- | -- | 0.770 | 0.866 | C | D |
| 29 | Arrow Hwy. & Live Oak Av. (East) | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.741 | **0.948** | C | **E** |
| | - 2020 With Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.753 | **0.973** | C | **E** |
| | - With Improvements | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | **3** | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.753 | 0.855 | C | D |
| 30 | Maine Av. & Arrow Hwy. | | | | | | | | | | | | | | | | | | | | | |
| | - 2020 Without Project | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 3 | 0 | -- | -- | -- | -- | 0.885 | 0.464 | D | A |
| | - 2020 With Project | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 3 | 0 | -- | -- | -- | -- | **0.902** | 0.478 | **E** | A |
| | - With Improvements | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | **3** | **0** | 1 | 3 | 0 | -- | -- | -- | -- | **0.902** | 0.478 | **E** | A |

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

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d= Defacto Right Turn Lane; **1** = Improvement

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

[3] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio. ICU not reported for unsignalized intersections or at Caltrans facilities.

[4] TS = Traffic Signal; CSS = Cross-Street Stop; **TS** = Improvement

[5] Remove the southbound cross-walk (west leg).

Worksheets for Opening Year Cumulative With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.10.

### 6.11.2 Recommended Improvements to Address Deficiencies on Roadway Segments

With the implementation of the intersection improvements listed above in conjunction with the Project's site adjacent improvements, only the following roadway segments would continue to operate at a deficient LOS for Opening Year Cumulative (2020) With Project traffic conditions (see Table 6-8):

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS E
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS E
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS F
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS E
- Arrow Highway, Rivergrade Road to Live Oak Avenue (#14) – LOS E
- Avenida Barbosa, Alpha Street/Buena Vista Street to Arrow Highway (#16) – LOS E
- Live Oak Avenue, Live Oak Avenue/Arrow Highway to Driveway 2 (#19) – LOS D
- Live Oak Avenue, Driveway 2 to Speedway Driveway (#20) – LOS E
- Live Oak Avenue, Driveway 7 to Private Drive A (#24) – LOS D
- Live Oak Avenue, Private Drive A to Driveway 10 (#25) – LOS D
- Live Oak Avenue, Driveway 10 to I-605 Southbound On-Ramp (#26) – LOS D
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramp (#27) – LOS F
- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Rivergrade Road to Stewart Avenue (#29) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS F

However, additional roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS during the peak hours with the recommended improvements.

### 6.11.3 Recommended Improvements to Address Deficiencies on Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale (or other neighboring jurisdictions) on SHS facilities. As such, no improvements have been recommended to address Opening Year Cumulative deficiencies on the SHS, because there is no feasible mitigation available.

**Table 6-8**

**Roadway Segment Analysis for Opening Year Cumulative (2020) Conditions With Improvements**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | 2020 Without Project | V/C[2] | LOS[3] | 2020 With Project | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 18,878 | **0.94** | **E** | 19,940 | **1.00** | **E** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | **5D** | **46,700** | 26,917 | 0.58 | A | 28,035 | 0.60 | B |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 46,253 | **0.87** | **D** | 47,899 | **0.90** | **E** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | **6D** | **53,000** | 32,633 | 0.62 | B | 33,293 | 0.63 | B |
| 5 | | Dwy. 1 to Dwy. 3 | **6D** | **53,000** | 32,631 | 0.62 | B | 33,221 | 0.63 | B |
| 6 | | Dwy. 3 to Driveway/Private Drive B | **6D** | **53,000** | 32,631 | 0.62 | B | 33,344 | 0.63 | B |
| 7 | | Driveway/Private Drive B to Dwy. 6 | **6D** | **53,000** | 32,631 | 0.62 | B | 33,884 | 0.64 | B |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | **6D** | **53,000** | 32,631 | 0.62 | B | 34,002 | 0.64 | B |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | **6D** | **53,000** | 32,158 | 0.61 | B | 37,945 | 0.72 | C |
| 10 | | Dwy. 8 to Dwy. 9 | **6D** | **53,000** | 32,158 | 0.61 | B | 39,608 | 0.75 | C |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | **6D** | **53,000** | 32,158 | 0.61 | B | 39,609 | 0.75 | C |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 31,213 | **1.04** | **F** | 36,114 | **1.20** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 26,846 | **0.89** | **D** | 29,198 | **0.97** | **E** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 25,978 | **0.87** | **D** | 27,222 | **0.91** | **E** |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 17,839 | 0.89 | D | 18,437 | **0.92** | **E** |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | **6D** | **53,000** | 45,596 | **0.86** | **D** | 47,207 | **0.89** | **D** |
| 20 | | Dwy. 2 to Speedway Dwy. | **6D** | **53,000** | 47,170 | **0.89** | **D** | 48,688 | **0.92** | **E** |
| 21 | | Speedway Dwy. to Dwy. 4 | **6D** | **53,000** | 40,779 | 0.77 | C | 42,297 | 0.80 | C |
| 22 | | Dwy. 4 to Dwy. 5 | **6D** | **53,000** | 40,779 | 0.77 | C | 42,306 | 0.80 | C |
| 23 | | Dwy. 5 to Dwy. 7 | **6D** | **53,000** | 40,779 | 0.77 | C | 42,306 | 0.80 | C |
| 24 | | Dwy. 7 to Private Drive A | **6D** | **53,000** | 40,842 | 0.77 | C | 43,016 | **0.81** | **D** |
| 25 | | Private Drive A to Dwy. 10 | **6D** | **53,000** | 40,751 | 0.77 | C | 45,838 | **0.86** | **D** |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | **6D** | **53,000** | 40,957 | 0.77 | C | 46,390 | **0.88** | **D** |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 37,937 | **0.94** | **E** | 41,686 | **1.03** | **F** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 31,969 | 0.79 | C | 33,205 | **0.82** | **D** |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 36,473 | 0.78 | C | 37,525 | **0.80** | **D** |
| 30 | | Stewart Av. to Baldwin Park Bl. | **5D** | **46,700** | 33,071 | 0.71 | C | 33,617 | 0.72 | C |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | **5D** | **46,700** | 30,305 | 0.65 | B | 30,343 | 0.65 | B |
| 32 | | Arrow Hwy. to Maine Av. | **5D** | **46,700** | 50,172 | **1.07** | **F** | 51,452 | **1.10** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 8,112 | 0.41 | A | 9,220 | 0.46 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 6,346 | 0.32 | A | 7,454 | 0.37 | A |

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

**5D** = Improvement

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

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# 7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year Without and With Project traffic forecasts, and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations analyses.

## 7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year conditions are consistent with those shown previously on Exhibit 3-1, with the exception of Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year traffic conditions.

## 7.2 HORIZON YEAR WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT, AM and PM peak hour volumes which can be expected for Horizon Year Without Project traffic conditions are shown on Exhibit 7-1 and Exhibit 7-2, respectively.

## 7.3 HORIZON YEAR WITH PROJECT TRAFFIC VOLUME FORECASTS

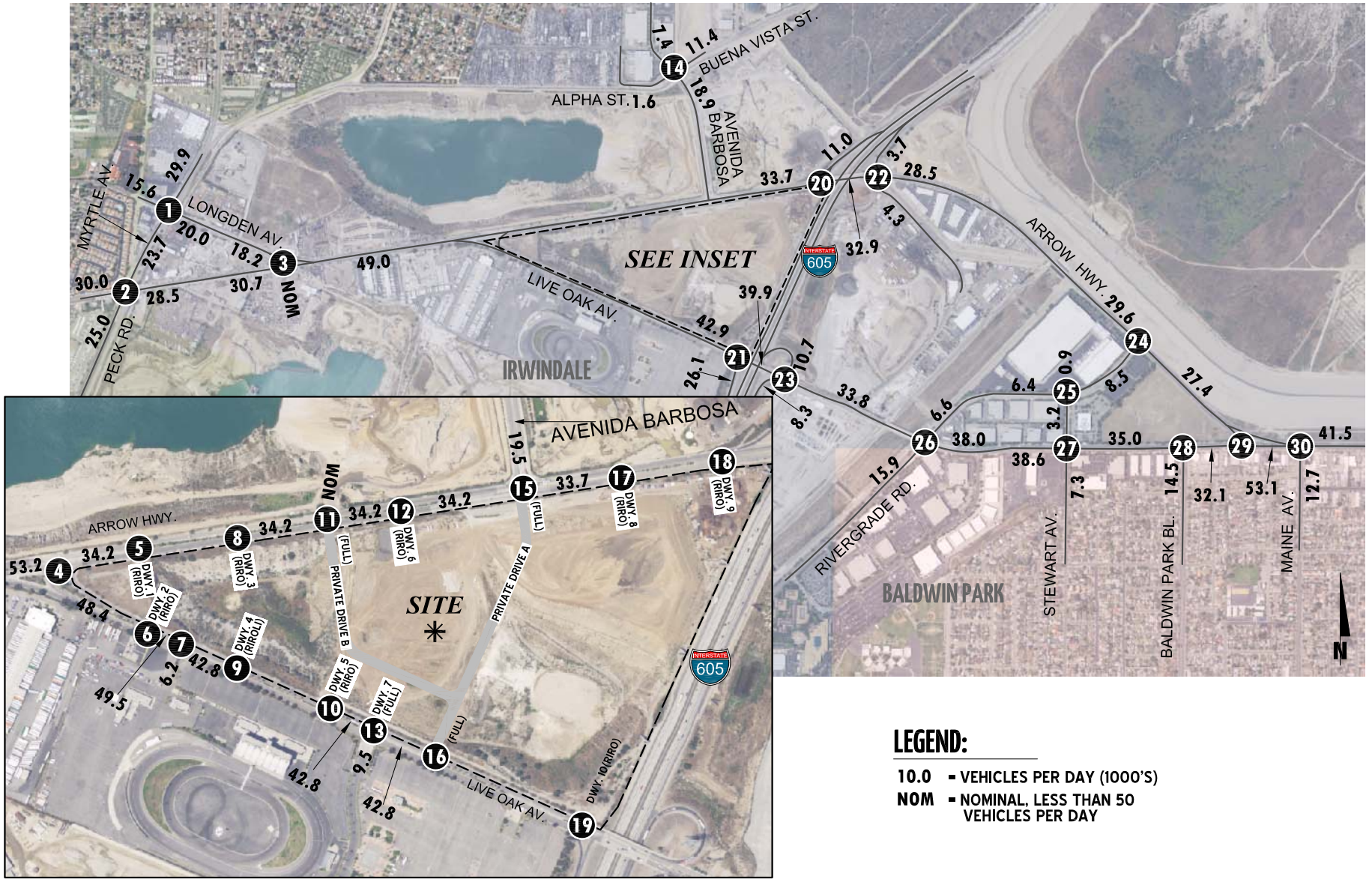
The weekday ADT, AM and PM peak hour volumes which can be expected for Horizon Year With Project traffic conditions are shown on Exhibit 7-3 and Exhibit 7-4, respectively.

## 7.4 INTERSECTION OPERATIONS ANALYSIS

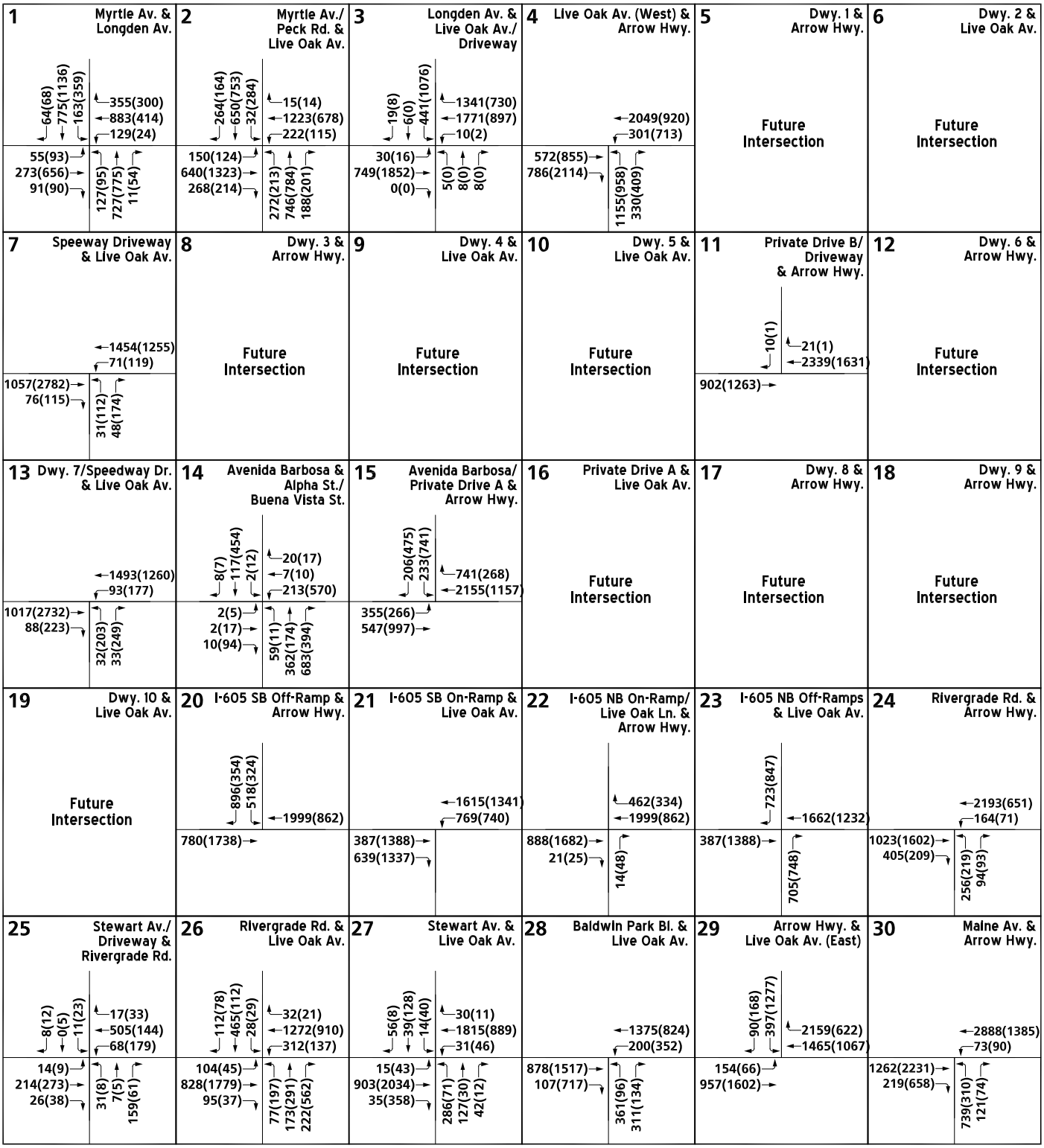
There are no additional study area intersections that would operate at an unacceptable LOS during the peak hours for Horizon Year (2040) Without Project traffic conditions in addition to those previously identified under Opening Year Cumulative (2020) traffic conditions. Similarly, there are no additional study area intersections that would operate at an unacceptable LOS with the addition of Project traffic in addition to those operating at a deficient LOS under Horizon Year (2040) traffic conditions. Summaries of the peak hour intersection LOS for Horizon Year Without and With Project are shown on Exhibit 7-5 and Exhibit 7-6, respectively.

The intersection operations analysis worksheets for Horizon Year Without and With Project traffic conditions are included in Appendix 7.1 and Appendix 7.2 of this TIA, respectively.

## EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



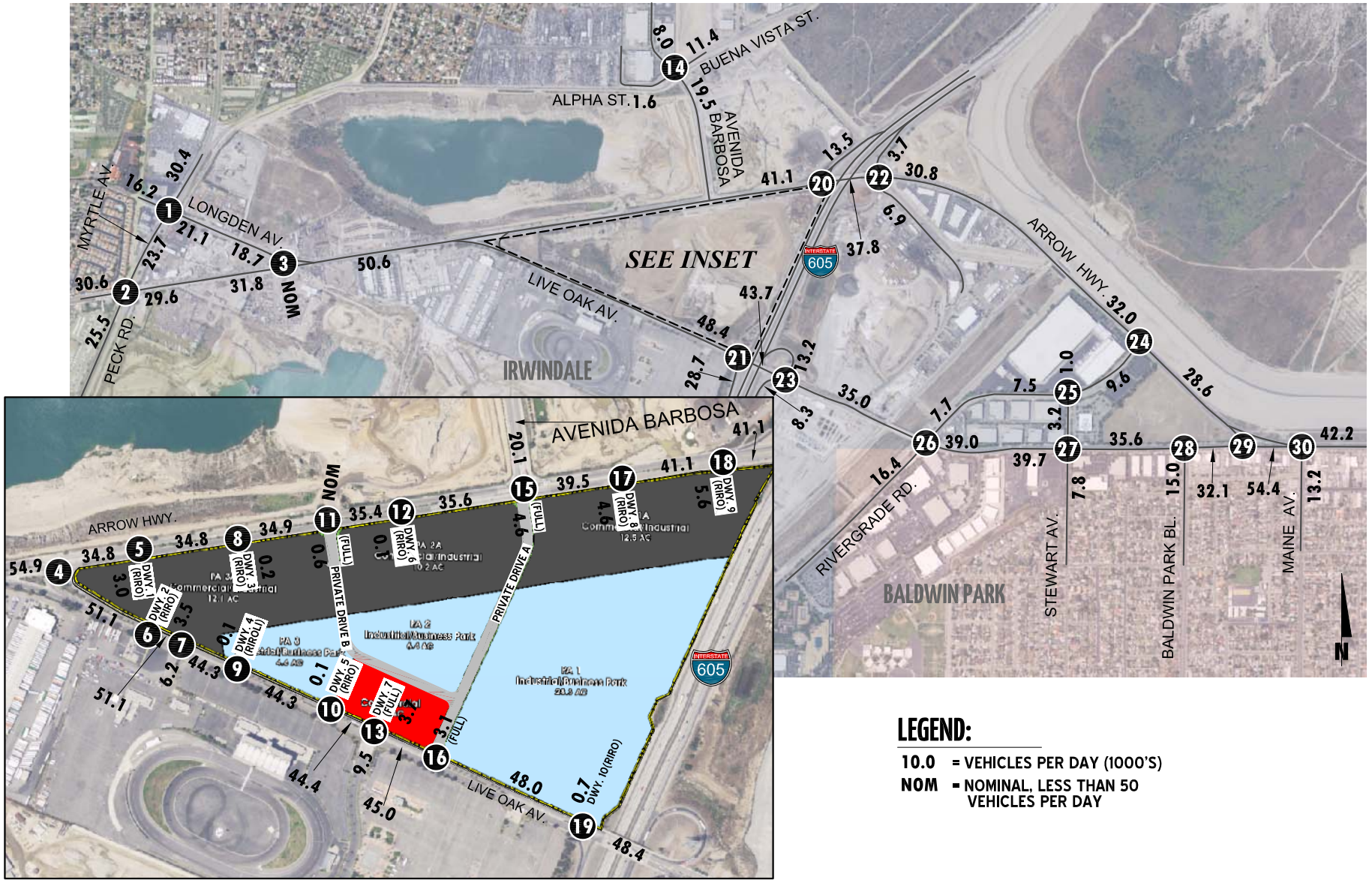
## EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)




## LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 7-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

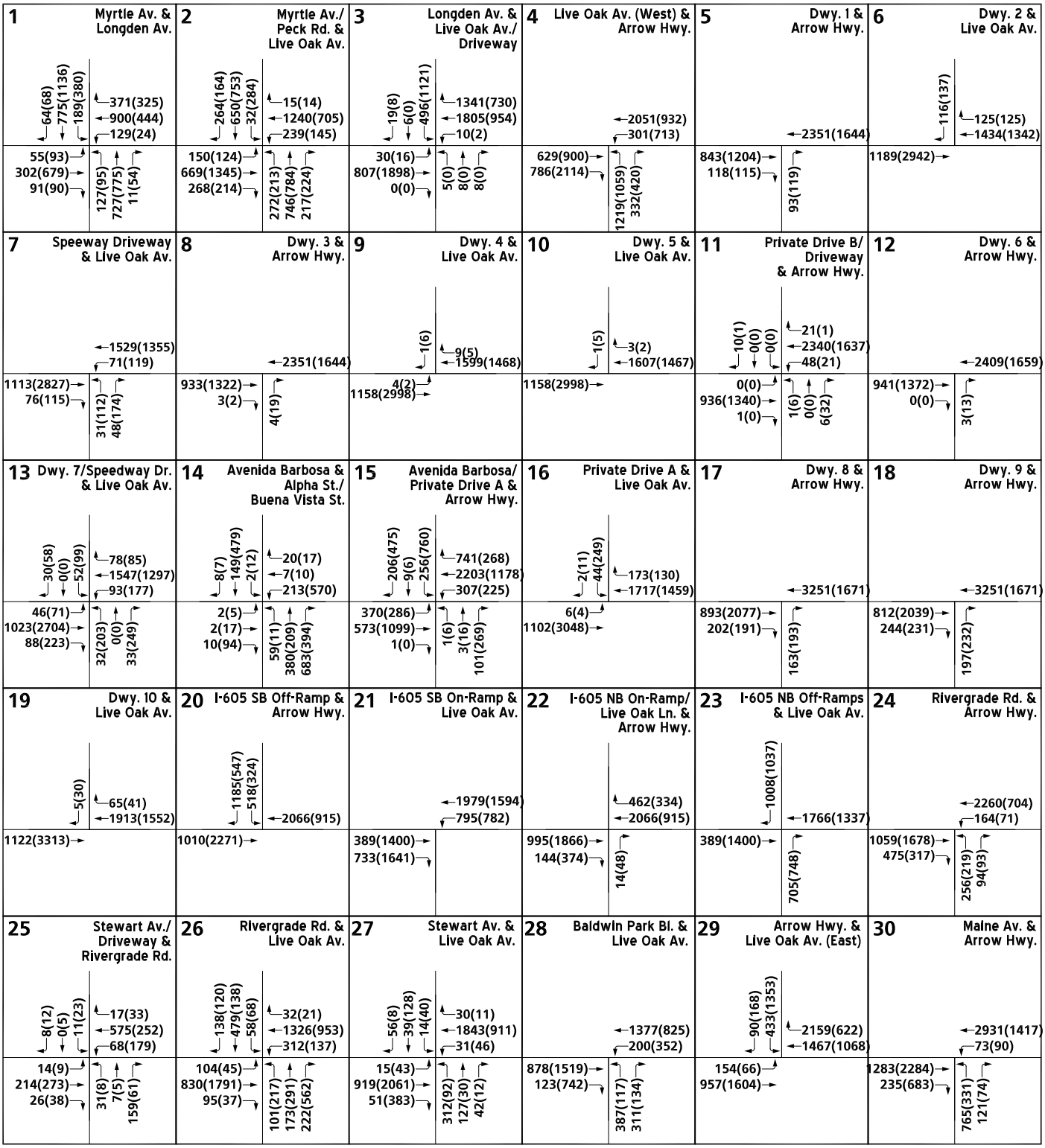







URBAN CROSSROADS

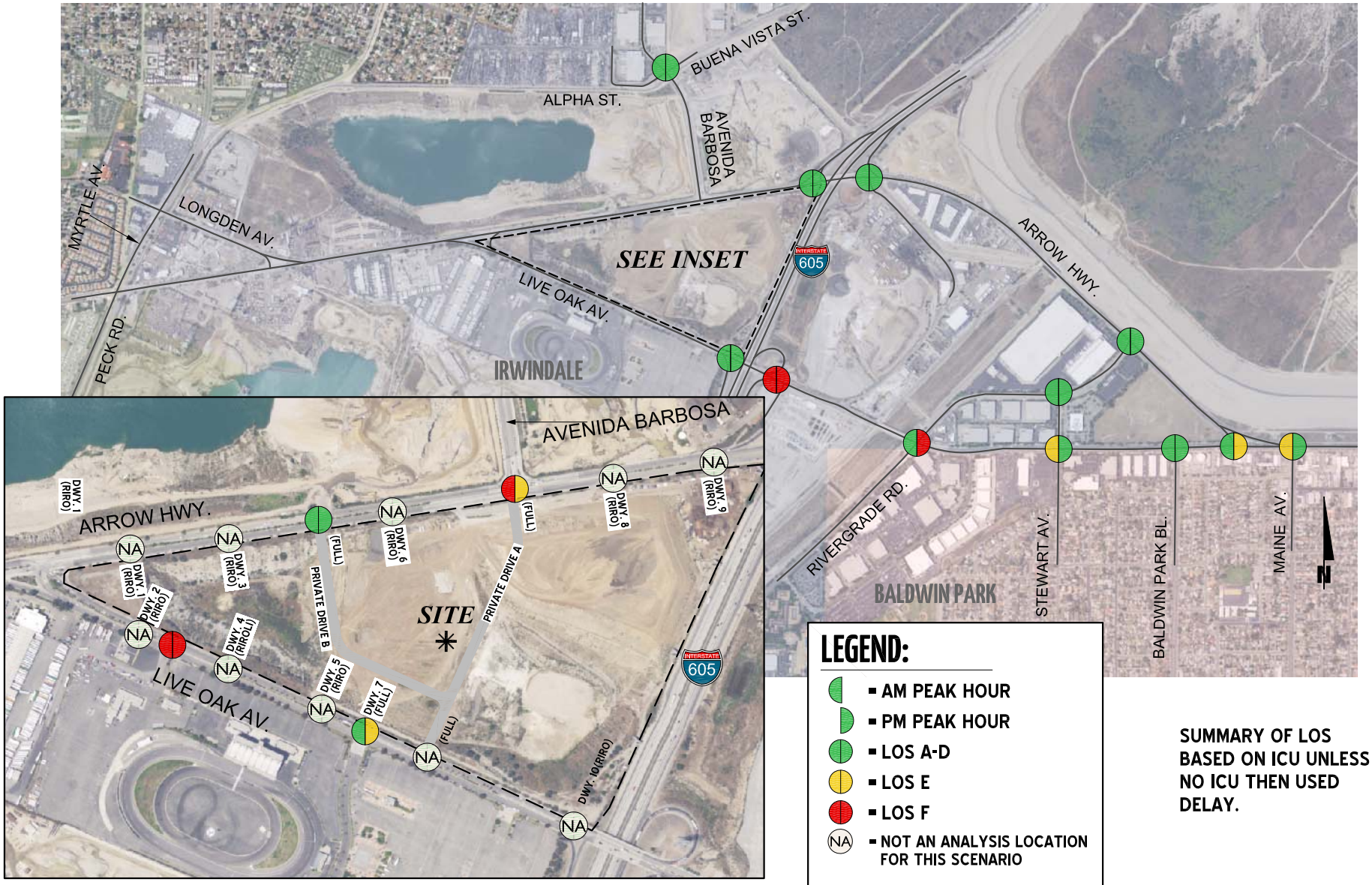
## EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)




## LEGEND:

**10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES**

## EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

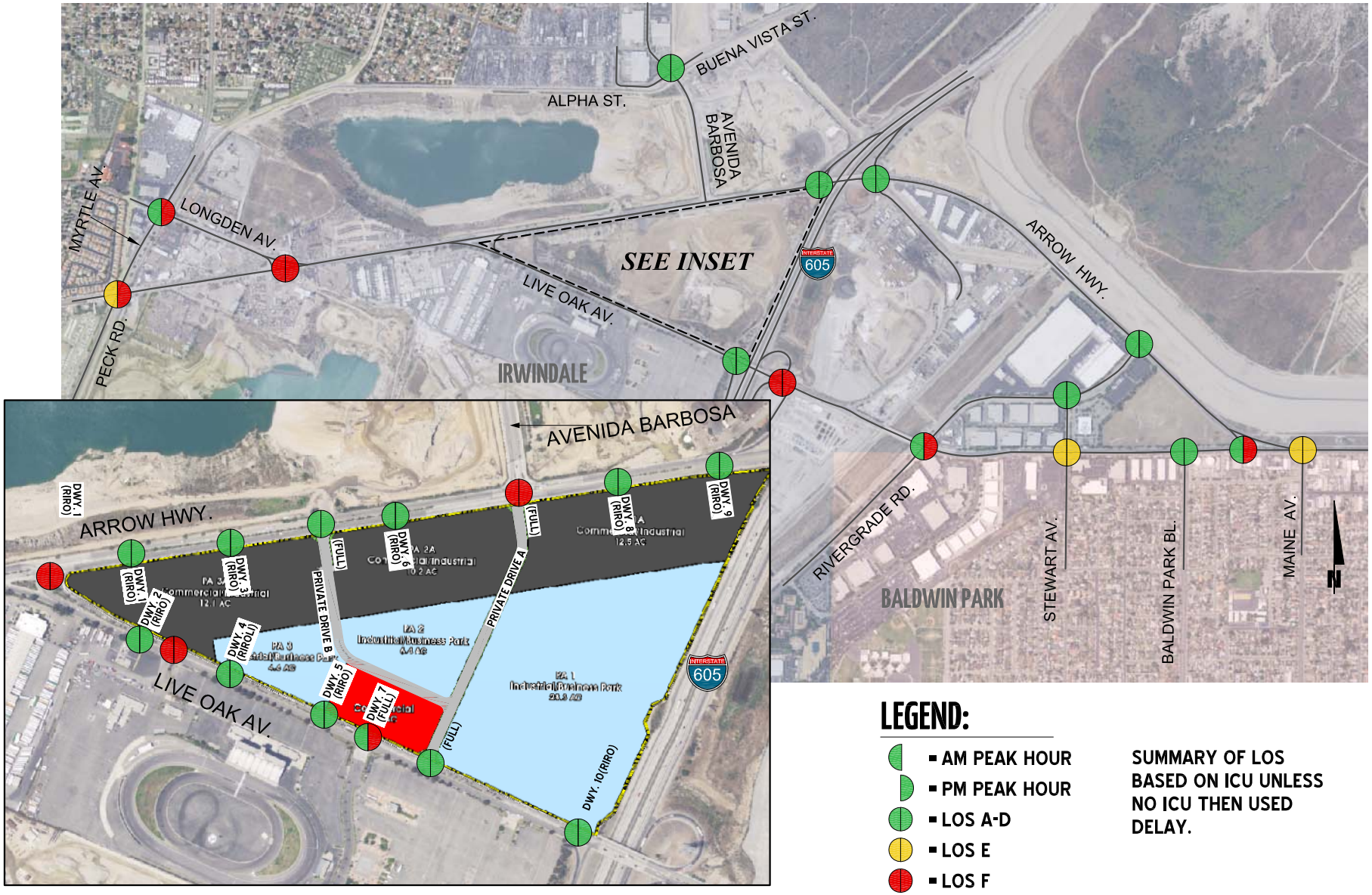







URBAN CROSSROADS

## EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS




**LEGEND:**

- AM PEAK HOUR
- PM PEAK HOUR
- LOS A-D
- LOS E
- LOS F

SUMMARY OF LOS BASED ON ICU UNLESS NO ICU THEN USED DELAY.





URBAN CROSSROADS

## Table 7-1

**Intersection Analysis for Horizon Year (2040) Conditions**

| # | Intersection | Traffic Control[3] | 2040 Without Project | | | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | | HCM Delay[1] (secs.) | | Level of Service | | ICU[2] (v/c) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.85 | **1.01** | D | **F** | --[6] | --[6] | --[6] | --[6] | 0.88 | **1.04** | D | **F** |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | **0.95** | **1.01** | **E** | **F** | --[6] | --[6] | --[6] | --[6] | **0.96** | **1.03** | **E** | **F** |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | --[6] | --[6] | --[6] | --[6] | **1.24** | **1.02** | **F** | **F** | --[6] | --[6] | --[6] | --[6] | **1.27** | **1.05** | **F** | **F** |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | --[6] | --[6] | --[6] | --[6] | **1.10** | 0.89 | **F** | D | --[6] | --[6] | --[6] | --[6] | **1.12** | **0.94** | **F** | **E** |
| 5 | Dwy. 1 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 15.9 | 23.4 | C | C | --[4] | --[4] | --[4] | --[4] |
| 6 | Dwy. 2 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 30.3 | 30.5 | D | D | --[4] | --[4] | --[4] | --[4] |
| 7 | Speedway Dwy. & Live Oak Av. | CSS | **91.8** | **>100.0** | **F** | **F** | --[4] | --[4] | --[4] | --[4] | **55.0** | **>100.0** | **F** | **F** | --[4] | --[4] | --[4] | --[4] |
| 8 | Dwy. 3 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 13.3 | 17.0 | B | C | --[4] | --[4] | --[4] | --[4] |
| 9 | Dwy. 4 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 26.6 | 22.9 | D | C | --[4] | --[4] | --[4] | --[4] |
| 10 | Dwy. 5 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 19.2 | 17.9 | C | C | --[4] | --[4] | --[4] | --[4] |
| 11 | Driveway/Private Drive B & Arrow Hwy. | CSS | 33.8 | 18.5 | D | C | --[4] | --[4] | --[4] | --[4] | 33.8 | 23.3 | D | C | --[4] | --[4] | --[4] | --[4] |
| 12 | Dwy. 6 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 13.3 | 17.2 | B | C | --[4] | --[4] | --[4] | --[4] |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.59 | **0.98** | A | **E** | --[6] | --[6] | --[6] | --[6] | 0.54 | **1.07** | A | **F** |
| 14 | Avenida Barbosa & Alpha St./Buena Vista St. | TS | --[6] | --[6] | --[6] | --[6] | 0.51 | 0.74 | A | C | --[6] | --[6] | --[6] | --[6] | 0.54 | 0.78 | A | C |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | **1.12** | **0.93** | **F** | **E** | --[6] | --[6] | --[6] | --[6] | **1.22** | **1.12** | **F** | **F** |
| 16 | Private Drive A & Live Oak Av. | **TS** | Future Intersection | | | | | | | | --[6] | --[6] | --[6] | --[6] | 0.53 | 0.89 | A | D |
| 17 | Dwy. 8 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 11.4 | 24.9 | B | C | --[4] | --[4] | --[4] | --[4] |
| 18 | Dwy. 9 & Arrow Hwy. | **CSS** | Future Intersection | | | | | | | | 11.4 | 29.0 | B | D | --[4] | --[4] | --[4] | --[4] |
| 19 | Dwy. 10 & Live Oak Av. | **CSS** | Future Intersection | | | | | | | | 21.9 | 18.4 | C | C | --[4] | --[4] | --[4] | --[4] |
| 20 | I-605 SB Off-Ramp & Arrow Hwy. | TS | 33.8 | 9.3 | C | A | --[5] | --[5] | --[5] | --[5] | 37.9 | 10.9 | D | B | --[5] | --[5] | --[5] | --[5] |
| 21 | I-605 SB On-Ramp & Live Oak Av. | TS | 8.1 | 24.9 | A | C | --[5] | --[5] | --[5] | --[5] | 9.7 | 27.6 | A | C | --[5] | --[5] | --[5] | --[5] |
| 22 | I-605 NB On-Ramp/Live Oak Ln. & Arrow Hwy. | CSS | 11.9 | 19.6 | B | C | --[5] | --[5] | --[5] | --[5] | 12.6 | 22.4 | B | C | --[5] | --[5] | --[5] | --[5] |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | CSS | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] | **>100.0** | **>100.0** | **F** | **F** | --[5] | --[5] | --[5] | --[5] |
| 24 | Rivergrade Rd. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | 0.87 | 0.71 | D | C | --[6] | --[6] | --[6] | --[6] | 0.89 | 0.74 | D | C |
| 25 | Stewart Av./Driveway & Rivergrade Rd. | TS | --[6] | --[6] | --[6] | --[6] | 0.38 | 0.37 | A | A | --[6] | --[6] | --[6] | --[6] | 0.40 | 0.37 | A | A |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.75 | **1.11** | C | **F** | --[6] | --[6] | --[6] | --[6] | 0.79 | **1.14** | C | **F** |
| 27 | Stewart Av. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | **0.97** | 0.89 | **E** | D | --[6] | --[6] | --[6] | --[6] | **1.00** | **0.91** | **E** | **E** |
| 28 | Baldwin Park Bl. & Live Oak Av. | TS | --[6] | --[6] | --[6] | --[6] | 0.72 | 0.88 | C | D | --[6] | --[6] | --[6] | --[6] | 0.73 | 0.88 | C | D |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | --[6] | --[6] | --[6] | --[6] | 0.78 | **1.00** | C | **E** | --[6] | --[6] | --[6] | --[6] | 0.79 | **1.02** | C | **F** |
| 30 | Maine Av. & Arrow Hwy. | TS | --[6] | --[6] | --[6] | --[6] | **0.93** | 0.89 | **E** | D | --[6] | --[6] | --[6] | --[6] | **0.95** | **0.92** | **E** | **E** |

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

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

[2] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio.

[3] TS = Traffic Signal; CSS = Cross-street Stop

[4] ICU not reported for intersections without a signal.

[5] ICU not reported for intersections under Caltrans' jurisdiction.

[6] HCM not reported for signalized intersections.

## 7.5 ROADWAY SEGMENT CAPACITY ANALYSIS

Table 7-2 provides a summary of the Horizon Year (2040) Without Project traffic conditions roadway segment capacity analysis based on the City of Irwindale Roadway Segment Capacity Thresholds. The following study area roadway segments would operate at an unacceptable LOS for Horizon Year (2040) Without Project traffic conditions:

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS F
- Live Oak Avenue, Peck Road to Longden Avenue (#2) – LOS E
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS E
- Arrow Highway, Live Oak Avenue to Driveway 1 (#4) – LOS F
- Arrow Highway, Driveway 1 to Driveway 3 (#5) – LOS F
- Arrow Highway, Driveway 3 to Driveway/Private Drive B (#6) – LOS F
- Arrow Highway, Driveway/Private Drive B to Driveway 6 (#7) – LOS E
- Arrow Highway, Driveway 6 to Avenida Barbosa/Private Drive A (#8) – LOS E
- Arrow Highway, Avenida Barbosa/Private Drive A to Driveway 8 (#9) – LOS F
- Arrow Highway, Driveway 8 to Driveway 9 (#10) – LOS F
- Arrow Highway, Driveway 9 to I-605 Southbound Off-Ramp (#11) – LOS F
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS F
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS E
- Arrow Highway, Rivergrade Road to Live Oak Avenue (#14) – LOS E
- Avenida Barbosa, Alpha Street/Buena Vista Street to Arrow Highway (#16) – LOS E
- Live Oak Avenue, Live Oak Avenue/Arrow Highway to Driveway 2 (#19) – LOS F
- Live Oak Avenue, Driveway 2 to Speedway Driveway (#20) – LOS F
- Live Oak Avenue, Speedway Driveway to Driveway 4 (#21) – LOS E
- Live Oak Avenue, Driveway 4 to Driveway 5 (#22) – LOS E
- Live Oak Avenue, Driveway 5 to Driveway 7 (#23) – LOS E
- Live Oak Avenue, Driveway 7 to Private Drive A (#24) – LOS E
- Live Oak Avenue, Private Drive A to Driveway 10 (#25) – LOS E
- Live Oak Avenue, Driveway 10 to I-605 Southbound On-Ramp (#26) – LOS E
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramp (#27) – LOS E
- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Rivergrade Road to Stewart Avenue (#29) – LOS D
- Live Oak Avenue, Stewart Avenue to Baldwin Park Boulevard (#30) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS F

There are no additional roadway segments that would operate at a deficient LOS with the addition of Project traffic in addition to those previously identified for Horizon Year (2040) Without Project traffic conditions.

**Table 7-2**

**Roadway Segment Analysis for Horizon Year (2040) Conditions**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | 2040 Without Project | V/C[2] | LOS[3] | 2040 With Project | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 19,994 | **1.00** | **F** | 21,056 | **1.05** | **F** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | 4D | 30,000 | 28,468 | **0.95** | **E** | 29,586 | **0.99** | **E** |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 48,940 | **0.92** | **E** | 50,586 | **0.95** | **E** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | 4D | 30,000 | 34,153 | **1.14** | **F** | 34,813 | **1.16** | **F** |
| 5 | | Dwy. 1 to Dwy. 3 | 4D | 30,000 | 34,151 | **1.14** | **F** | 34,741 | **1.16** | **F** |
| 6 | | Dwy. 3 to Driveway/Private Drive B | 4D | 30,000 | 34,151 | **1.14** | **F** | 34,864 | **1.16** | **F** |
| 7 | | Driveway/Private Drive B to Dwy. 6 | 5D | 37,500 | 34,151 | **0.91** | **E** | 35,404 | **0.94** | **E** |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | 5D | 37,500 | 34,151 | **0.91** | **E** | 35,522 | **0.95** | **E** |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | 4D | 30,000 | 33,660 | **1.12** | **F** | 39,447 | **1.31** | **F** |
| 10 | | Dwy. 8 to Dwy. 9 | 4D | 30,000 | 33,660 | **1.12** | **F** | 41,110 | **1.37** | **F** |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | 4D | 30,000 | 33,660 | **1.12** | **F** | 41,111 | **1.37** | **F** |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 32,859 | **1.10** | **F** | 37,760 | **1.26** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 28,427 | **0.95** | **E** | 30,779 | **1.03** | **F** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 27,356 | **0.91** | **E** | 28,600 | **0.95** | **E** |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 18,881 | **0.94** | **E** | 19,479 | **0.97** | **E** |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | 5D | 46,700 | 47,912 | **1.03** | **F** | 49,523 | **1.06** | **F** |
| 20 | | Dwy. 2 to Speedway Dwy. | 5D | 46,700 | 49,486 | **1.06** | **F** | 51,004 | **1.09** | **F** |
| 21 | | Speedway Dwy. to Dwy. 4 | 5D | 46,700 | 42,713 | **0.91** | **E** | 44,231 | **0.95** | **E** |
| 22 | | Dwy. 4 to Dwy. 5 | 5D | 46,700 | 42,713 | **0.91** | **E** | 44,240 | **0.95** | **E** |
| 23 | | Dwy. 5 to Dwy. 7 | 5D | 46,700 | 42,713 | **0.91** | **E** | 44,240 | **0.95** | **E** |
| 24 | | Dwy. 7 to Private Drive A | 5D | 46,700 | 42,776 | **0.92** | **E** | 44,950 | **0.96** | **E** |
| 25 | | Private Drive A to Dwy. 10 | 5D | 46,700 | 42,685 | **0.91** | **E** | 47,772 | **1.02** | **F** |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | 5D | 46,700 | 42,891 | **0.92** | **E** | 48,324 | **1.03** | **F** |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 39,892 | **0.99** | **E** | 43,641 | **1.08** | **F** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 33,762 | **0.84** | **D** | 34,998 | **0.87** | **D** |
| 29 | | Rivergrade Rd. to Stewart Av. | 5D | 46,700 | 38,576 | **0.83** | **D** | 39,628 | **0.85** | **D** |
| 30 | | Stewart Av. to Baldwin Park Bl. | 4D | 40,400 | 34,992 | **0.87** | **D** | 35,538 | **0.88** | **D** |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | 4D | 40,400 | 32,021 | 0.79 | C | 32,059 | 0.79 | C |
| 32 | | Arrow Hwy. to Maine Av. | 4D | 40,400 | 53,060 | **1.31** | **F** | 54,340 | **1.35** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 8,462 | 0.42 | A | 9,570 | 0.48 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 6,588 | 0.33 | A | 7,696 | 0.38 | A |

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

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

## 7.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrant analysis was not performed for Horizon Year (2040) Without Project traffic conditions as there are no additional unsignalized intersections aside from the location previously warranted under Existing (2017) traffic conditions. No additional study area intersections would meet either peak hour volume-based or the planning level traffic signal warrants for Horizon Year (2040) With Project traffic conditions (see Appendix 7.3).

## 7.7 FREEWAY OFF-RAMP QUEUING ANALYSIS

Ramp queuing analysis findings are presented in Table 7-3 for Horizon Year traffic conditions. As shown on Table 7-3, there are no queuing issues on the study area freeway off-ramps during the peak hours for both Horizon Year Without and With Project traffic conditions. Worksheets for Horizon Year Without and With Project conditions queuing analysis are provided in Appendix 7.4 and Appendix 7.5, respectively.

## 7.8 BASIC FREEWAY SEGMENT ANALYSIS

Horizon Year Without and With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibits 7-7 and 7-8 for the I-605 Freeway. As shown on Table 7-4, The freeway mainline segments would operate at an acceptable LOS for Horizon Year (2040) Without Project traffic conditions. However, the addition of Project traffic would result in the following deficient freeway mainline segment:

- I-605 Freeway Southbound, South of Live Oak Avenue (#3) – LOS E PM peak hour only

Horizon Year Without Project basic freeway segment analysis worksheets are provided in Appendix 7.6. Horizon Year With Project basic freeway segment analysis worksheets are provided in Appendix 7.7.

## 7.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Horizon Year Without and With Project traffic conditions and the results of this analysis are presented in Table 7-4. As shown on Table 7-4, the following freeway ramp merge/diverge junctions would operate at an unacceptable LOS (i.e., LOS E or worse) during one or both peak hours:

- I-605 Freeway – Southbound, Off-Ramp at Arrow Highway (#1) – LOS E AM peak hour only
- I-605 Freeway – Southbound, On-Ramp at Live Oak Avenue (#2) – LOS F PM peak hour only
- I-605 Freeway – Northbound, Off-Ramp at Live Oak Avenue (#5) – LOS E AM and PM peak hours

The addition of Project traffic would not result in any additional deficient ramp merge/diverge junctions in addition to those previously identified for Horizon Year (2040) Without Project traffic conditions. Horizon Year Without Project freeway ramp junction operations and weaving analysis worksheets are provided in Appendix 7.8. Horizon Year With Project freeway ramp junction operations analysis worksheets are provided in Appendix 7.9.

**Table 7-3**

**Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 2040 Without Project | | | | 2040 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet) | | Acceptable? [1] | | 95th Percentile Queue (Feet) | | Acceptable? [1] | |
| | | | AM Peak Hour | PM Peak Hour | AM | PM | AM Peak Hour | PM Peak Hour | AM | PM |
| I-605 SB Off-Ramp / Arrow Hwy. | SBLT | 960 | 456 | 261 | Yes | Yes | 456 | 269 | Yes | Yes |
| I-605 NB Off-Ramps / Live Oak Av. | NBR | 1,920 | 293 | 1,030 | Yes | Yes | 293 | 1,038 | Yes | Yes |
| | SBR | 2,650 | 1,335 | 1,198 | Yes | Yes | 2,353 | 1,868 | Yes | Yes |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

**Table 7-4**

**Basic Freeway Segment Analysis for Horizon Year (2040) Conditions**

| Freeway | Direction | Mainline Segment | Lanes[1] | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Density[2] | | LOS[3] | | Density[2] | | LOS[3] | |
| | | | | AM | PM | AM | PM | AM | PM | AM | PM |
| I-605 | SB | North of Arrow Hwy. | 4 | 30.7 | 24.4 | D | C | 32.6 | 25.4 | D | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 23.0 | 20.4 | C | C | 23.0 | 20.4 | C | C |
| | | South of Live Oak Av. | 4 | 30.1 | 32.9 | D | D | 30.9 | **35.5** | D | **E** |
| | NB | North of Arrow Hwy. | 4 | 22.7 | 23.3 | C | C | 23.3 | 24.9 | C | C |
| | | Arrow Hwy. to Live Oak Av. | 4 | 19.2 | 20.1 | C | C | 19.2 | 20.1 | C | C |
| | | South of Live Oak Av. | 4 | 25.4 | 27.8 | C | D | 26.9 | 29.0 | D | D |

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

## Table 7-5

**Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2040) Conditions**

| Freeway | Direction | Ramp or Segment | Lanes on Freeway[1] | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] | Density[2] | LOS[3] |
| I-605 | SB | Off-Ramp at Arrow Hwy. | 4 | **30.1** | **E** | 24.6 | D | **31.7** | **E** | 25.7 | D |
| | | On-Ramp at Live Oak Av. | 4 | 30.4 | D | --[4] | **F** | 31.3 | D | --[4] | **F** |
| | NB | On-Ramp at Arrow Hwy. | 4 | 23.2 | C | 23.5 | C | 23.8 | C | 25.2 | C |
| | | Loop On-Ramp at Arrow Hwy. | 4 | 21.3 | C | 22.1 | C | 21.9 | C | 23.8 | C |
| | | Off-Ramp at Live Oak Av. | 4 | **26.2** | **E** | **28.4** | **E** | **27.8** | **E** | **29.6** | **E** |

* **BOLD** = Unacceptable Level of Service

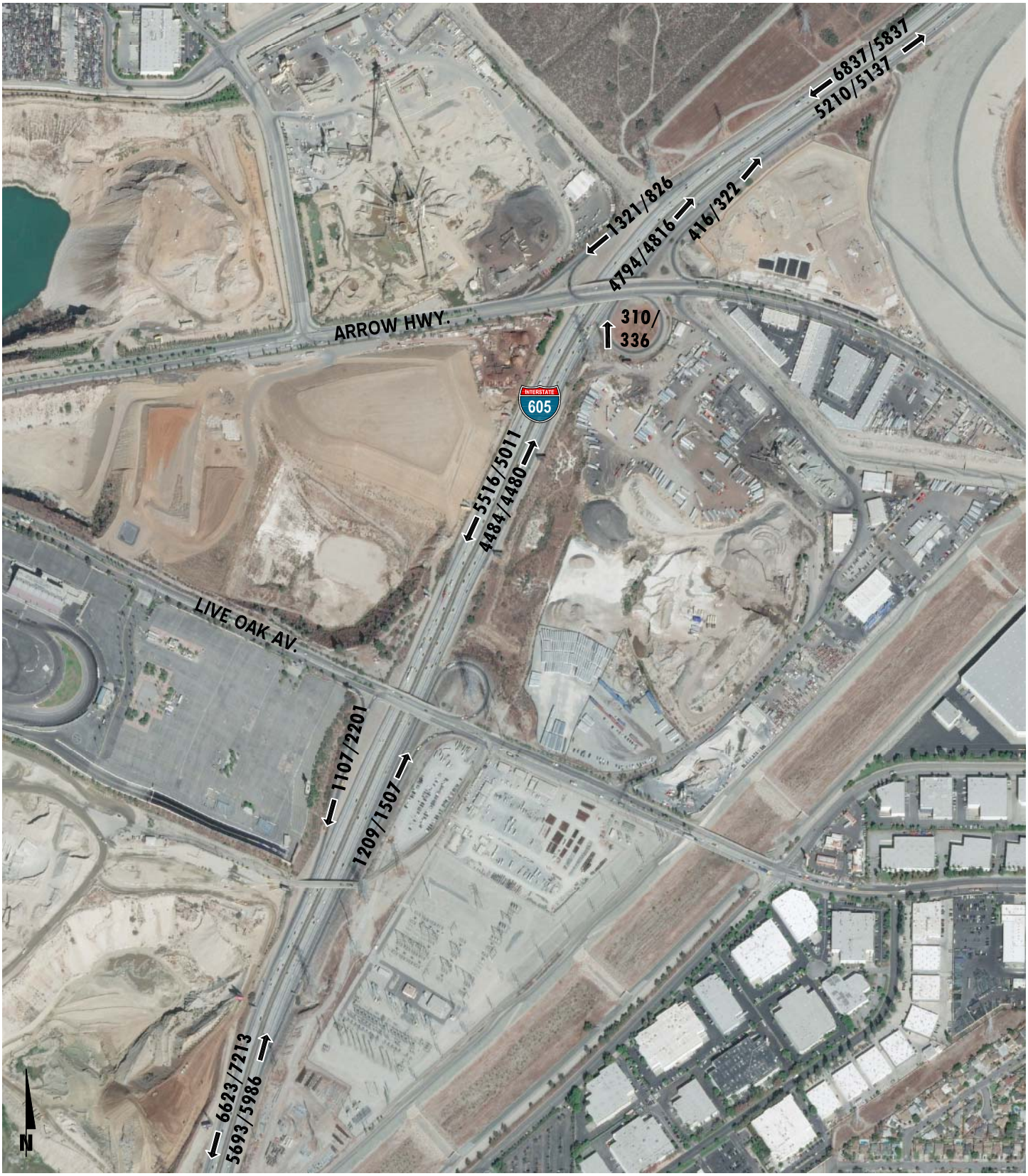
[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

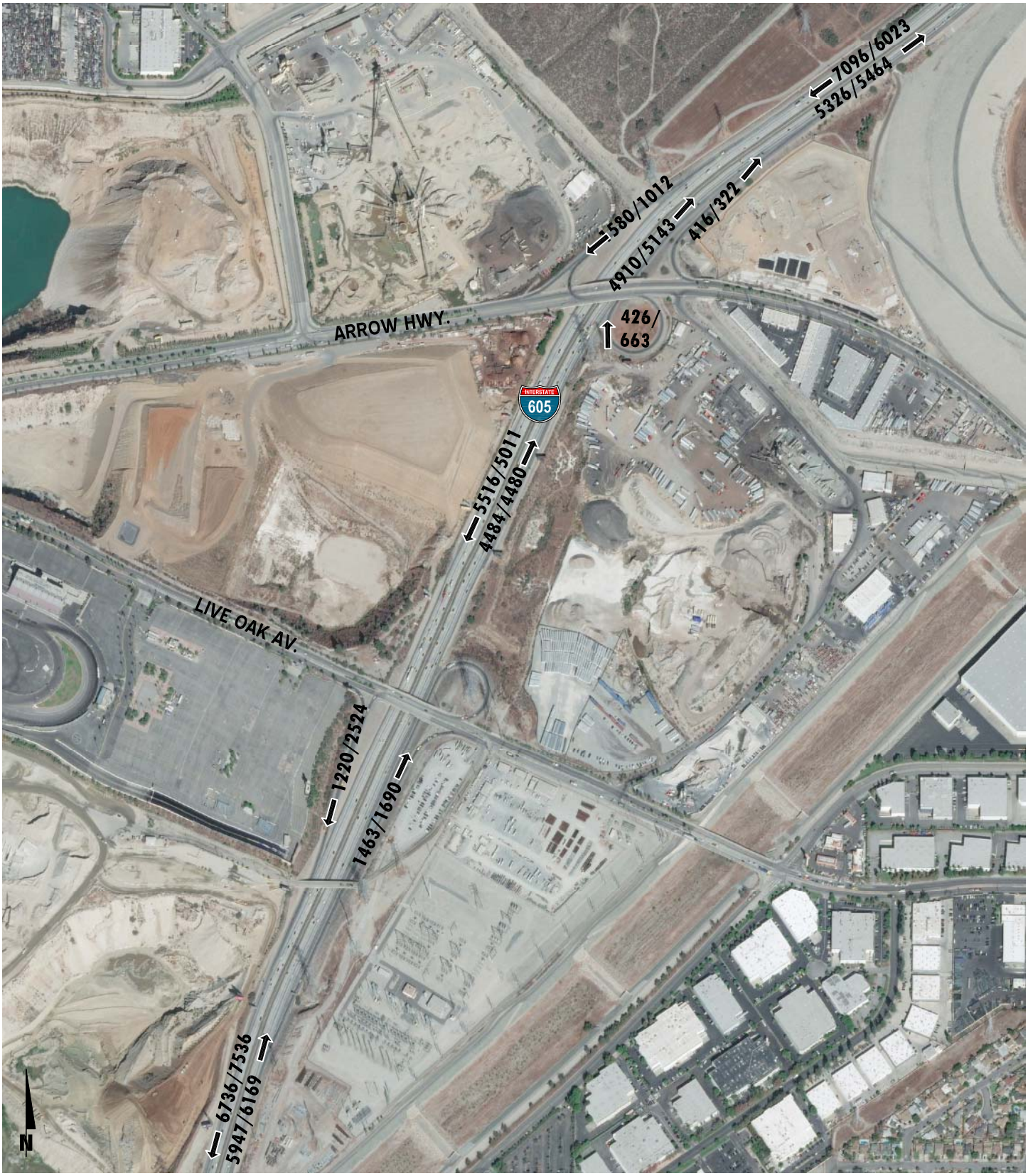
[3] LOS = Level of Service

[4] HCS7 does not report density for freeway facilities operating at LOS F.

## EXHIBIT 7-7: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



## EXHIBIT 7-8: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES



## 7.10 HORIZON YEAR (2040) IMPACTS

Based on the applicable jurisdiction's significance criteria as discussed in Section 2.9 *Thresholds of Significance*, the following study area intersections were found to be significantly impacted by the Project for Horizon Year (2040) traffic conditions:

- Myrtle Avenue & Longden Avenue (#1)
- Myrtle Avenue/Peck Road & Live Oak Avenue (#2)
- Longden Avenue & Live Oak Avenue/Driveway (#3)
- Live Oak Avenue & Arrow Highway (West) (#4)
- Speedway Drive & Live Oak Avenue (#7)
- Driveway 7/Driveway & Live Oak Avenue (#13)
- Avenida Barbosa/Private Drive A & Arrow Highway (#15)
- I-605 Northbound Off-Ramp & Live Oak Avenue (#23)
- Rivergrade Road & Live Oak Avenue (#26)
- Stewart Avenue & Live Oak Avenue (#27)
- Arrow Highway & Live Oak Avenue (East) (#29)
- Maine Avenue & Arrow Highway (#30)

The determination of significant impacts is shown on Table 7-6.

## 7.11 HORIZON YEAR RECOMMENDED IMPROVEMENTS

### 7.11.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies discussed below to address Horizon Year traffic deficiencies is presented in Table 7-6. It is recommended that the Project Applicant participate in the funding of off-site improvements that are needed to serve cumulative traffic conditions through the payment of City of Irwindale DIF (if the improvements are included in the DIF program) or on a fair share basis (if the improvements are not included in a pre-existing fee program). The improvements constructed by the Project would result in a less than significant impact. However, the locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented.

Mitigation Measures 1.1 through 11.1 identified previously for E+P and Opening Year Cumulative (2020) traffic conditions are recommended to improve each impacted intersection's LOS back to pre-project conditions, or better, for Horizon Year (2040) traffic conditions. Worksheets for Horizon Year Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.10.

## Table 7-6

**Determination of Significant Impacts for Horizon Year (2040) Conditions**

| # | Intersection | Traffic Control[2] | 2040 Without Project V/C Ratio or Delay[1] | | 2040 With Project V/C Ratio or Delay[1] | | Difference in V/C or Delay | | Significant Impact?[3,4] |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM | PM | AM | PM | AM | PM | |
| 1 | Myrtle Av. & Longden Av. | TS | 0.85 | **1.01** | 0.88 | **1.04** | -- | **0.028** | Yes |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | TS | **0.95** | **1.01** | **0.96** | **1.03** | 0.005 | **0.025** | Yes |
| 3 | Longden Av. & Live Oak Av./Driveway | TS | **1.24** | **1.02** | **1.27** | **1.05** | **0.028** | **0.029** | Yes |
| 4 | Live Oak Av. & Arrow Hwy. (West) | TS | **1.10** | 0.89 | **1.12** | **0.94** | **0.021** | **0.046** | Yes |
| 7 | Speedway Dwy. & Live Oak Av.[6] | CSS | **91.8** | **1239.7** | **55.0** | **1330.9** | -36.8 | **91.2** | Yes |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | TS | 0.59 | **0.98** | 0.54 | **1.07** | -- | **0.09** | Yes |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | TS | **1.12** | **0.93** | **1.22** | **1.12** | **0.093** | **0.191** | Yes |
| 23 | I-605 NB Off-Ramps & Live Oak Av. | CSS | **459.1** | **299.2** | **883.2** | **511.1** | **424.1** | **211.9** | Yes[5] |
| 26 | Rivergrade Rd. & Live Oak Av. | TS | 0.75 | **1.11** | 0.79 | **1.14** | -- | **0.028** | Yes |
| 27 | Stewart Av. & Live Oak Av. | TS | **0.97** | 0.89 | **1.00** | **0.91** | **0.025** | **0.021** | Yes |
| 29 | Arrow Hwy. & Live Oak Av. (East) | TS | 0.78 | **1.00** | 0.79 | **1.02** | -- | **0.024** | Yes |
| 30 | Maine Av. & Arrow Hwy. | TS | **0.93** | 0.89 | **0.95** | **0.92** | 0.017 | **0.023** | Yes |

[1] V/C calculated using the TRAFFIX operation analysis software, based on the ICU methodology. Delay based on HCM (6th Edition) methodology.

[2] TS = Traffic Signal; CSS = Cross-Street Stop

[3] Significant impact occurs when V/C is increased by 0.02 or more for either peak hour.

[4] Significant impact occurs when the delay is increased by more than 2 seconds.

[5] Caltrans facility does not have significance threshold. However, Project will contribute to the existing deficiency. As such, impact is cumulatively considerable.

[6] Intersection includes additional 3rd westbound through lane along Project's frontage on Live Oak Avenue for With Project traffic conditions.

## Table 7-7

**Intersection Analysis for Horizon Year (2040) Conditions With Improvements**

| # | Intersection | Traffic Control[4] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | Level of Service | | ICU[3] (v/c) | | Level of Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | | | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Myrtle Av. & Longden Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.854 | **1.008** | D | **F** |
| | - 2040 With Project | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | 1 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | 0.880 | **1.036** | D | **F** |
| | - With Improvements | TS | 1 | 2 | 0 | 1 | 2 | d | 1 | **2** | **0** | 1 | 2 | 0 | -- | -- | -- | -- | 0.880 | 0.895 | D | D |
| 2 | Myrtle Av./Peck Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.954** | **1.008** | **E** | **F** |
| | - 2040 With Project | TS | 1 | 2 | d | 1 | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.959** | **1.033** | **E** | **F** |
| | - With Improvements | TS | 1 | 2 | d | **2** | 2 | d | 1 | 2 | 1 | 1 | 2 | 0 | -- | -- | -- | -- | **0.959** | **0.979** | **E** | **E** |
| 3 | Longden Av. & Live Oak Av./Driveway | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | **1.244** | **1.016** | **F** | **F** |
| | - 2040 With Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | d | 1 | 2 | 1>> | -- | -- | -- | -- | **1.272** | **1.045** | **F** | **F** |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | **3** | **0** | 1 | 2 | 1>> | -- | -- | -- | -- | 0.853 | 0.847 | D | D |
| 4 | Live Oak Av. & Arrow Hwy. (West) | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **1.101** | **0.889** | **F** | **D** |
| | - 2040 With Project | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | 2 | 1>> | 2 | 2 | 0 | -- | -- | -- | -- | **1.122** | **0.935** | **F** | **E** |
| | - With Improvements | TS | 2 | 0 | 1>> | 0 | 0 | 0 | 0 | **3** | 1>> | 2 | **3** | 0 | -- | -- | -- | -- | **0.908** | 0.841 | **E** | D |
| 7 | Speedway Dwy. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | CSS | 1 | 0 | d | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | **91.8** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - 2040 With Project | CSS | 1 | 0 | d | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | **55.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - With Improvements | **TS** | 1 | 0 | d | 0 | 0 | 0 | 0 | 3 | 0 | 1 | **3** | 0 | -- | -- | -- | -- | 0.449 | 0.896 | A | D |
| 13 | Dwy. 7/Speedway Dr. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | -- | -- | -- | -- | 0.587 | **0.982** | A | **E** |
| | - 2040 With Project | TS | 2 | 0 | 1 | 0 | **1** | 0 | 0 | 3 | 0 | 1 | **3** | 0 | -- | -- | -- | -- | 0.539 | **1.074** | A | **F** |
| | - With Improvements | TS | 2 | 0 | 1 | **1** | **1** | 0 | 0 | 3 | **1** | 1 | **3** | 0 | -- | -- | -- | -- | 0.520 | **0.991** | A | **E** |
| 15 | Avenida Barbosa/Private Drive A & Arrow Hwy. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.124** | **0.925** | **F** | **E** |
| | - 2040 With Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1 | -- | -- | -- | -- | **1.217** | **1.116** | **F** | **F** |
| | - With Improvements | TS | **1** | **1** | **1** | 2 | **1** | 1 | **2** | **3** | 0 | **1** | **3** | **1>** | -- | -- | -- | -- | 0.818 | 0.875 | D | D |
| 23 | I-605 NB Off-Ramp & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - 2040 With Project | CSS | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | **>100.0** | **>100.0** | **F** | **F** | -- | -- | -- | -- |
| | - With Improvements | **TS** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 1.0 | 1.0 | A | A | -- | -- | -- | -- |
| 26 | Rivergrade Rd. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.747 | **1.111** | C | **F** |
| | - 2040 With Project | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.792 | **1.139** | C | **F** |
| | - With Improvements | TS | 1 | 1 | **1>** | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | -- | -- | -- | -- | 0.792 | **1.053** | C | **F** |
| 27 | Stewart Av. & Live Oak Av. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | **0.970** | 0.889 | **E** | D |
| | - 2040 With Project | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | d | -- | -- | -- | -- | **0.995** | **0.910** | **E** | **E** |
| | - With Improvements | TS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | **3** | **0** | 1 | **3** | **0** | -- | -- | -- | -- | 0.809 | 0.775 | D | C |
| 29 | Arrow Hwy. & Live Oak Av. (East) | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.778 | **1.000** | C | **E** |
| | - 2040 With Project | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.790 | **1.024** | C | **F** |
| | - With Improvements | TS | 0 | 0 | 0 | 2 | 0 | 1 | 1 | **3** | 0 | 0 | 2 | 1>> | -- | -- | -- | -- | 0.790 | 0.898 | C | D |
| 30 | Maine Av. & Arrow Hwy. | | | | | | | | | | | | | | | | | | | | | |
| | - 2040 Without Project | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 3 | 0 | -- | -- | -- | -- | **0.933** | 0.894 | **E** | D |
| | - 2040 With Project | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | d | 1 | 3 | 0 | -- | -- | -- | -- | **0.950** | **0.917** | **E** | **E** |
| | - With Improvements | TS | 2 | 0 | 1 | 0 | 0 | 0 | 0 | **3** | **0** | 1 | 3 | 0 | -- | -- | -- | -- | **0.950** | 0.822 | **E** | D |

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d= Defacto Right Turn Lane; **1** = Improvement

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

[3] Intersection capacity utilization (ICU) methodology results are presented as a volume-to-capacity ratio. ICU not reported for unsignalized intersections or at Caltrans facilities.

[4] TS = Traffic Signal; CSS = Cross-Street Stop; **TS** = Improvement

### 7.11.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

With the implementation of the intersection improvements listed above in conjunction with the Project's site adjacent improvements, only the following roadway segments would continue to operate at a deficient LOS for Horizon Year (2040) With Project traffic conditions (see Table 7-8):

- Longden Avenue, Myrtle Avenue to Live Oak Avenue (#1) – LOS F
- Live Oak Avenue, Longden Avenue to Live Oak Avenue (#3) – LOS E
- Arrow Highway, I-605 Southbound Off-Ramp to I-605 Northbound On-Ramp/Live Oak Lane (#12) – LOS F
- Arrow Highway, I-605 Northbound On-Ramp/Live Oak Lane to Rivergrade Road (#13) – LOS F
- Arrow Highway, Rivergrade Road to Live Oak Avenue (#14) – LOS E
- Avenida Barbosa, Alpha Street/Buena Vista Street to Arrow Highway (#16) – LOS E
- Live Oak Avenue, Live Oak Avenue/Arrow Highway to Driveway 2 (#19) – LOS E
- Live Oak Avenue, Driveway 2 to Speedway Driveway (#20) – LOS E
- Live Oak Avenue, Speedway Driveway to Driveway 4 (#21) – LOS D
- Live Oak Avenue, Driveway 4 to Driveway 5 (#22) – LOS D
- Live Oak Avenue, Driveway 5 to Driveway 7 (#23) – LOS D
- Live Oak Avenue, Driveway 7 to Private Drive A (#24) – LOS D
- Live Oak Avenue, Private Drive A to Driveway 10 (#25) – LOS E
- Live Oak Avenue, Driveway 10 to I-605 Southbound On-Ramp (#26) – LOS E
- Live Oak Avenue, I-605 Southbound On-Ramp to I-605 Northbound Off-Ramp (#27) – LOS F
- Live Oak Avenue, I-605 Northbound Off-Ramps to Rivergrade Road (#28) – LOS D
- Live Oak Avenue, Arrow Highway to Maine Avenue (#32) – LOS F

However, additional roadway widening has not been recommended as the adjacent study area intersections would operate at acceptable LOS during the peak hours with the recommended improvements.

### 7.11.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Irwindale (or other neighboring jurisdictions) on SHS facilities. As such, no improvements have been recommended to address Horizon Year deficiencies on the SHS, because there is no feasible mitigation available.

**Table 7-8**

**Roadway Segment Analysis for Horizon Year (2040) Conditions With Improvements**

| # | Roadway | Segment Limits | Roadway Section | LOS Capacity[1] | 2040 Without Project | V/C[2] | LOS[3] | 2040 With Project | V/C[2] | LOS[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longden Av. | Myrtle Av. to Live Oak Av. | 4D | 20,000 | 19,994 | **1.00** | **F** | 21,056 | **1.05** | **F** |
| 2 | Live Oak Av. | Peck Rd. to Longden Av. | **5D** | **46,700** | 28,468 | 0.61 | B | 29,586 | 0.63 | B |
| 3 | | Longden Av. to Live Oak Av. | 6D | 53,000 | 48,940 | **0.92** | **F** | 50,586 | **0.95** | **E** |
| 4 | Arrow Hwy. | Live Oak Av. to Dwy. 1 | **6D** | **53,000** | 34,153 | 0.64 | B | 34,813 | 0.66 | B |
| 5 | | Dwy. 1 to Dwy. 3 | **6D** | **53,000** | 34,151 | 0.64 | B | 34,741 | 0.66 | B |
| 6 | | Dwy. 3 to Driveway/Private Drive B | **6D** | **53,000** | 34,151 | 0.64 | B | 34,864 | 0.66 | B |
| 7 | | Driveway/Private Drive B to Dwy. 6 | **6D** | **53,000** | 34,151 | 0.64 | B | 35,404 | 0.67 | B |
| 8 | | Dwy. 6 to Avenida Barbosa/Private Drive A | **6D** | **53,000** | 34,151 | 0.64 | B | 35,522 | 0.67 | B |
| 9 | | Avenida Barbosa/Private Drive A to Dwy. 8 | **6D** | **53,000** | 33,660 | 0.64 | B | 39,447 | 0.74 | C |
| 10 | | Dwy. 8 to Dwy. 9 | **6D** | **53,000** | 33,660 | 0.64 | B | 41,110 | 0.78 | C |
| 11 | | Dwy. 9 to I-605 SB Off-Ramp | **6D** | **53,000** | 33,660 | 0.64 | B | 41,111 | 0.78 | C |
| 12 | | I-605 SB Off-Ramp to I-605 NB On-Ramp/Live Oak Ln. | 4D | 30,000 | 32,859 | **1.10** | **F** | 37,760 | **1.26** | **F** |
| 13 | | I-605 NB On-Ramp/Live Oak Ln. to Rivergrade Rd. | 4D | 30,000 | 28,427 | **0.95** | **E** | 30,779 | **1.03** | **F** |
| 14 | | Rivergrade Rd. to Live Oak Av. | 4D | 30,000 | 27,356 | **0.91** | **E** | 28,600 | **0.95** | **E** |
| 15 | Private Drive B | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 622 | 0.06 | A |
| 16 | Avenida Barbosa | Alpha St./Buena Vista St. to Arrow Hwy. | 4D | 20,000 | 18,881 | **0.94** | **E** | 19,479 | **0.97** | **E** |
| 17 | Private Drive A | South of Arrow Hwy. | 2U | 10,000 | Future Segment | | | 4,635 | 0.46 | A |
| 18 | | North of Live Oak Av. | 2U | 10,000 | Future Segment | | | 3,097 | 0.31 | A |
| 19 | Live Oak Av. | Live Oak Av./Arrow Hwy. to Dwy. 2 | **6D** | **53,000** | 47,912 | **0.90** | **E** | 49,523 | **0.93** | **E** |
| 20 | | Dwy. 2 to Speedway Dwy. | **6D** | **53,000** | 49,486 | **0.93** | **E** | 51,004 | **0.96** | **E** |
| 21 | | Speedway Dwy. to Dwy. 4 | **6D** | **53,000** | 42,713 | **0.81** | **D** | 44,231 | **0.83** | **D** |
| 22 | | Dwy. 4 to Dwy. 5 | **6D** | **53,000** | 42,713 | **0.81** | **D** | 44,240 | **0.83** | **D** |
| 23 | | Dwy. 5 to Dwy. 7 | **6D** | **53,000** | 42,713 | **0.81** | **D** | 44,240 | **0.83** | **D** |
| 24 | | Dwy. 7 to Private Drive A | **6D** | **53,000** | 42,776 | **0.81** | **D** | 44,950 | **0.85** | **D** |
| 25 | | Private Drive A to Dwy. 10 | **6D** | **53,000** | 42,685 | **0.81** | **D** | 47,772 | **0.90** | **E** |
| 26 | | Dwy. 10 to I-605 SB On-Ramp | **6D** | **53,000** | 42,891 | **0.81** | **D** | 48,324 | **0.91** | **E** |
| 27 | | I-605 SB On-Ramp to I-605 NB Off-Ramps | 4D | 40,400 | 39,892 | **0.99** | **E** | 43,641 | **1.08** | **F** |
| 28 | | I-605 NB Off-Ramps to Rivergrade Rd. | 4D | 40,400 | 33,762 | **0.84** | **D** | 34,998 | **0.87** | **D** |
| 29 | | Rivergrade Rd. to Stewart Av. | **6D** | **53,000** | 38,576 | 0.73 | C | 39,628 | 0.75 | C |
| 30 | | Stewart Av. to Baldwin Park Bl. | **6D** | **53,000** | 34,992 | 0.66 | B | 35,538 | 0.67 | B |
| 31 | | Baldwin Park Bl. to Arrow Hwy. | **5D** | **46,700** | 32,021 | 0.69 | B | 32,059 | 0.69 | B |
| 32 | | Arrow Hwy. to Maine Av. | **5D** | **46,700** | 53,060 | **1.14** | **F** | 54,340 | **1.16** | **F** |
| 33 | Rivergrade Rd. | Arrow Hwy. to Stewart Av. | 4D | 20,000 | 8,462 | 0.42 | A | 9,570 | 0.48 | A |
| 34 | | Stewart Av. to Live Oak Av. | 4D | 20,000 | 6,588 | 0.33 | A | 7,696 | 0.38 | A |

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

**5D** = Improvement

[1] These maximum roadway capacities have been obtained from the City of Irwindale General Plan Update (Table 4-10).

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

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