# APPENDIX A

## TRAFFIC STUDY SCOPE OF WORK

# MEMORANDUM

| | | | |
|---|---|---|---|
| To: | Mr. David Kennedy, P.E.<br>City of Anaheim | Date: | August 16, 2019 |
| From: | Keil D. Maberry, P.E. KDM<br>Daniel A. Kloos, P.E. DAK<br>Linscott, Law & Greenspan, Engineers | LLG Ref: | 2.19.4152.1 |
| Subject: | TIA Scope of Work for the Lincoln Avenue Redevelopment Project<br>Anaheim, California | | |


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Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit the following Traffic Study Scope of Work for the proposed Lincoln Avenue Redevelopment Project for your review and approval.

## Traffic Study Scope of Work

The Traffic Impact Analysis for the proposed Lincoln Avenue Redevelopment Project will satisfy the traffic impact requirements of the City of Anaheim and will be consistent with the requirements and procedures outlined in the most current *Congestion Management Program (CMP) for Orange County.*

**A. Project Location:** The proposed project site is generally bounded by Euclid Street to the west, Lincoln Avenue to the south, Loara Street to the east and the Southern Pacific Railroad tracks and the I-5 Freeway to the north in the City of Anaheim, California. The project site is primarily vacant. However, a portion of the site is currently occupied by a 32,100 square-foot (SF) cement manufacturing company and an area used for vehicle storage/parking. See the attached Vicinity Map – ***Figure 1-1*** and Existing Site Aerial – ***Figure 2-1***.

**B. Project Description:** The proposed Project will consist of a new residential single-family attached development with a maximum of 119 units. The proposed Project is expected to be completed in the Year 2023 and will consist of two (2) phase options. Phase I (Scenario No. 1) will consist of 105 units. Phase II (Scenario No. 2) will consist of 119 units, which includes 14 additional units and is contingent on the project applicant acquiring the adjacent City owned parcels. Access to the proposed Project site will be provided via two gated unsignalized driveways located along Lincoln Avenue. The easterly driveway will provide full access to the site and the westerly driveway will provide emergency access only to the site. See the attached Proposed Site Plan – ***Figure 2-2.***

**C. Project Study Area:** The following six (6) key study intersections and five (5) key roadway segments have been selected for evaluation based on discussions with City of Anaheim Public Works Department staff.


Philip M. Linscott, PE (1924-2000
Jack M. Greenspan, PE (Ret.)
William A. Law, PE (Ret.)
Paul W. Wilkinson, PE
John P. Keating, PE
David S. Shender, PE
John A. Boarman, PE
Clare M. Look-Jaeger, PE
Richard E. Barretto, PE
Keil D. Maberry, PE

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***Key Study Intersections***

1) I-5 Ramps at Euclid Street
2) Euclid Street at Lincoln Avenue
3) Loara Street at Lincoln Avenue
4) I-5 SB Ramps at Lincoln Avenue
5) Manchester Avenue at Lincoln Avenue
6) I-5 NB Ramps/Wilshire Avenue at Lincoln Avenue

***Key Roadway Segments***

A. Euclid Street between Lincoln Avenue and I-5 Ramps
B. Lincoln Avenue between Euclid Street and Loara Street
C. Lincoln Avenue between Loara Street and I-5 SB Ramps
D. Lincoln Avenue between I-5 SB Ramps and Manchester Avenue
E. Lincoln Ave between Manchester Ave and I-5 NB Ramps/Wilshire Ave

**D. Traffic Counts:** The traffic counts for the above listed key study intersections and key roadway segments will be provided by City of Anaheim Public Works Department staff.

**E. Project Traffic Generation (Scenario No. 1):** The trip generation potential of the existing land use and the proposed Project (Scenario No. 1 – 105 dwelling units) will be estimated using ITE Land Use 150: Warehousing trip rates and ITE Land Use 220: Multifamily Housing (Low-Rise) trip rates contained in the 10th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE), [Washington, D.C., 2017].

***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the existing land use and the proposed Project (Scenario No. 1 – 105 dwelling units) and presents the forecast daily and peak hour project traffic volumes for a "typical" weekday. Review of the middle portion of *Table 5-1* indicates that the proposed Project (Scenario No. 1 – 105 dwelling units) is forecast to generate approximately 769 daily trips, with 48 trips (11 inbound, 37 outbound) produced in the AM peak hour and 59 trips (37 inbound, 22 outbound) produced in the PM peak hour on a "typical" weekday. Review of the lower portion of *Table 5-1* indicates that the existing land use generates approximately 56 daily trips, with 5 trips (4 inbound, 1 outbound) produced in the AM peak hour and 6 trips (2 inbound, 4 outbound) produced in the PM peak hour on a "typical" weekday. Comparison of the trips generated by the existing land use to the trips generated by the proposed Project (Scenario No. 1 – 105 dwelling units) shows that the proposed Project (Scenario No. 1 – 105 dwelling units) will generate 713 net daily trips, 43 net AM peak hour trips and 53 net PM peak hour trips. The potential

impact of these net additional trips will be assessed in the traffic study (i.e. Year 2023 – Scenario No. 1).

**F. Project Traffic Generation (Scenario No. 2):** The trip generation potential of the existing land use and the proposed Project (Scenario No. 2 – 119 dwelling units) will be estimated using ITE Land Use 150: Warehousing trip rates and ITE Land Use 220: Multifamily Housing (Low-Rise) trip rates contained in the 10th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE), [Washington, D.C., 2017].

***Table 5-2*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the existing land use and the proposed Project (Scenario No. 2 – 119 dwelling units) and presents the forecast daily and peak hour project traffic volumes for a "typical" weekday. Review of the middle portion of *Table 5-2* indicates that the proposed Project (Scenario No. 2 – 119 dwelling units) is forecast to generate approximately 871 daily trips, with 54 trips (12 inbound, 42 outbound) produced in the AM peak hour and 67 trips (42 inbound, 25 outbound) produced in the PM peak hour on a "typical" weekday. Review of the lower portion of *Table 5-2* indicates that the existing land use generates approximately 56 daily trips, with 5 trips (4 inbound, 1 outbound) produced in the AM peak hour and 6 trips (2 inbound, 4 outbound) produced in the PM peak hour on a "typical" weekday. Comparison of the trips generated by the existing land use to the trips generated by the proposed Project (Scenario No. 2 – 119 dwelling units) shows that the proposed Project (Scenario No. 2 – 119 dwelling units) will generate 815 net daily trips, 49 net AM peak hour trips and 61 net PM peak hour trips. The potential impact of these net additional trips will be assessed in the traffic study (i.e. Year 2023 – Scenario No. 2). It should also be noted that these trips will also be utilized in the existing plus project analysis and the long-term buildout analysis.

**G. Project Trip Distribution Pattern:** See the attached Project Traffic Distribution Pattern – ***Figure 5-1***.

**H. Year 2023 Cumulative Traffic:**

- Ambient Growth Rate: 1.0% per year.
- Cumulative Projects – Obtain information regarding cumulative projects in the vicinity of the proposed project (i.e. 2-mile radius) from the City of Anaheim and the City of Fullerton.

**I. Long-Term Buildout Traffic:** Obtain long-term buildout traffic volumes (ATAM runs) for the key study intersections and key roadway segments for the following scenarios from City of Anaheim Public Works Department staff.

- General Plan Buildout No Project;
- General Plan Buildout No Project with Cumulative Project (1600 West Lincoln Avenue) and
- General Plan Buildout with Cumulative Project (1600 West Lincoln Avenue) with Project.

**J. Analysis Scenarios:** The following traffic analysis scenarios will be prepared for the proposed Project.

(a) Existing Traffic Conditions;
(b) Existing Plus Project Traffic Conditions (119 units);
(c) Scenario (b) with Mitigation, if necessary;
(d) Year 2023 Cumulative Traffic Conditions;
(e) Year 2023 Cumulative Plus Project Traffic Conditions (Scenario No. 1 – 105 units);
(f) Scenario (e) with Mitigation, if necessary;
(g) Year 2023 Cumulative Plus Project Traffic Conditions (Scenario No. 2 – 119 units);
(h) Scenario (g) with Mitigation, if necessary;
(i) General Plan Buildout No Project Traffic Conditions;
(j) General Plan Buildout No Project with Cumulative Project (1600 West Lincoln Avenue) Traffic Conditions;
(k) Scenario (j) with Mitigation, if necessary;
(l) General Plan Buildout with Cumulative Project (1600 West Lincoln Avenue) with Project Traffic Conditions (119 units) and
(m) Scenario (l) with Mitigation compared to (i), if necessary.

The LOS calculations for the key study intersections will be based on the ICU methodology for signalized intersections and the Highway Capacity Manual (HCM) methodology for unsignalized intersections. The LOS calculations for the key roadway segments will be based on the Volume to Capacity Ratio (V/C) methodology. The Project's potential impact will be based on the significant impact criteria outlined in the *City of Anaheim Criteria For Preparation of Traffic Impact Studies.*

It should be noted that all Caltrans-controlled study intersections will also be analyzed utilizing the Highway Capacity Manual (HCM) methodology.

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**K. Other Issues:**

- Evaluate site access and internal circulation.
- Include a section in the TIA discussing the feasibility of left-turns out of the project site and also determine the recommended length of the proposed eastbound left-turn pocket at the project driveway.

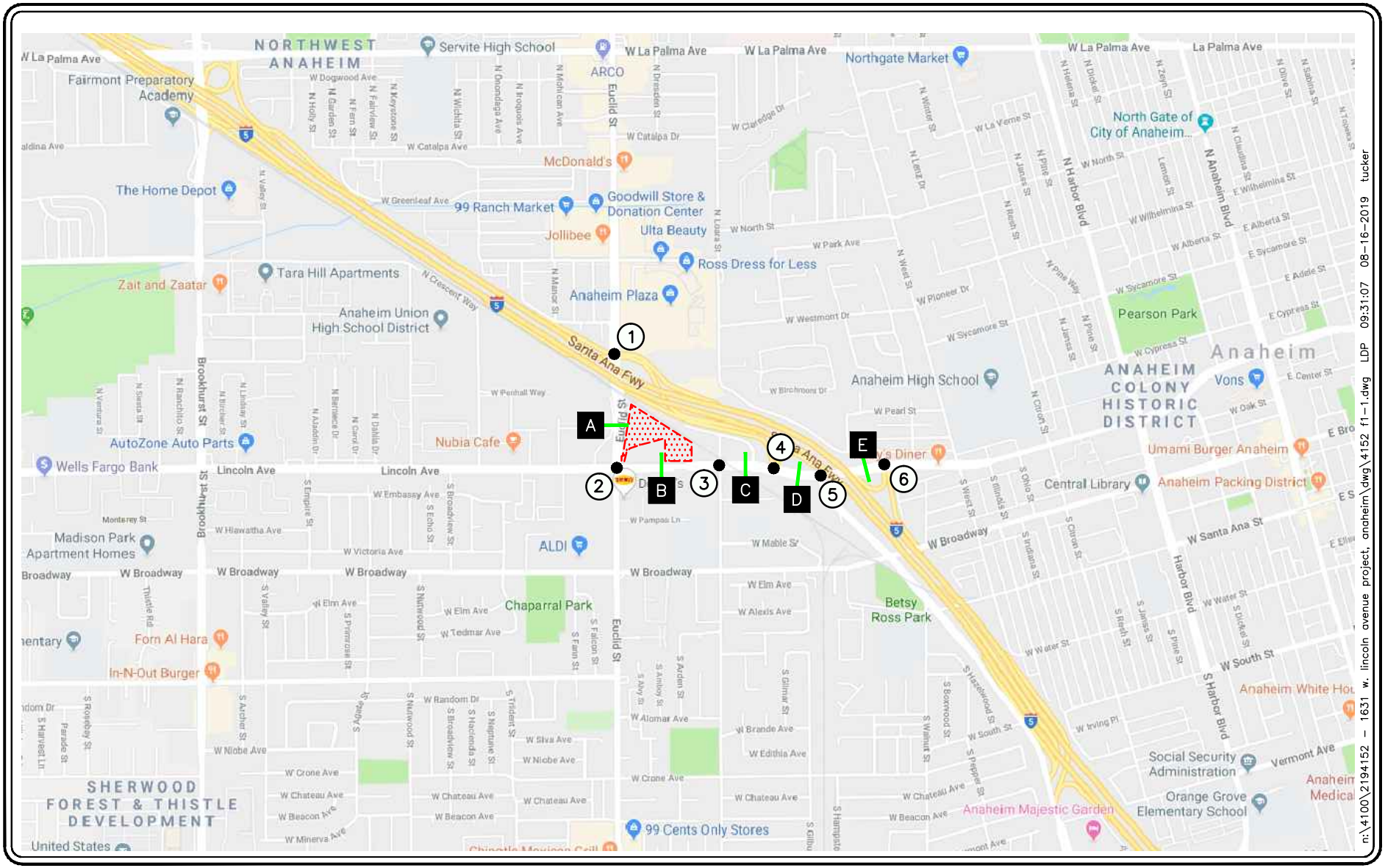
We appreciate the opportunity to provide this scope of work. Should you have any questions, please call us at (949) 825-6175. Thank you.

**Approved by:**

_____ _____

City of Anaheim Date

Attachments:

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N NO SCALE

SOURCE: GOOGLE

KEY

(#) = STUDY INTERSECTION

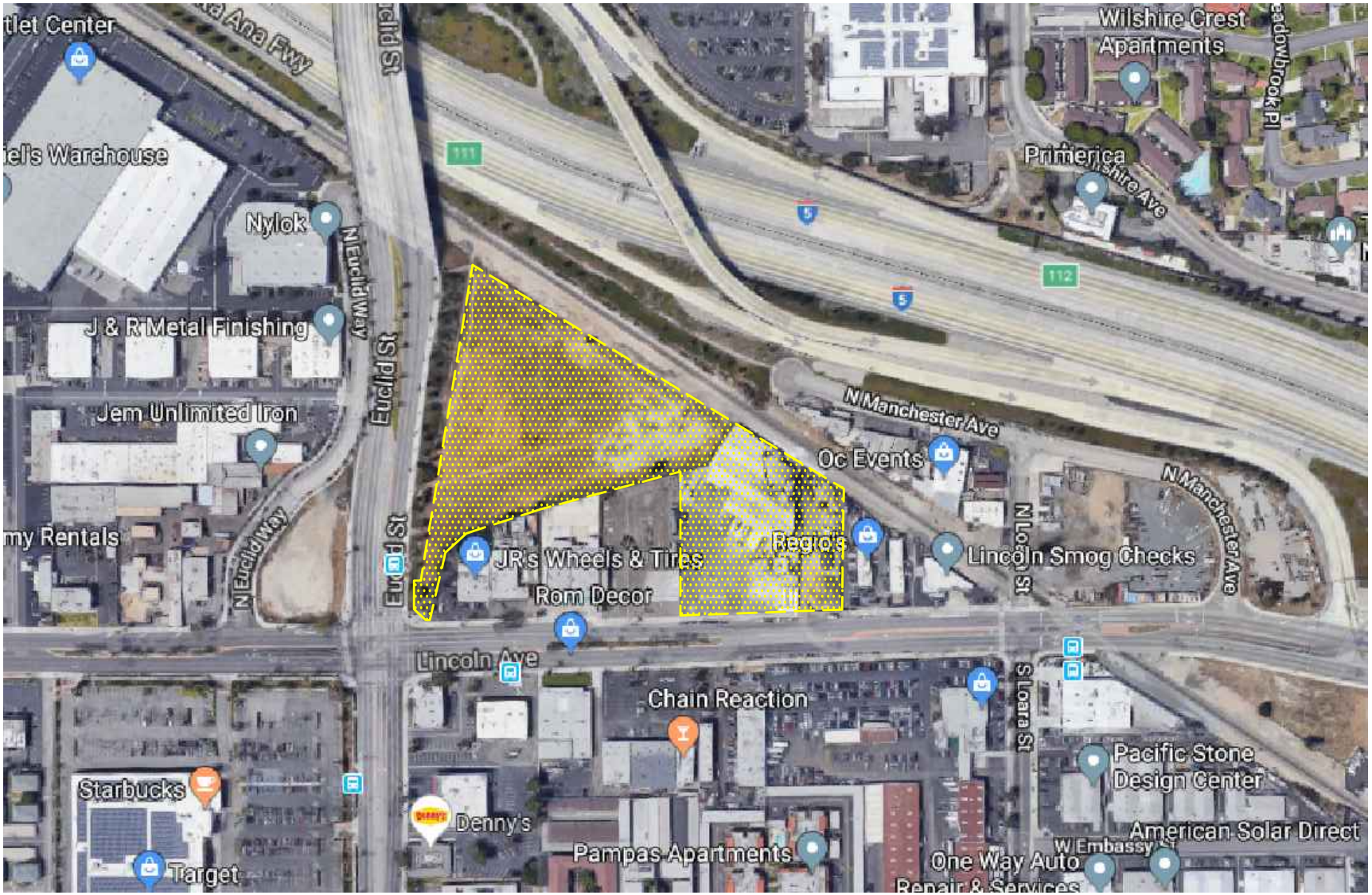
A = STUDY ROADWAY SEGMENT

= PROJECT SITE

# FIGURE 1-1

## VICINITY MAP

LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM

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N NO SCALE

SOURCE: GOOGLE

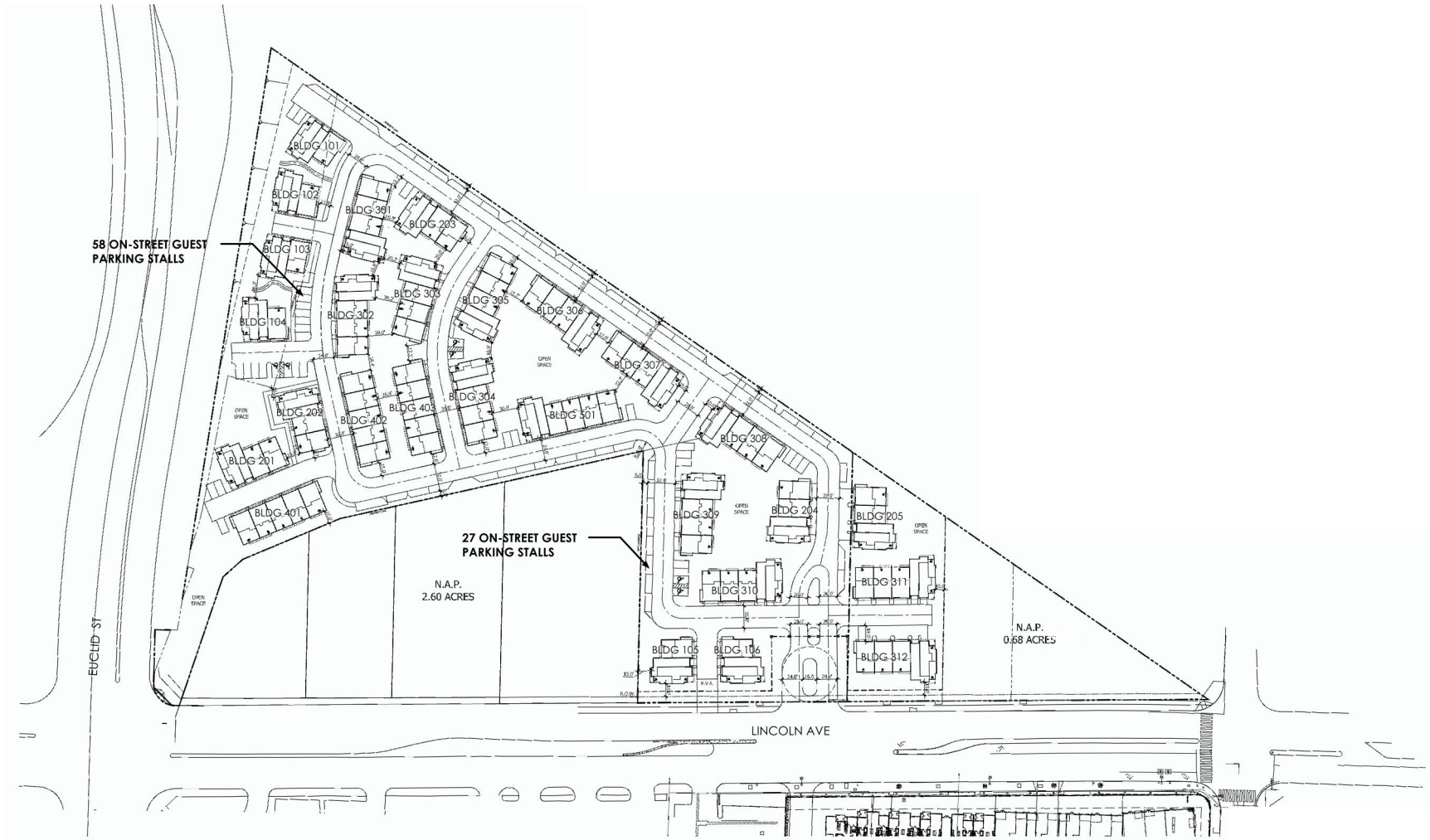
KEY

= PROJECT SITE

# FIGURE 2-1

## EXISTING SITE AERIAL

LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM

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SOURCE: JZMK PARTNERS

# FIGURE 2-2

## PROPOSED SITE PLAN

LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM

**TABLE 5-1**
**PROJECT TRAFFIC GENERATION FORECAST (SCENARIO NO. 1)[1]**
**LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM**

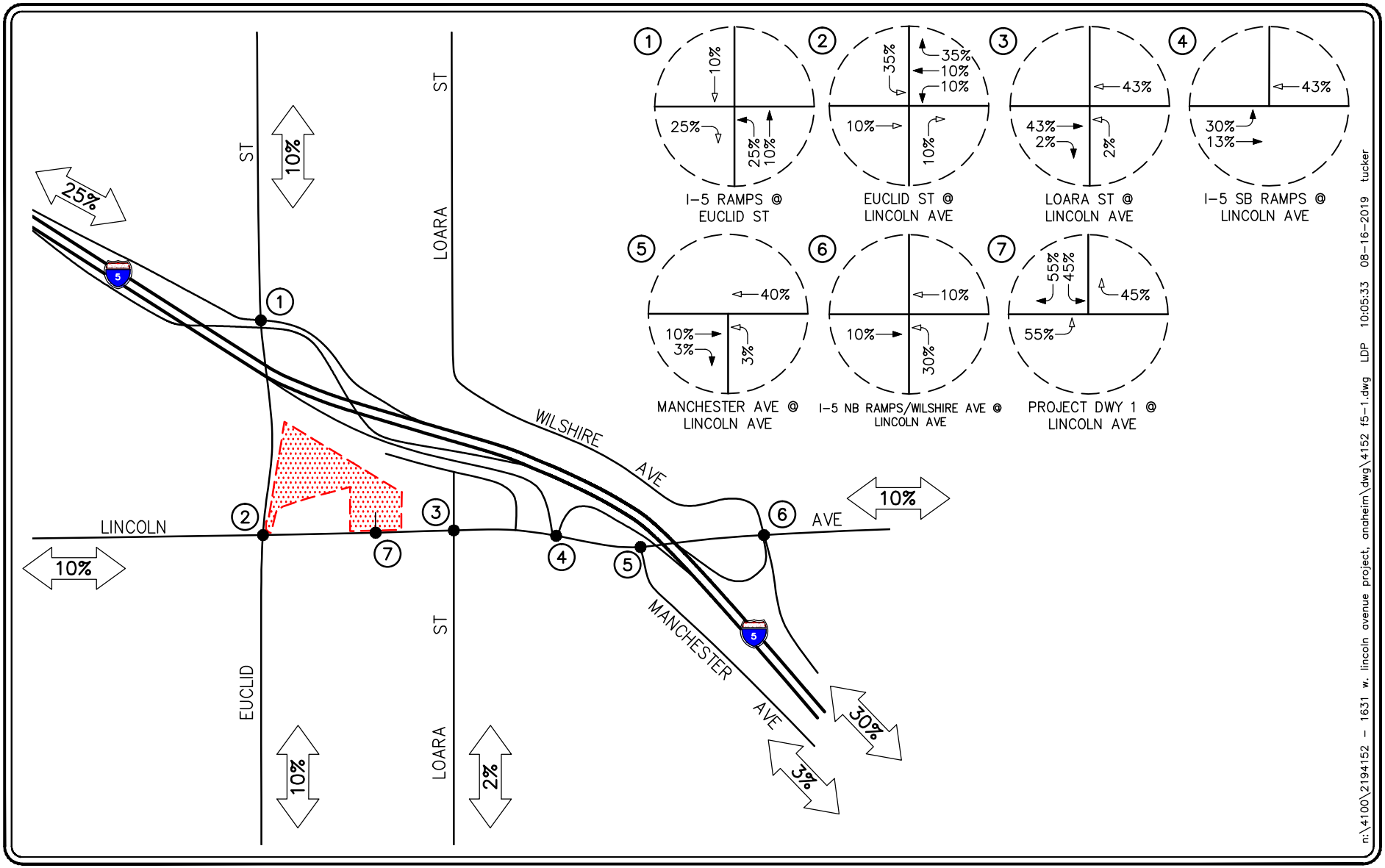
| ITE Land Use Code / Project Description | Daily 2-Way | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| ***Generation Factors:*** | | | | | | | |
| ▪ 150: Warehousing (TE/1000 SF) | 1.74 | 77% | 23% | 0.17 | 27% | 73% | 0.19 |
| ▪ 220: Multifamily Housing Low-Rise (TE/DU) | 7.32 | 23% | 77% | 0.46 | 63% | 37% | 0.56 |
| ***Proposed Project Generation Forecast:*** | | | | | | | |
| ▪ Scenario No. 1 Project (105 DU) | 769 | 11 | 37 | 48 | 37 | 22 | 59 |
| ***Existing Land Use Generation Forecast:*** | | | | | | | |
| ▪ Warehouse (32,100 SF) | 56 | 4 | 1 | 5 | 2 | 4 | 6 |
| **Net Project Trip Generation Forecast (Scenario No. 1 Project vs. Existing Land Use)** | **713** | **7** | **36** | **43** | **35** | **18** | **53** |

[1] Source: *Trip Generation*, 10th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2017).

**TABLE 5-2**
**PROJECT TRAFFIC GENERATION FORECAST (SCENARIO NO. 2)[2]**
**LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM**

| ITE Land Use Code / Project Description | Daily 2-Way | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| ***Generation Factors:*** | | | | | | | |
| ▪ 150: Warehousing (TE/1000 SF) | 1.74 | 77% | 23% | 0.17 | 27% | 73% | 0.19 |
| ▪ 220: Multifamily Housing Low-Rise (TE/DU) | 7.32 | 23% | 77% | 0.46 | 63% | 37% | 0.56 |
| ***Proposed Project Generation Forecast:*** | | | | | | | |
| ▪ Scenario No. 2 Project (119 DU) | 871 | 12 | 42 | 54 | 42 | 25 | 67 |
| ***Existing Land Use Generation Forecast:*** | | | | | | | |
| ▪ Warehouse (32,100 SF) | 56 | 4 | 1 | 5 | 2 | 4 | 6 |
| **Net Project Trip Generation Forecast (Scenario No. 2 Project vs. Existing Land Use)** | **815** | **8** | **41** | **49** | **40** | **21** | **61** |

[2] Source: *Trip Generation*, 10th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2017).

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N NO SCALE

KEY
= INBOUND PERCENTAGE
= OUTBOUND PERCENTAGE
= PROJECT SITE

# FIGURE 5-1

## PROJECT TRAFFIC DISTRIBUTION PATTERN

LINCOLN AVENUE REDEVELOPMENT PROJECT, ANAHEIM