APPENDIX G

TRAFFIC IMPACT ANALYSIS REPORT

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November 16, 2004

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LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614

LLG Reference: 2.02.2354.1

Subject: **Traffic Impact Analysis Report**
Long Beach Sports Park Project
Long Beach, California

Dear Ms. De Leon:

As requested, Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit this Traffic Impact Analysis Report for the development of the Long Beach Sports Park. The project site is a rectangular-shaped 55.5±-acre parcel of land in the City of Long Beach that is located south of Spring Street, bounded by California Avenue on the west, Orange Avenue on the east, and the Sunnyside/Long Beach Cemetery on the south. The City of Signal Hill jurisdiction completely borders the site on the south, east and west, and partially on the north.

The Sports Park, in general, will have six (6) softball/baseball diamonds, four (4) soccer fields, four (4) volleyball courts, two (2) arena soccer pavilions, nine (9) batting cages and a 23,000 square-foot (SF) skate park. The project also includes two uses outside of the sports park facility. A commercial parcel, with approximately 30,000 SF of office floor area, is proposed to be located in the northwest corner of the project site and youth golf center with 15,000 SF of floor area, an eight (8) tee driving range, three (3) pitch-n-putt practice holes, and a putting green, will be located on the southeast corner of the project site. Approximately 746 parking spaces will be provided for the Long Beach Sports Park; 612 spaces in the main parking lot with an additional 134 spaces provided in the parking lot adjacent to the proposed youth golf facility. The Long Beach Sports Park project is expected to open by the year 2006.

This report summarizes the trip generation potential for the proposed Sports Park project on a typical weekday and weekend day. Per the City of Long Beach requirements, the traffic analysis evaluates the relative traffic impacts of the proposed development at eighteen (18) study intersections for a near-term horizon year (2006).

LINSCOTT LAW & GREENSPAN engineers

Briefly, based on the results of our traffic analysis, the proposed Long Beach Sports Park project will have an impact at five of the eighteen study intersections in the Year 2006. Based on our analysis, the project's significant traffic impacts can be mitigated through implementation of the following recommended mitigation measures:

- **Orange Avenue at 28th Street:** Install a five-phase traffic signal with protected northbound and southbound left-turn lane phasing on Orange Avenue at 28th Street/Long Beach Sport Park project driveway.

- **Atlantic Avenue at Spring Street:** Widen Atlantic Avenue to provide a separate northbound right-turn lane to proceed eastbound on Spring Street.

- **Orange Avenue at Spring Street:** Convert the existing southbound right-turn lane to provide a second through lane on Orange Avenue, and restripe Orange Avenue south of Spring Street to provide two southbound departure lanes. Provide a separate eastbound right-turn lane on Spring Street to proceed southbound on Orange Avenue.

- **I-405 SB Ramps at Orange Avenue:** Install a three-phase traffic signal.

- **32nd Avenue at Orange Avenue:** Modify traffic signal and upgrade from a pretimed (fixed time) signal to an actuated signal.

The Long Beach Sports Park project can be expected to pay a "fair-share" of the improvement costs associated with the construction of these improvements.

A summary of our analysis, findings, and conclusions are presented on pages 64 – 67 of this report. We appreciate the opportunity to prepare this investigation. Should you have any questions regarding this analysis, please call us at (714) 641-1587.

Very truly yours,
LINSCOTT, LAW & GREENSPAN, ENGINEERS

Richard E. Barretto, P.E.
Principal

Daniel A Kloos, P.E.
Transportation Engineer II

LINSCOTT LAW & GREENSPAN engineers

TRAFFIC IMPACT ANALYSIS REPORT

LONG BEACH SPORTS PARK

Long Beach, California
November 16, 2004

Prepared for:

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614

And

The City of Long Beach
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LLG Ref. 2.02.2354.1

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TRAFFIC IMPACT ANALYSIS

LONG BEACH SPORTS PARK

Long Beach, California
November 16, 2004

1.0 INTRODUCTION

This traffic impact study addresses the potential traffic impacts and circulation needs associated with the development of a pay-for-play sports park complex, which is to be located in the City of Long Beach. The project site is located south of Spring Street, bounded by California Avenue on the west, Orange Avenue on the east, and the Sunnyside and Long Beach Cemeteries on the south. The City of Signal Hill jurisdiction borders the site on the east and west, south of the cemeteries, and partially on the north.

This report documents the findings of a traffic impact analysis, as well as a parking analysis, conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential impacts associated with the Long Beach Sports Park project. The traffic analysis evaluates the existing operating conditions at eighteen (18) intersections within the project vicinity and five (5) site driveways, estimates the trip generation potential of the proposed sports park, and forecasts future intersection operating conditions at completion and occupancy of the project. Where necessary, intersection improvements/mitigation measures are identified. Further, an evaluation of the project's parking needs is provided based on the City of Long Beach off-street parking code.

The traffic report satisfies the traffic impact requirements of the City of Long Beach as well as the City of Signal Hill and is consistent with the *2002 Congestion Management Program (CMP) for Los Angeles County.* The Scope of Work for this report has been developed in coordination with City of Long Beach staff.

The project study area has been visited and a detailed inventory of key area roadways and intersections made. Existing traffic count information has been researched and supplemented with manual peak period turning movement counts and 24-hour traffic machine counts on a "typical" weekday and Saturday. Information concerning cumulative projects (planned and/or approved) in the vicinity of the project has been researched at the City of Long Beach and City of Signal Hill. Based on our research, there are forty-four (44) planned and/or approved related projects within the study area; thirty-four (34) in the City of Long Beach and ten (10) in the City of Signal Hill.

Per the City of Long Beach requirement's, this traffic report analyzes existing and future weekday PM peak hour, and weekend (Saturday) midday peak hour traffic conditions for a near-term (Year 2006) traffic setting upon opening of the Long Beach Sports Park. Peak hour traffic forecasts for the Year 2006 horizon year have been projected by increasing existing traffic volumes by an annual growth rate of 2.0 percent per year and adding traffic volumes generated by 44 related projects.

1.1 Study Area

The City of Long Beach staff has identified the eighteen (18) key intersections listed below within the Cities of Long Beach and Signal Hill as locations that have the potential to be impacted by the proposed project. These intersections define the extent of the study boundaries for this traffic impact investigation. ***Figure 1-1*** presents a Vicinity Map, which illustrates the general location of the project and depicts the study locations and surrounding street system.

1) Atlantic Avenue at Willow Street (Long Beach)
2) California Avenue at Willow Street (Signal Hill)
3) Orange Avenue at Willow Street (Signal Hill)
4) Walnut Avenue at Willow Street (Signal Hill)
5) Cherry Avenue at Willow Street (Signal Hill)
6) Orange Ave at 28th Street (Long Beach/Signal Hill)
7) Orange Ave at 29th Street (Long Beach/Signal Hill)
8) Atlantic Avenue at Spring Street (Long Beach)
9) California Ave at Spring St (Long Beach/Signal
10) Orange Ave at Spring St (Long Beach/Signal Hill)
11) Walnut Ave at Spring St (Long Beach/Signal Hill)
12) Cherry Ave at Spring St (Long Beach/Signal Hill)
13) I-405 SB Rmps at Orange (Long Beach/Signal
14) 32nd Street at Orange Avenue (Signal Hill)
15) I-405 NB Ramps at 32nd Street (Signal Hill)
16) Atlantic Avenue at I-405 SB Ramps (Long Beach)
17) California Avenue at Wardlow Road (Long Beach)
18) Orange Avenue at Wardlow Road (Long Beach)

The Volume-Capacity (V/C) and Level of Service (LOS) investigations at these key locations were used to evaluate the potential traffic-related impacts associated with area growth, cumulative projects, and the Long Beach Sports Park. When necessary, this report recommends intersection improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service, and/or mitigates the impact of the project.

Finally, as now required by the State of California Department of Transportation (Caltrans), the three (3) state route intersections within the project study area were analyzed on peak hour basis consistent with the published Caltrans *Guide for the Preparation of Traffic Impact Studies*, [December 2002].

Included in this traffic impact analysis report are:

- Existing traffic counts
- Estimated project traffic generation/distribution/assignment
- Estimated cumulative projects traffic generation/assignment
- Weekday PM peak commute hour and Weekend Midday peak hour capacity analyses for existing and future near-term traffic conditions without and with Long Beach Sports Park project traffic
- Site Access and Internal Circulation Evaluation
- Area Traffic Improvement Recommendations
- Project-Specific Improvements
- Congestion Management Program System Analysis
- Parking Code Requirements

2.0 PROJECT DESCRIPTION AND LOCATION

The project site is located on a rectangular-shaped 55.5±-acre parcel of land in the City of Long Beach. The project site is located south of Spring Street, bounded by California Avenue on the west, Orange Avenue on the east, and north of the Sunnyside and Long Beach Cemeteries; it is located in the Long Beach/Signal Hill Joint Powers Authority (JPA) area. Located north of the project site, across Spring Street, are mixed-use commercial offices and industrial developments and oil operations. The City of Long Beach General Plan land use designation for the project site is currently "9G-Industrial."

The City of Long Beach owns most of the project site and is in the process of acquiring the portion in the northeast corner of the site that is currently owned by Signal Hill Petroleum, Inc. / Amerigas Propane LP. Although the project site is located entirely within the City of Long Beach, the City of Signal Hill surrounds it on three sides.

Figure 2-1 is an existing aerial photograph provided by LSA Associates of the project site and surrounding land uses. ***Figure 2-2*** presents the conceptual site plan for the Long Beach Sports Park prepared by the RJM Design Group, Inc. and PBS&J. The recreation components of the Long Beach Sports Park include six (6) softball/baseball diamonds, four (4) soccer fields, four (4) volleyball courts, two (2) arena soccer pavilions, nine (9) batting cages and a 23,000 square-foot (SF) skate park.

The project also includes two uses outside of the sports park facility, a site for a future 30,000 SF commercial/office center, and a youth golf center with 15,000 SF of floor area, an eight (8) tee driving range, three (3) pitch-n-putt practice holes, and a putting green. The project is expected to open by the year 2006. Approximately 746 parking spaces will be provided for the Long Beach Sports Park; 612 spaces in the main parking lot with an additional 134 spaces provided in the parking lot adjacent to the proposed youth golf facility. The number of parking spaces to be provided within the commercial parcel will be designed to meet the City of Long Beach parking code requirements.

The Sports Park will operate as a distinct, fenced facility with a single parking lot and a primary and secondary entrance gate. Separate parking and access are provided for the commercial center and youth golf center. As shown in Figure 3, vehicular access is provided from Orange Avenue, Spring Street, and California Avenue. The primary entrance to the sports park facility is from Orange Avenue opposite 28th Street with a secondary driveway located to the north. Access to the youth golf center will be provided by a full-access unsignalized driveway located on Orange Avenue south of 28th Street. Access to the proposed commercial center will be provided by one driveway along California Avenue and one driveway along Spring Street. Pedestrian access to the site will be provided via a public sidewalk that will be provided on all three street frontages. It is anticipated that most of the site users will access the site via private vehicles or school buses, given the site's relative isolation from residential neighborhoods and schools.

2.1 Long Beach Sports Park Development Components

In general, the Long Beach Sports Park will have the following components of sports facilities and ancillary uses:

2.1.1 *Sports Facilities*

- Six (6) lighted, full sized softball diamonds;
- Four (4) lighted, full size soccer fields;
- Four (4) lighted sand volleyball courts; and
- Two (2) large indoor arena soccer courts.

2.1.2 *Ancillary Facilities*

- Nine (9) station softball/batting cages;
- Skate Park (23,000 SF);
- Three (3) fully equipped concession/customer service buildings totaling approximately 16,600 SF;
- Two (2) children's play areas;
- One maintenance building totaling 2,000 SF;
- One gate/administration building with 2,300 SF of floor area;

2.2 Project Operations

2.2.1 *Sports Facilities*

- Facilities are open to the public for play and practice once maintenance crews arrive in the morning until the last person leaves at night.
- Monday through Friday league play - 3:00 PM to 12:00 midnight, with an occasional game running past midnight; primarily used for league play
- Saturday - 8:00 AM to 12:00 midnight with an occasional game running past midnight; primarily used for tournaments and league play
- Sunday - varies
- Occasionally leagues or tournaments will utilize the Sports Park before 3:00 PM, Monday through Friday by special arrangement. These are night shift workers or senior citizens. This is very infrequent.

2.2.2 *Ancillary Uses*

- Corporate Picnics, seminars, etc. - Noontime Monday through Sunday
- Sports complex will be in operation 52 weeks of the year (closed for five holidays). Sports activities will be staggered so not all are operating at the same time of year. However, to remain conservative, we have assumed that different activities will operate concurrently.

2.2.3 *Employment*

- General Manager, Office Manager, Marketing Director
- Four (4) Program Coordinators, One Maintenance Supervisor, & Six (6) Maintenance Workers

- One Concession Supervisor, two (2) Concession Crew Leaders, 13 Concession Workers & Three (3) cashiers and grounds crew leaders
- Majority will be on-site during peak use; split shift anticipated.
- Approximately 100 people will be employed, with about 60 of these jobs as full-time positions.

2.2.4 *Special Events*

- Park facilities will be utilized annually for up to nine (9) special events of 5,000 persons on Sunday afternoons and up to six (6) special events for 1,500 persons during Saturday nights. The Sunday afternoon special events will be picnic style, while the Saturday night functions will be reception style.

2.3 Attendance and Schedule

The following provides a summary of the attendance figures for the Long Beach Sports Park during a "typical" weekday and weekend day when all sport venues are in operation and have tournaments scheduled. This is based on our review of the attendance figures previously provided by the City of Long Beach, prior comments from Department of Parks, Recreation & Marine staff, and input by Big League Dreams, the expected sports park operator. The schedule for each activity is based on our understanding of the operations.

2.3.1 *Weekday League Play:*

The baseball/softball league at the Long Beach Sports Park will include a summer and winter youth league and a year round adult softball league. Youth baseball games may begin as early as 4:30 PM during the weekdays. To provide a conservative traffic forecast, we have assumed adult-use on four of the six baseball/softball fields, as well as other sports park facilities; youth baseball leagues are assumed to use the remaining two baseball fields.

Softball – League A:

- Monday through Friday operation, from 6:00 PM to 11:30 PM, 48 weeks of league play.
- Assume 11 players and 6 spectators per team; 4 softball fields results in 136 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assume League A has ~~4~~ games per field scheduled on a "typical" weekday (16 games per night).
- Assume 70 minute games, 10 minutes between games, with the following schedule:

1st game:	6:00 PM - 7:10 PM
2nd game:	7:20 PM - 8:30 PM
3rd game:	8:40 PM - 9:50 PM
4th game:	10:00 PM - 11:10 PM

Youth Baseball League:

- Monday through Friday operation, from 4:30 PM to 8:30 PM, 48 weeks of league play.
- Assume 12 players and 18 spectators per team; 2 softball fields results in 120 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assume Youth Baseball League has 4 games per field scheduled on a "typical" weekday (6 games per night).
- Assume 70 minute games, 10 minute between games, with the following schedule:

  1st game: 4:30 PM – 5:40 PM
  2nd game: 5:50 PM - 7:00 PM
  3rd game: 7:10 PM - 8:20 PM

Soccer:

- Monday through Friday operation, 6:00 PM to 11:00 PM, 40 weeks of adult/youth league play.
- Assume 12 players and 3 spectators per team; 4 soccer fields results in 120 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assumes 3 games per field scheduled on a "typical" weekday (12 games per night).
- Assume 1 hour 30 minute games with 15 minutes between games, with the following schedule:

  1st game: 6:00 PM - 7:30 PM
  2nd game: 7:45 PM - 9:15 PM
  3rd game: 9:30 PM - 10:45 PM

Volleyball:

- Monday through Friday operation, 6:30 PM to 11:00 PM, 45 weeks of adult/youth league play.
- Assume 7 players and 2 spectators per team; 4 sand volleyball courts results in 72 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assumes 4 games per court scheduled on a "typical" weekday (16 games per night).
- Assume 1 hour time limit with best 2 of 3 matches, 10 minutes between games, with the following schedule:

1st game: 6:30 PM - 7:30 PM
2nd game: 7:40 PM - 8:40 PM
3rd game: 8:50 PM – 9:50 PM
4th game: 10:00 PM – 11:00 PM

Arena Soccer:

- Monday through Friday operation, 6:30 PM to 10:30 PM, 36 weeks of adult/youth league play.
- Assume 8 players and 2 spectators per team, 2 arena soccer courts results in 40 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assumes 4 games per court scheduled on a "typical" weekday (8 games per night).
- Assume 50 minute time limit, 10 minute between games, with the following schedule:

1st game: 6:30 PM - 7:20 PM
2nd game: 7:30 PM - 8:20 PM
3rd game: 8:30 PM - 9:20 PM
4th game: 9:30 PM – 10:20 PM

Batting Cages

- Assume 50% of users are assumed to be individuals already figured into the overall attendance numbers. Assume 1 batter and 1 spectator per group; 9 batting practice areas results in 9 new persons in attendance per practice time.
- Assume players/spectators arrive 15 minutes prior, and leave 15 minutes after, batting practice.
- Assume 6 practices per practice area scheduled on a "typical" weekday.
- Assume 1 hour practices with the following schedule, although actual use will be less structured:

1st group: 4:30 PM - 5:30 PM
2nd group: 5:30 PM - 6:30 PM
3rd group: 6:30 PM - 7:30 PM
4th group: 7:30 PM - 8:30 PM
5th group: 8:30 PM - 9:30 PM
6th group: 9:30 PM - 10:30 PM

2.3.2 *Weekend Day (Saturday) Tournament Play:*

Softball – League A:

- Assume 11 players and 13 spectators per team; 6 softball fields results in 288 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assume 9 games per field scheduled on a "typical" weekend day tournament (54 games total).
- Assume 70 minute games, 15 minutes between games, with the following schedule:

1st game:	8:00 AM - 9:10 AM
2nd game:	9:25 AM - 10:35 AM
3rd game:	10:50 AM - 12:00 PM
4th game:	12:15 PM - 1:25 PM
5th game:	1:40 PM - 2:50 PM
6th game:	3:05 PM – 4:15 PM
7th game:	4:30 PM – 5:40 PM
8th game:	5:55 PM – 7:05 PM
9th game:	7:20 PM – 8:30 PM

Soccer:

- Assume 12 players and 9 spectators per team; 4 soccer fields results in 168 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assume 5 games per field scheduled on a "typical" weekend day tournament (20 games total).
- Assume 1 hour 30 minute games with 15 minutes between games, with the following schedule:

1st game:	8:00 AM - 9:30 AM
2nd game:	9:45 AM - 11:15 AM
3rd game:	11:30 AM - 1:00 PM
4th game:	1:15 PM - 2:45 PM
5th game:	3:00 PM - 4:30 PM

Volleyball:

- Assume 7 players and 9 spectators per team; 4 sand volleyball courts results in 128 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assume 7 games per court scheduled on a "typical" weekend day tournament (28 games total).
- Assume 1 hour time limit with best 2 of 3 matches, 10 minutes between games, with the following schedule:

1st game:	8:30 AM - 9:30 AM
2nd game:	9:40 AM - 10:40 AM
3rd game:	10:50 AM - 11:50 AM
4th game:	12:00 PM - 1:00 PM
5th game:	1:10 PM - 2:10 PM
6th game:	2:20 PM – 3:20 PM
7th game:	3:30 PM – 4:30 PM

Arena Soccer:

- Assume 8 players and 5 spectators per team, 2 arena soccer courts results in 52 persons in attendance per game time.
- Assume players/spectators arrive 30 minutes prior (half within the first fifteen minutes and the other half within the second fifteen minutes) and leave 30 minutes (half within the first fifteen minutes and the other half within the second fifteen minutes) after the game.
- Assumes 7 games per court scheduled on a "typical" weekday (14 games total).
- Assume 50 minute time limit, 10 minute between games, with the following schedule:

1st game:	9:00 AM - 9:50 AM
2nd game:	10:00 AM - 10:50 AM
3rd game:	11:00 AM - 11:50 AM
4th game:	12:00 PM – 12:50 PM
5th game:	1:00 PM - 1:50 PM
6th game:	2:00 PM – 2:50 PM
7th game:	3:00 PM – 3:50 PM

Batting Cages:

- Assume 50% of users are assumed to be individuals already figured into the overall attendance numbers. Assume 1 batter and 1 spectator per group; 9 batting practice areas results in 9 new persons in attendance per practice time.
- Assume players/spectators arrive 15 minutes prior, and leave 15 minutes after, batting practice.
- Assume 13 practices per practice area scheduled on a "typical" weekend day.
- Assume 1 hour practices with the following schedule, although actual use will be less structured:

1st group:	7:45 AM - 8:45 AM
2nd group:	8:45 AM - 9:45 AM
3rd group:	9:45 AM - 10:45 AM
4th group:	10:45 AM - 11:45 AM
5th group:	11:45 PM - 12:45 PM
6th group:	12:45 PM - 1:45 PM
7th group:	1:45 PM - 2:45 PM
8th group:	2:45 PM - 3:45 PM
9th group:	3:45 PM - 4:45 PM
10th group:	4:45 PM - 5:45 PM
11th group:	5:45 PM - 6:45 PM
12th group:	6:45 PM - 7:45 PM
13th group:	7:45 PM - 8:45 PM

3.0 EXISTING CONDITIONS

The San Diego Freeway (Interstate 405) primarily provides regional access to the project site. The San Diego Freeway generally runs in a northwest to southeast direction in the vicinity of the project site. This 8-lane facility is a major highway, which extends through Los Angeles County and links Long Beach with the neighboring communities of Westminster, Seal Beach, Lakewood and Carson, as well as more distant locations such as Los Angeles, Orange County and San Diego. High Occupancy Vehicle (HOV) lanes are provided on the I-405 Freeway throughout Los Angeles County and Orange County. Freeway access to the project site is provided via the Atlantic Avenue/I-405 Interchange, the Orange Avenue/I-405 SB Ramps Interchange, the 32nd Street/I-405 NB Ramps Interchange, the Cherry Avenue/I-405 Interchange and the Temple Avenue/I-405 Interchange.

The principal local network of streets serving the project includes Willow Street, Spring Street, Atlantic Avenue, California Avenue, Orange Avenue, Cherry Avenue, 32nd Street and Wardlow Road. The following discussion provides a brief synopsis of these key area streets. The descriptions are based on an inventory of existing roadway conditions.

3.1 Street Network

Willow Street is a six-lane, divided roadway oriented in the east-west direction, with a raised center median, providing three travel lanes in each direction. Parking is not permitted along either side of this roadway, within the vicinity of the project. The posted speed limit on Willow Street is 40 miles per hour (mph). Existing weekday and weekend daily traffic volumes on Willow, between California and Orange, total approximately 31,670 vehicles per day (vpd) and 24,630 vpd, respectively. This roadway is classified as a Major Highway in the City of Signal Hill Circulation Element.

Spring Street is a four-lane, divided roadway oriented in the east-west direction, which borders the project site to the north. Spring Street is designated as a major roadway with a 100-foot right-of-way. Spring Street at Orange Avenue and Spring Street at California Avenue are controlled by two-phase traffic signals. Parking is permitted on either side of this roadway, within the vicinity of the project. The posted speed limit on Spring Street is 40 mph. Spring Street provides access to the children's museum project site via a proposed full access driveway. Spring Street at the project site between Orange Avenue and California Avenue, has previously been widened to an 84-foot curb to curb width within a 100-foot right-of-way except for a short section on the north side of Spring Street east of California Avenue. Existing weekday and weekend daily traffic volumes on Spring, between California and Orange, total approximately 13,690 vpd and 8,055 vpd, respectively. This roadway is classified as a Major Highway in the City of Signal Hill Circulation Element.

Under the Spring Street Corridor Agreement with the County of Los Angeles, City of Long Beach and the City of Signal Hill, Spring Street, between Long Beach Boulevard and California Avenue, has been recently widened to an 84-foot curb-to-curb width within a 100-foot right of way, providing left turn lanes and traffic signal improvements, and two travel lanes in each direction.

Atlantic Avenue is a four-lane, divided roadway oriented in the north-south direction, with a raised center median, providing two lanes of travel in each direction. Parking is not permitted along either side of this roadway, within the vicinity of the project. The posted speed limit on Atlantic Avenue is 35 mph. Existing weekday and weekend daily traffic volumes on Atlantic, between Spring and Willow, total approximately 31,040 vpd and 25,200 vpd, respectively. This roadway is classified as a Major Arterial in the City of Long Beach Circulation Element.

California Avenue is a two-lane, divided roadway oriented in the north-south direction, which borders the project site to the west. The roadway lies within the City of Signal Hill adjacent to the subject area and is designated in the City of Signal Hill Circulation Element as a Secondary Modified Highway with a 70-foot right-of-way requirement, and a 60-foot paved width south of Spring Street and a local Collector north of Spring Street. California at Spring and California at Willow are controlled by two-phase traffic signals. Parking is not permitted on either side of this roadway, within the vicinity of the project. The posted speed limit on California Avenue is 40 mph. Existing weekday and weekend daily traffic volumes on California bordering the site total approximately 5,160 vpd and 3,835 vpd, respectively.

Orange Avenue is a two-lane, divided roadway oriented in the north-south direction, which borders the project site to the east. A two-way left-turn lane separates northbound and southbound traffic. In the future, Orange Avenue will provide two lanes in each direction. Immediately south of Spring Street, the roadway merges to one lane in each direction with left turn lanes to the south. According to the City of Signal Hill, south of Spring Street has been reclassified and is designated as a Secondary Highway with an 80-foot right-of-way requirement and 64-feet paved width. Parking is not permitted on either side of this roadway, within the vicinity of the project. The posted speed limit on Orange Avenue is 40 mph. Orange Avenue provides access to the project site via three (3) driveways. Existing weekday and weekend daily traffic volumes on Orange adjacent to the project site total approximately 13,180 vpd and 10,260 vpd, respectively.

Cherry Avenue is a six-lane, divided roadway oriented in the north-south direction, providing three lanes of travel in each direction. Parking is not permitted along either side of this roadway, within the vicinity of the project. The posted speed limit on Cherry Avenue is 40 mph. Cherry Avenue is classified as a Major Highway in the City of Signal Hill Circulation Element.

32nd Street is a two-lane, undivided roadway oriented in the east-west direction. Parking is permitted along either side of this roadway, within the vicinity of the project. The posted speed limit on 32nd Street is 25 mph. 32nd Street is classified as a Local Street in the City of Signal Hill Circulation Element.

Wardlow Road is a four-lane, divided roadway oriented in the east-west direction, providing two lanes of travel in each direction. Parking is permitted along either side of this roadway, within the vicinity of the project. The posted speed limit on Wardlow Road is 35 mph.

Figure 3-1 presents an inventory of the existing roadway conditions for the arterials and intersections evaluated in this report. This Figure identifies the number of travel lanes for key arterials, as well as intersection configurations and controls for the key area intersections neighboring the project site.

3.2 Existing Public Transit

Public transit service in the vicinity of the proposed project is provided by Long Beach Transit (LBT). The project site is currently serviced by LBT route 7. LBT route 7 travels north and south on Orange Avenue adjacent to the site, with a bus stop at the intersection of Orange Avenue and Willow Street. LBT route 7 operates during weekdays between the hours of 5:30 AM and 8:00 PM, with 20-minute headways throughout most of the day; on weekends, this bus route operates from 6:00 AM to 10:00 PM, with 40-minute headways.

LBT route 102, with a stop at the intersection of Willow Street and Cherry Avenue, runs east and west on Willow Street just south of the proposed project. LBT route 102 operates during weekdays between the hours of 6:00 AM and 7:30 PM, with 30-minute headways throughout most of the day; this bus route does not operate during weekends.

Additional LBT routes within a mile of the proposed project are located on Atlantic Avenue, Cherry Avenue, and Wardlow Road. LBT routes 61, 62, 101, and 103 run north and south on Atlantic Avenue and LBT routes 21, 22, 23, and 131 run north and south on Cherry Avenue. LBT route 131 runs east and west on Wardlow Road.

The LBT service area extends beyond the City of Long Beach in portions of Signal Hill, Cerritos, Lakewood, San Pedro, Paramount, Compton, Los Angeles, Hawaiian Gardens, and Seal Beach. All LBT routes connect with the Metro Blue Line light rail rapid transit system. Bus transfers provide for discounted fares on the Blue Line.

3.3 Bike Routes

The Transportation Element of the *Long Beach General Plan* identifies bike routes within the City. The system is intended to provide alternative facilities of transportation. The Long Beach Bicycle Master Plan identifies Orange Avenue adjacent to the project site as a future Class III bike route, while Spring Street is identified as a Class II bike route. It should be noted that on-street (Class II) bike lanes, installed as part of the recently completed Spring Street Improvement Project, currently exists on Spring Street, between Atlantic Avenue and Orange Avenue.

3.4 Existing Area Traffic Volumes

Eighteen (18) key intersections have been identified as the locations at which to evaluate existing and future traffic operating conditions. Some portion of potential project-related traffic will pass through each of these intersections, and their analysis will reveal the expected relative impacts of the project. These key intersections were selected for evaluation based on discussions with the City of Long Beach and in consideration of the criteria in the current County of Los Angeles CMP traffic impact guidelines.

Existing weekday PM peak hour traffic volumes, and existing weekend Noon peak hour traffic volumes for the eighteen key study intersections are presented in ***Figure 3-2*** and ***3-3***, respectively. The average daily traffic (ADT) volumes on the thirteen (13) key roadway segments within the project vicinity for a "typical" weekday and Saturday are shown in ***Figure 3-4***. Review of *Figure 3-4* shows that on a daily basis, traffic volumes are significantly greater during a "typical" weekday than on a weekend day (Saturday).

Figure 3-5 graphically provides a summary of the total "Weekday ADT versus Weekend ADT" volumes on an hourly basis. Review of the ADT profiles show that on-street traffic peaks at two different time periods on a "typical" weekday. Whereas, during the weekend, on-street traffic gradually builds and peaks at the noon hour then steadily decreases. Nevertheless, for individual hours from 6:00 AM to 6:00 PM, on-street traffic in the immediate area of the project is greater on a "typical" weekday than on a weekend day (Saturday).

The existing PM peak hour traffic counts and the 24-hour machine traffic counts were conducted in May 2002 and June 2002 by Transportation Studies Inc. ***Appendix A*** contains the detailed peak hour count sheets and the 24-hour machine traffic counts for the key intersections and roadway segments evaluated in this report.

3.5 Traffic Signal Warrant Analysis

The intersection of the I-405 SB Ramps at Orange Avenue is currently an unsignalized intersection. Traffic on Orange Avenue is uncontrolled, while a stop sign controls traffic exiting the I-405 Freeway. To determine if existing traffic volumes at this location require installation of a traffic signal, a signal warrant analysis was performed.

3.5.1 *Overview*

Traffic control signals exert a significant influence on vehicle and pedestrian traffic flow. Traffic signals are designed to draw the attention of drivers approaching an intersection. Their main purpose is to safely assign the right-of-way to various traffic movements, and thus, may be notably advantageous. Some advantages include:

- Provide for the orderly movement of traffic,
- Can increase the traffic handling capacity of the intersection,
- Reduce the frequency of certain types of accidents (especially the right angle type),
- Can be coordinated to provide for continuous, or nearly continuous movement, of traffic at a definite speed along a given route, and
- Permit minor street traffic, vehicular or pedestrian, to enter, or cross, continuous traffic on the major street.

However, improper or unwarranted traffic control signals may also cause disadvantages. In some circumstances, traffic signals may cause more problems than it solves. The State of California's *Traffic Manual* cites possible disadvantages:

- Excessive motorist delays,
- Disobedience of the signal indications,
- Increased accident frequency (rear-end collisions may increase), and
- Reduce intersection capacity.

3.5.2 *State of California Policy/Criteria*

The justification for the installation of a traffic signal at an intersection is based on several factors. One factor includes the warrants set forth in the State of California's *Traffic Manual*. The *Traffic Manual* lists eleven parameters, which help to determine the necessity of a traffic signal at an intersection. The warrants consider conditions involving traffic volumes on the intersecting streets, the difficulty of vehicles or pedestrians on a side street crossing a major street, the number of recorded accidents that may be correctable by a traffic signal, special conditions that may be improved by a traffic signal, etc.

Other factors taken into consideration for the installation of a traffic signal include: approach conditions, driver confusion and comfort level, safety conditions, future land uses, and other indications demonstrating the need for right of way assignment beyond that which could be provided by stop signs.

3.5.3 *Traffic Signal Warrant Analysis*

For this analysis, the Peak Hour Traffic Volumes Warrant (*Traffic Manual* warrant #11) was utilized to determine the need for traffic signal at the study intersection of the I-405 SB Ramps and Orange Avenue.

Based on existing peak hour traffic volumes and current intersection geometrics, the study intersection of the I-405 SB Ramps at Orange Avenue intersection was found to satisfy the Peak Hour Traffic Volumes Warrant. ***Appendix B*** contains the calculation worksheets.

The findings of this traffic signal warrant analysis are consistent with the City of Long Beach's plans to install a traffic signal at the I-405 SB Ramps and Orange Avenue intersection. According to information provided by the City, preliminary traffic signal and interconnect plans have been developed for this intersection; the traffic signal will most likely be installed by the City of Long Beach under an encroachment permit from the State of California Department of Transportation.

3.6 Existing Intersection Conditions

Existing AM and PM peak hour operating conditions for the 18 key study intersections were evaluated using the *Intersection Capacity Utilization* (ICU) methodology for signalized intersections and the methodology outlined in Chapter 17 of the *Highway Capacity Manual 2000* (HCM2000) for unsignalized intersections.

3.6.1 *Intersection Capacity Utilization (ICU) Method of Analysis*

In conformance with the City of Long Beach and LA County CMP requirements, existing peak hour operating conditions for the key intersections have been investigated according to the Intersection Capacity Utilization (ICU) method. The ICU technique reflects the flow characteristics of signalized intersections and estimates the volume to capacity (V/C) relationship for an intersection based on individual V/C ratios for key conflicting movements. The ICU numerical value represents the percent of required signal green time, and thus capacity, required by existing or future traffic. It should be noted that the ICU methodology assumes uniform traffic distribution per intersection approach lane.

The ICU value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The six qualitative categories of Level of Service that have been defined, along with the corresponding ICU value range, are shown in ***Table 3-1***. The ICU value is the sum of the critical volume to capacity ratios at an intersection; it is not intended to be indicative of the LOS of each of the individual turning movements.

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS)	Intersection Capacity Utilization Value (V/C)	Level of Service Description
A	≤ 0.600	EXCELLENT. No vehicle waits longer than one red light, and no approach phase is fully used.
B	0.601 – 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Potentially very long delays with continuously increasing queue lengths.

According to City of Long Beach criteria, LOS D is the minimum acceptable condition that should be maintained during the peak commute hours, or the current LOS if the existing LOS is worse than LOS D (i.e. LOS E of F). The City of Signal Hill also considers LOS D to be the minimum acceptable condition that should be maintained during peak commute hours.

Per LA County CMP requirements, the ICU calculations use a lane capacity of 1,600 vehicles per hour (vph) for left-turn, through, and right-turn lanes, and dual left turn capacity of 2,880 vpd. Clearance intervals are based on the number of phases in the intersection and whether the left turning movements are all fully protected or whether some of them are permitted with other left-turn movements being protected. ***Table 3-2*** shows the clearance intervals used in the analysis of the key study intersections within the City of Long Beach.

To remain consistent, these clearance adjustment factors were utilized for the study intersections located in the City of Signal Hill.

3.6.2 *Highway Capacity Manual (HCM) Method of Analysis (Unsignalized Intersections)*

In addition to the ICU method of analysis, the 2000 HCM unsignalized methodology for stop-controlled intersections was utilized for the analysis of the unsignalized key study intersections. This methodology estimates the average control delay for each of the subject movements and determines the level of service for each movement. The overall average control delay measured in seconds per vehicle, and level of service is then calculated for the entire intersection. The HCM control delay value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The six qualitative categories of Level of Service have been defined along with the corresponding HCM control delay value range, as shown in ***Table 3-3.***

TABLE 3-2

CITY OF LONG BEACH CLEARANCE INTERVALS[1]

Number of Signal Phases	Left-turn Phasing Type	Clearance Interval (percent)
2	Permitted	10%
3	Protected and Permitted	12%
3	Fully Protected	15%
4	Protected and Permitted	14%
4	Fully Protected	18%

[1] Source: *City of Long Beach Guidelines for Signalized Intersection Analysis, 2004.*

TABLE 3-3

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[2]

Level of Service (LOS)	Highway Capacity Manual Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

[2] Source: *Highway Capacity Manual 2000*, Chapter 17 (Unsignalized Intersections).

3.7 Existing Level of Service Results

3.7.1 *Weekday Conditions*

Table 3-4 summarizes the weekday PM peak hour service levels calculated for each of the eighteen key study intersections based on the existing Year 2002 traffic volumes depicted in *Figure 3-2*, and current lane configurations and intersection controls.

As shown, four of the eighteen key study intersections currently operate at an unacceptable LOS during the PM peak commute hour. The signalized intersections of Cherry Avenue at Willow Street, Atlantic Avenue at Spring Street and Cherry Avenue at Spring Street currently operate at unacceptable LOS E during the PM peak commute hour (adverse ICU/LOS values are shown in bold). Although the unsignalized intersection of the I-405 SB Ramps at Orange Avenue, overall operates, at LOS B during the PM peak hour, the minor street (I-405 SB Off-Ramp) approach currently operates at LOS E during the PM peak hour.

The remaining fourteen key study intersections currently operate at LOS D or better during the PM peak commute hour.

3.7.2 *Weekend Day Conditions*

Table 3-5 summarizes the weekend Midday peak hour service levels calculated for each of the eighteen key study intersections for a "typical" weekend day based on the existing Year 2002 traffic volumes depicted in *Figure 3-3*, and current lane configurations and intersection controls.

As shown, all eighteen key study intersections currently operate at LOS D or better during the weekend day, Midday peak hour. Further, all minor street approaches at the four key unsignalized study intersections currently operate at LOS C or better during the weekend midday peak hour.

Appendix C contains the ICU and HCM level of service calculation worksheets for the key study intersections.

TABLE 3-4

EXISTING WEEKDAY PEAK HOUR LEVELS OF SERVICE SUMMARY[3]

Key Signalized Intersection	City Jurisdiction	Control Type	ICU (V/C Ratio)	LOS
1. Atlantic Avenue at Willow Street	Long Beach	8∅ Traffic Signal	**0.956**	**E**
2. California Avenue at Willow Street	Signal Hill	2∅ Traffic Signal	0.782	C
3. Orange Avenue at Willow Street	Signal Hill	5∅ Traffic Signal	0.807	D
4. Walnut Avenue at Willow Street	Signal Hill	2∅ Traffic Signal	0.740	C
5. Cherry Avenue at Willow Street	Signal Hill	8∅ Traffic Signal	**0.946**	**E**
8. Atlantic Avenue at Spring Street	Long Beach	5∅ Traffic Signal	0.875	D
9. California Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.571	A
Key Unsignalized Intersection	**City Jurisdiction**	**Control Type**	**Delay (sec/veh)**	**LOS**
6. Orange Avenue at 28th Street[4]	Long Beach/ Signal Hill	One – Way Stop Control		
	▪ Overall Delay		1.34 s/v	A
	▪ Minor Approach Delay		15.1 s/v	C
7. Orange Avenue at 29th Street[4]	Long Beach/ Signal Hill	One – Way Stop Control		
	▪ Overall Delay		1.16 s/v	A
	▪ Minor Approach Delay		14.3 s/v	B

[3] *Appendix B* contains ICU/LOS sheets for key study intersections.

[4] This key intersection was analyzed using the HCM Unsignalized Methodology. LOS is based upon average delay, in seconds per vehicle, for the entire intersection).

TABLE 3-4 (CONTINUED)

EXISTING WEEKDAY PEAK HOUR LEVELS OF SERVICE SUMMARY[5]

Key Signalized Intersection	City Jurisdiction	Control Type	ICU (V/C Ratio)	LOS
10. Orange Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.751	C
11. Walnut Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.660	B
12. Cherry Avenue at Spring Street	Long Beach/ Signal Hill	8∅ Traffic Signal	**0.942**	**E**
14. 32nd Street at Orange Avenue	Signal Hill	2∅ Traffic Signal	0.796	C
16. Atlantic Avenue at I-405 SB Ramps	Long Beach	2∅ Traffic Signal	0.699	B
17. California Avenue at Wardlow Road	Long Beach	2∅ Traffic Signal	0.524	A
18. Orange Avenue at Wardlow Road	Long Beach	2∅ Traffic Signal	0.864	D
Key Unsignalized Intersection	**City Jurisdiction**	**Control Type**	**Delay (sec/veh)**	**LOS**
13. I-405 SB Ramps at Orange Avenue[6]	Long Beach	One-Way Stop Control		
	▪ Overall Delay		10.28 s/v	B
	▪ Minor Approach Delay		**45.3 s/v**	**E**
15. I-405 NB Ramps at 32nd Street	Signal Hill	One – Way Stop Control		
	▪ Overall Delay		8.17 s/v	A
	▪ Minor Approach Delay		14.2 s/v	B

[5] *Appendix B* contains ICU/LOS sheets for key study intersections.

[6] The existing volumes at this key intersection warrants the installation of a traffic signal (See Appendix B for warrant sheet).

TABLE 3-5

EXISTING WEEKEND MIDDAY PEAK HOUR LEVEL OF SERVICE SUMMARY[7]

Key Signalized Intersection	City Jurisdiction	Control Type	ICU (V/C Ratio)	LOS
1. Atlantic Avenue at Willow Street	Long Beach	8∅ Traffic Signal	0.723	C
2. California Avenue at Willow Street	Signal Hill	2∅ Traffic Signal	0.458	A
3. Orange Avenue at Willow Street	Signal Hill	5∅ Traffic Signal	0.639	B
4. Walnut Avenue at Willow Street	Signal Hill	2∅ Traffic Signal	0.421	A
5. Cherry Avenue at Willow Street	Signal Hill	8∅ Traffic Signal	0.769	C
8. Atlantic Avenue at Spring Street	Long Beach	5∅ Traffic Signal	0.538	A
9. California Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.254	A
Key Unsignalized Intersection	**City Jurisdiction**	**Control Type**	**Delay (sec/veh)**	**LOS**
6. Orange Avenue at 28th Street[8]	Long Beach/ Signal Hill	One – Way Stop Control		
	▪ Overall Delay		0.36 s/v	A
	▪ Minor Approach Delay		11.1 s/v	B
7. Orange Avenue at 29th Street[4]	Long Beach/ Signal Hill	One – Way Stop Control		
	▪ Overall Delay		0.15 s/v	A
	▪ Minor Approach Delay		13.5 s/v	B

[7] **BOLD ICU/LOS values** indicate adverse service levels based on City LOS standards. Appendix C contains ICU/LOS and HCM/LOS calculation sheets for all study intersections.

[8] This key intersection was analyzed using the HCM Unsignalized Methodology. LOS is based upon average delay, in seconds per vehicle, for the entire intersection).

TABLE 3-5 (CONTINUED)

EXISTING WEEKEND MIDDAY PEAK HOUR LEVEL OF SERVICE SUMMARY[9]

Key Signalized Intersection	City Jurisdiction	Control Type	ICU (V/C Ratio)	LOS
10. Orange Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.476	A
11. Walnut Avenue at Spring Street	Long Beach/ Signal Hill	2∅ Traffic Signal	0.277	A
12. Cherry Avenue at Spring Street	Long Beach/ Signal Hill	8∅ Traffic Signal	0.636	B
14. 32nd Street at Orange Avenue	Signal Hill	2∅ Traffic Signal	0.572	A
16. Atlantic Avenue at I-405 SB Ramps	Long Beach	2∅ Traffic Signal	0.597	A
17. California Avenue at Wardlow Road	Long Beach	2∅ Traffic Signal	0.277	A
18. Orange Avenue at Wardlow Road	Long Beach	2∅ Traffic Signal	0.564	A
Key Unsignalized Intersection	**City Jurisdiction**	**Control Type**	**Delay (sec/veh)**	**LOS**
13. I-405 SB Ramps at Orange Avenue[10]	Long Beach	One-Way Stop Control		
	▪ Overall Delay		3.65 s/v	A
	▪ Minor Approach Delay		16.1 s/v	C
15. I-405 NB Ramps at 32nd Street	Signal Hill	One – Way Stop Control		
	▪ Overall Delay		5.34 s/v	A
	▪ Minor Approach Delay		10.8 s/v	B

[9] **BOLD ICU/LOS values** indicate adverse service levels based on City LOS standards. Appendix C contains ICU/LOS and HCM/LOS calculation sheets for all study intersections.

[10] The existing volumes at this key intersection warrants the installation of a traffic signal (See Appendix B for warrant sheet).

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic impact characteristics of the proposed Long Beach Sports Park project, a multi-step process has been utilized. The first step is trip generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations or rates to the project development tabulation. The second step of the forecasting process is trip distribution, which identifies the origins and destinations of inbound and outbound project traffic. These origins and destinations are typically based on demographics and existing/anticipated travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway links and intersection turning movements throughout the study area. With the forecasting process complete and project traffic assignments developed, the impact of the proposed project is isolated by comparing operational (LOS) conditions at selected key intersections using expected future traffic volumes with and without forecast project traffic. The need for site-specific and/or cumulative local area traffic improvements can then be evaluated and the significance of the project's impacts identified.

4.1 Significance Criteria

Impacts to local and regional transportation systems are considered significant if:

- An unacceptable peak hour Level of Service (LOS) (i.e. LOS E or F) at any of the key intersections is projected. The City of Long Beach considers LOS D (ICU = 0.81 - 0.90) to be the minimum acceptable LOS for all other intersections. For the City of Long Beach, the current LOS, if worse than LOS D (i.e. LOS E or F), should also be maintained; and

- The project increases traffic demand at the study intersection by 2% of capacity (ICU increase ≥ 0.02), causing or worsening LOS E or F (ICU > 0.90). At unsignalized intersections, a "significant" adverse traffic impact is defined as a project that: adds 2% of more traffic to delay (seconds per vehicle) at an intersection operating LOS E or F.

- The City of Signal Hill also considers LOS "D" to be the minimum acceptable condition that should be maintained during the AM and PM peak hours for all signalized and unsignalized intersections. Similar to the City of Long Beach, the City of Signal Hill considers a significant project impact as an increase in the intersection volume-to-capacity (V/C) of 0.020 or greater at any location where the final (future) operating condition is LOS E or F.

5.0 LONG BEACH SPORTS PARK TRAFFIC CHARACTERISTICS

The traditional focus of traffic studies is weekday traffic conditions, especially the morning and evening peak commuter hours. However, the Long Beach Sports Park has the potential to generate a significant amount of traffic on the weekend, and especially on Saturday when sports tournaments are scheduled. On that basis, our trip forecasting for the Long Beach Sports Park and detailed intersection capacity analyses looks at both periods.

Development Description

- Six (6) lighted, full sized softball diamonds;
- Four (4) lighted, full size soccer fields;
- Four (4) lighted sand volleyball courts;
- Two (2) large arena soccer courts; and
- Nine (9) station softball/batting cages.
- Skate Park (23,000 SF)
- Youth Golf Center (15,000 SF with 8 tee /driving positions, 3-hole pitch-n-putt facility)
- Commercial Office Center (30,000 SF)

5.1 Project Traffic Generation

Traffic Generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Typically, trip generation factors and equations used in the traffic forecasting procedure can be found in *Trip Generation, 6th Edition* published by the Institute of Transportation Engineers (ITE) [Washington, D.C., 1997] and *San Diego Traffic Generators*, dated April 2002, published by San Diego Associated Governments (SANDAG).

Table 5-1 summarizes the trip generation rates used in forecasting the impact of the proposed Long Beach Sports. The trip generation potential of the proposed Youth Golf Center was estimated using ITE Land Use Code 430: Golf Course and ITE Land Use Code 432: Golf Driving Range; ITE Land Use Code 710: General Office Building was used to forecast the trip generation potential of the 30,000 SF commercial center component of the project.

Since neither ITE nor SANDAG have any published rates for a "skate park", trip rates that were developed based on trip generation studies of "similar uses" were utilized. The trip generation potential for the proposed sports park athletic fields and courts were estimated based on the expected attendance figures, and daily league and weekend tournament schedules. This information is provided on pages 5 through 10 of this report.

TABLE 5-1

PROJECT TRAFFIC GENERATION FORECAST[11]

ITE Land Use Code/ Project Description	Weekday				Weekend Day (Saturday)			
	Daily 2-Way	PM Peak Hour			Daily 2-Way	Midday Peak Hour		
		In	Out	Total		In	Out	Total
Generation Rates								
▪ 430: Golf Course (TE/Holes)	35.74	1.21	1.53	2.74	40.63	2.25	2.34	4.59
▪ 432: Golf Driving Range (TE/Hitting Position) [12]	14.00	0.53	0.73	1.26	8.90	0.43	0.37	0.80
▪ 710: General Office[13] (TE/1000 SF)	17.55	0.64	3.12	3.76	2.75	0.26	0.22	0.47
▪ Skate Park[14] (TE/1000 SF)	15.76	1.46	0.90	2.36	24.09	1.28	1.13	2.41
▪ Long Beach Sport Park Athletic Fields[15]	--	--	--	--	--	--	--	--
Youth Golf Center								
▪ Youth Golf Center (8 Tees & 3 Holes)	250	8	10	18	190	10	10	20
Commercial Use								
▪ Office Building (30,000 SF)	530	19	94	113	80	8	7	15
Sports Park								
▪ Athletic Fields & Courts & Batting Cages	2,830	398	103	501	6,410	374	334	708
▪ Skate Park (23,000 SF)	360	34	21	55	560	29	26	55
Subtotal	3,190	432	124	556	6,970	403	360	763
Long Beach Sports Park Total Trip Generation	**3,970**	**459**	**228**	**687**	**7,240**	**421**	**377**	**798**

[11] Source: *Trip Generation*, 6th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (1997).

[12] Daily trip rates based on information published in SANDAG *Traffic Generators*.

[13] Source: The weekday and weekend trip generation rates for general office were calculated based on the equations per *Trip Generation*, 6th Edition. Weekday Daily Trips: Ln (T) = 0.7681Ln (X) + 3.654, Weekday PM Peak Hr: T = 1.121(X) + 79.295. Weekend Daily Trips: T = 2.136 (X) + 18.473, Saturday Peak Hour: LN (T) = 0.814 Ln(X) – 0.115

[14] Source: Trip generation study of the existing Laguna Niguel Skate Park located on Alicia Parkway north of Aliso Creek Road in the City of Laguna Niguel conducted by LLG Engineers in May 2003.

[15] Project traffic generation forecast for the Sports Park is based on expected attendance figures, weekday league play, and weekend tournament schedules, a weekday AVR of 1.25 persons per vehicle, and a weekend AVR of 1.5 persons per vehicles. See Appendix D for detailed trip generation calculations.

Table 5-1 also summarizes the results of our trip generation analysis for the Long Beach Sports Park project. As shown, on a "typical" weekday, the proposed project is forecast to generate 3,970 daily trips with 687 trips (459 entering and 228 exiting) produced during the PM peak commute hour. During a "typical" weekend day (Saturday) when tournaments are scheduled, the project is expected to generate 7,240 daily trips, with 798 trip (421 entering and 377 exiting) generated during the mid-day peak hour.

The trip generation potential for the project was calculated assuming an average vehicle ridership (AVR) of 1.25 persons per vehicle for the weekday scenario and 1.50 persons per vehicle for the weekend conditions. This accounts for participants who may walk, bike, or carpool to the park, as well as coaches, referees, and spectators who will do the same (carpool). The higher weekend average vehicle ridership reflects that many trip origins to the will come from home, with families, couples, and friends carpooling on the weekend.

Based on prior information provided by DRPM and Big League Dreams (sports park operators), the observed AVR at sites similar to the proposed project is more in the range of 1.7 persons per vehicle. ***Appendix D*** contains a summary of our trip generation analysis for the Long Beach Sports Park.

5.2 Project Traffic Distribution and Assignment

The general distribution pattern for the proposed Long Beach Sports Park is illustrated in ***Table 5-2***. ***Figures 5-1*** and ***5-2*** display the traffic distribution pattern for the Sports Park component of the project, while ***Figures 5-3*** and ***5-4*** illustrate the overall traffic distribution pattern for the proposed commercial office component of the project. Project traffic volumes in and out of the site have been distributed and assigned to the adjacent street system based upon the following considerations: 1) the site's proximity to major traffic carriers (e.g. I-405, Atlantic Avenue, Cherry Avenue, Spring Street, Willow Street, etc.); 2) expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals; 3) ingress/egress availability at the project site; and 4) input from City staff.

The anticipated weekday PM peak hour and weekend midday peak hour project traffic volumes associated with the Long Beach Sports Park project are presented in ***Figures 5-5*** and ***5-6***, respectively. The anticipated weekday PM peak hour and weekend midday peak hour volumes at the project driveways are presented in ***Figures 5-7*** and ***5-8***, respectively.

The daily project traffic volumes on the thirteen key roadway segments surrounding the site for a "typical" weekday and Saturday are shown in ***Figure 5-9***. The traffic volume assignments presented in *Figures 5-5* through *5-8* reflect the general distribution pattern presented in *Table 5-2*, the traffic distribution characteristics illustrated in *Figures 5-1* through *5-4* and the traffic generation forecast presented in *Table 5-1*.

TABLE 5-2

PROJECT DIRECTIONAL DISTRIBUTION PATTERN

Distribution Percentage	**Orientation**
20%	To/from the north via the I-405 Freeway
20%	To/from the south via the I-405 Freeway
25%	To/from the east via Spring Street and Willow Street
15%	To/from the west via Spring Street and Willow Street
10%	To/from the north via California Avenue and Orange Avenue
10%	To/from the south via California Avenue and Orange Avenue
100%	**Total**

6.0 FUTURE TRAFFIC CONDITIONS

6.1 Ambient Traffic

Horizon year background traffic growth estimates have been calculated using growth factors recommended for use in the LA County CMP guidelines. The ambient growth factor is intended to include unknown and future related projects in the study area, as well as account for regional growth outside the study area. Ambient traffic growth has been calculated at two percent (2%) per year. The application of this growth rate to existing 2002 traffic volumes results in a eight percent (8%) growth in existing volumes at the eighteen study intersections to horizon year 2006.

6.2 Related Projects Traffic Characteristics

Information concerning cumulative projects (planned and/or approved) in the vicinity of the project has been researched at the City of Long Beach and the City of Signal Hill. Based on our research, there are thirty-four (34) related projects located in the City of Long Beach and ten (10) related projects in the City of Signal Hill. ***Table 6-1*** provides the location and a brief description for each of the 44 related projects, while ***Figure 6-1*** graphically illustrates the location of the related projects. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the key study intersections.

Table 6-2 provides a summary of the cumulative projects in the City of Long Beach and the City of Signal Hill with the corresponding forecast weekday PM peak hour traffic volumes, weekend Midday peak hour traffic volumes, and daily traffic volumes.

As shown, on a "typical" weekday, the cumulative projects can be expected to generate 41,157 daily trips with 3,855 trips (1,534 entering and 2,321 exiting) occurring during the PM peak commute hour. During a "typical" weekend day (Saturday), the cumulative projects can be expected to generate 36,614 daily trips with 3,597 trips (1,894 entering and 1,703 exiting) during the Noon peak hour.

The 34 related projects in the City of Long Beach are expected to generate 25,705 trips on a daily basis, with 2,463 trips occurring in the PM peak hour during a "typical" weekday and 16,212 weekend daily trips, with 1,763 trips occurring in the weekend mid-day peak hour

The 10 related projects located in the City of Signal Hill are expected to generate 15,452 trips during a "typical" weekday and 20,502 trips on a "typical" weekend day, with 1,392 trips occurring in the weekday PM peak commute hour and 1,834 trips occurring in the weekend Midday peak hour.

TABLE 6-1

LOCATION AND DESCRIPTION OF RELATED PROJECTS[16]

No.	Cumulative Project	Location/Address	Description
City of Long Beach			
1.	Pine Villas (Case # 9709-27)	117 East 8th Street	63 Unit Assisted Living Facility
2.	Alamitos Ridge Residential (Case # 9809-02)[17]	2080 Obispo Avenue	106 Single Family Detached
3.	CSULB Technology Park (Case # 9811-05)	2000 West 19th Street	200,000 SF Industrial and 200,000 SF Research and Development
4.	Self-Storage (Case # 0001-03)	4200 Pacific Coast Highway	92,000 SF Self-Storage Facility
5.	Pharmacy (Case # 0012-03)	1250 E. Pacific Coast Highway	15,200 SF Pharmacy
6.	North Long Beach Police Station (Case # 0012-14)	4891 Atlantic Avenue	20,000 SF Police Station
7.	Medical Office (Case # 0102-02)	2702 Long Beach Boulevard	105,800 SF Medical Office Building
8.	Apartments (Case # 0102-05)	1601 Pacific Avenue	66 Apartments
9.	Retail Center (Case # 0104-19)	3400 Long Beach Boulevard	7,000 SF Retail and 1,500 SF Fast-Food Restaurant
10.	Retail (Case # 0109-23)	1570-1598 Long Beach Blvd	11,984 SF Retail
11.	Locust Avenue Residential (Case # 0110-05)	835 Locust Avenue	82 Condominiums/Townhouses
12.	Self Storage (Case # 0110-07)	712 West Baker Street	516,000 SF Self-Storage Facility
13.	Pharmacy With Drive Through (Case # 0112-16)	3570 Atlantic Avenue	11,550 SF Pharmacy With Drive Through
14.	Retail (Case # 0202-01)	2005-2011 Long Beach Boulevard	15,000 SF Retail
15.	Office/Retail (Case # 0205-05)	1900 Atlantic Avenue	6,150 SF Office/6,150 SF Retail
16.	Mark Twain Public Library (Case # 0207-22)	1401 East Anaheim Street	16,000 SF Public Library
17.	Retail (Case # 0208-04)	1422 West Willow Street	5,750 SF Retail
18.	Medical Office (Case # 0208-15)	2760 Atlantic Avenue	7,200 SF Medical Office Building
19.	Retail (Case # 0209-17)	4085 Atlantic Avenue	5,800 SF Retail
20.	Alamitos Green Residential[17]	East of Redondo Avenue between Stearns Street and Hathaway Avenue	15 Single Family Detached
21.	Elementary School[17]	South of Hill Street between Redondo Avenue and Obispo Avenue	1,450 Students
22.	Daugherty Sky Harbor[18]	North of Spring Street	70,706 SF Office and 77,558 SF Warehouse
23.	Comm Ctr (Case # 0207-17)	325 E. Anaheim Street	6,700 SF commercial center
24.	Self-Storage (Case # 0207-24)	3050 Orange Avenue	55,000 SF self-storage expansion

[16] Source: City of Long Beach Major Projects List dated October 1, 2003, with verification by City staff.

[17] Source: Traffic Impact Study for Alamitos Ridge prepared by LLG Pasadena (December 9, 2002).

[18] Source: Operations Analysis prepared by LLG Costa Mesa (November 22, 2002).

TABLE 6-1 (CONTINUED)

LOCATION AND DESCRIPTION OF RELATED PROJECTS

No.	Cumulative Project	Location/Address	Description
City of Long Beach (continued)			
25.	Commercial Bldg (Case # 0210-19)	1000-1008 E. Anaheim	4,000 SF commercial building
26.	Retail (Case # 0301-10)	2201 Lakewood Boulevard	6,230 SF retail center
27.	Affordable Housing (Case # 0301-16)	1593-1643 Pacific Avenue	43 DU affordable housing apartments
28.	Comm Bldg (Case # 0301-18)	2299 Pacific Avenue	1,953 SF commercial building
29.	Industrial Center (Case # 0302-03)	3701 Pacific Place	159,185 SF industrial building, with warehouse / accessory office space
30.	Walgreen's (Case # 0302-04)	3339 E. Anaheim Street	11,656 SF Drug Store/Pharmacy
31.	Affordable Condominiums (Case #0304-06)	1856 Long Beach Boulevard	60 DU affordable housing condominiums
32.	Java Lanes (Case # 0306-02	3738–3800 E. Pacific Coast Hwy	79 DU condominium complex
33.	New Comm. Rehab. Industries Bldg (Case # 0307-10)	1546 Anaheim Street	6,000 SF industrial building
34.	Commercial/Industrial Complex (Case # 0308-02)	1825 E. Spring Street	101,000 SF of industrial floor area
City of Signal Hill[19]			
35.	Home Improvement/Retail	North of Spring Street between Atlantic Avenue and California Avenue	138,708 SF Home Improvement, 23,700 SF Garden Center, 56,890 SF Retail, 6,000 SF Restaurant and two 2,500 SF Fast-Food Restaurants
36.	Hill Top Specific Plan	Skyline Drive, East of Cherry	100 Single Family Detached, 194 Multi-Family Attached
37.	A and A Ready Mix	NWC of 27th St & California Ave	25 Truck Cement Ready Mix Plant
38.	Gundry Estates	SEC of Willow St & Gundry Ave	11 Single Family Detached
39.	Hathaway Estates	SWC of Temple Ave & Hathaway Ave	20 Single Family Detached
40.	U.S. Storage	Northeast Corner of California Avenue and 32nd Street	130,000 SF Self-Storage Facility
41.	Long Beach BMW	Southeast Corner of Cherry Avenue and Spring Street	96,000 SF Auto Storage Parking Structure
42.	DCI Light Industrial	Southeast Corner of Hathaway Avenue and Palm Drive	18,400 SF General Light Industrial
43.	Cherry / 19th Condominiums	East of Cherry, between 19th Street & 20th Street	41 DU residential condominiums
44.	LBUSD Middle School	West of Cherry Avenue, south of 20th Street	850 Student Middle School

[19] Source: City of Signal Hill (Gary Jones).

TABLE 6-2

RELATED PROJECTS TRAFFIC GENERATION FORECAST[20]

Related Projects Description	Weekday				Weekend Day (Saturday)			
	Daily 2-Way	PM Peak Hour			Daily 2-Way	Midday Peak Hour		
		In	Out	Total		In	Out	Total
City of Long Beach Development								
1. Pine Villas (63 DU)	219	4	3	7	158	11	8	19
2. Alamitos Ridge Residential (106 DU)[21]	1,014	69	39	108	1,070	54	46	100
3. CSULB Technology Park (200,000 SF Industrial/200,000 SF R&D)	3,016	56	356	412	644	38	38	76
4. Self-Storage (92,000 SF)	230	12	12	24	214	18	19	37
5. Pharmacy (15,200 SF)[22]	1,232	27	28	55	1,232	27	28	55
6. N.L.B. Police Station (20,000 SF)[23]	980	41	57	98	980	41	57	98
7. Medical Office (105,800 SF)	3,823	105	282	387	948	219	165	384
8. Apartments (66 DU)	438	28	13	41	422	18	16	34
9. Retail/Fast-Food (7,000 SF/1,500 SF)[22]	940	22	21	43	1,290	34	33	67
10. Retail (11,984 SF)[22]	463	15	15	30	539	21	19	40
11. Locust Avenue Condominiums (82 DU)	481	30	15	45	465	21	18	39
12. Self-Storage (516,000 SF)	1,290	67	67	134	1,202	103	103	206
13. Pharmacy W/Drive Thru (11,550 SF)[22]	916	30	31	61	916	30	31	61
14. Retail (15,000 SF)[22]	580	18	19	37	675	26	24	50
15. Office/Retail (6,150 SF/6,150 SF)[22]	394	22	80	102	308	13	12	25
16. Mark Twain Public Library (16,000 SF)	864	54	59	113	745	57	51	108
17. Retail (5,750 SF)[22]	222	7	7	14	258	10	9	19
18. Medical Office (7,200 SF)	260	7	19	26	65	15	11	26
19. Retail (5,800 SF)[22]	224	7	7	14	261	10	9	19
20. Alamitos Green Residential (15 DU)[21]	144	10	5	15	151	8	6	14
21. Elementary School (1,450 Students)[21]	1,479	0	0	0	0	0	0	0
22. Daugherty Sky Harbor[24]	1,760	45	190	235	265	21	16	37
City of Long Beach Related Projects No. 1 - 22 Trip Generation-Subtotal	**20,969**	**676**	**1,325**	**2,001**	**12,808**	**795**	**719**	**1,514**

[20] Source: *Trip Generation*, 6th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (1997).

[21] Source: Traffic Impact Study for Alamitos Ridge prepared by LLG Pasadena (December 9, 2002).

[22] The trips presented above include adjustments for pass-by. Source: Trip Generation Handbook, ITE October 1998.
The following pass-by reduction factors were utilized:
- Land Use 820: Shopping Center (Daily = assume 10% and PM Peak Hour = 34%)
-Land Use 834: Fast-Food Restaurant With Drive-Through (Daily = assume 10%, AM Peak Hour= 49% and PM Peak Hour= 50%)
-Land Use 881: Pharmacy With Drive-Through Window (Daily = assume 10% and PM Peak Hour = 49%)

[23] Source: Traffic Impact Study for the North Long Beach Police Station project prepared by LLG Costa Mesa (December 15, 2000).

[24] Source: Operation Analysis prepared by LLG Costa Mesa (November 22, 2002).

TABLE 6-2 (CONTINUED)

RELATED PROJECTS TRAFFIC GENERATION FORECAST[25]

Related Projects Description	Weekday				Weekend Day (Saturday)			
	Daily 2-Way	PM Peak Hour			Daily 2-Way	Midday Peak Hour		
		In	Out	Total		In	Out	Total
23. Retail (6,700 SF)[26]	259	8	9	17	301	11	11	22
24. Self-Storage (55,000 SF)	138	7	7	14	128	11	11	22
25. Retail (4,000 SF)[26]	155	5	5	10	180	6	7	13
26. Retail (6,230 SF)[26]	240	7	8	15	280	10	10	20
27. Affordable Condominiums (43 DU)	252	15	8	23	244	11	9	20
28. Retail (1,950 SF)[26]	76	2	3	5	87	3	4	7
29. General Light Industrial (159,185 SF)	1,110	19	137	156	210	11	11	22
30. Pharmacy (11,656 SF)[26]	945	21	21	42	945	21	21	42
31. Affordable Condominiums (60 DU)	352	22	11	33	340	15	13	28
32. Java Lanes Condominiums (79 DU)	463	28	14	42	448	20	17	37
33. General Light Industrial (6,000 SF)	42	1	5	6	8	1	1	2
34. General Light Industrial (101,000 SF)	704	12	87	99	133	7	7	14
City of Long Beach Related Projects No. 23 - 34 Trip Generation-Subtotal	**4,736**	**147**	**315**	**462**	**3,304**	**127**	**122**	**249**
City of Signal Hill Development								
35. Home Improvement Center[27]	10,696	433	458	891	17,297	800	707	1,507
36. Hill Top Specific Plan[27]	2,094	135	71	206	2,109	100	86	186
37. A and A Ready Mix (25 Trucks)	200	9	21	30	0	0	0	0
38. Gundry Estates (11 SFD)	105	7	4	11	111	6	5	11
39. Hathaway Estates (20 SFD)	191	13	7	20	202	10	9	19
40. U.S. Storage (130,000 SF)	325	17	17	34	303	26	26	52
41. Long Beach BMW (96,000 SF)	240	12	12	24	224	19	19	38
42. DCI Light Industrial (18,400 SF)	128	2	16	18	24	1	1	2
43. Cherry/19th Condominiums (41 DU)	240	15	7	22	232	10	9	19
44. GTE Middle School (850 Students)	1,233	68	68	136	0	0	0	0
City of Signal Hill Related Projects Total Trip Generation Potential	**15,452**	**711**	**681**	**1,392**	**20,502**	**972**	**862**	**1,834**
Total Related Projects No. 1 - 44 Trip Generation Potential	**41,157**	**1,534**	**2,321**	**3,855**	**36,614**	**1,894**	**1,703**	**3,597**

[25] Source: *Trip Generation*, 6th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (1997).

[26] The trips presented above include adjustments for pass-by. Source: Trip Generation Handbook, ITE October 1998.
The following pass-by reduction factors were utilized:
- Land Use 820: Shopping Center (Daily = assume 10% and PM Peak Hour = 34%)
-Land Use 834: Fast-Food Restaurant With Drive-Through (Daily = assume 10%, AM Peak Hour= 49% and PM Peak Hour= 50%)
-Land Use 881: Pharmacy With Drive-Through Window (Daily = assume 10% and PM Peak Hour = 49%)

[27] Source: Traffic Impact Study for Home Depot prepared by Urban Crossroads (December 2000).

One related project not considered in the cumulative traffic analysis is the PacifiCenter @ Long Beach project. The PacifiCenter project site is located five miles northeast of downtown Long Beach and immediately north of the Long Beach Municipal Airport. The PacifiCenter project is a master-planned, mixed-use development consisting of 3,150,000 SF of commercial uses (office park), 255 single-family homes, 1,220 apartments, 1,025 condominiums/townhomes, 150,000 SF of retail and a 400-room hotel. The PacifiCenter project was not included as part of the Year 2006 cumulative traffic setting because the anticipated completion year for this related project is the Year 2020, which is outside of the horizon year for the proposed Long Beach Sports Park (Year 2006).

6.3 Year 2006 Traffic Volumes

Figures 6-2 and ***6-3*** present Year 2006 background peak hour traffic volumes at the eighteen key study intersections evaluated in the study area for the weekday PM peak hour and the weekend Midday peak hour, respectively. ***Figure 6-4*** illustrates the Year 2006 background ADT traffic volumes for a "typical" weekday and weekend (Saturday).

Figures 6-5 and ***6-6*** illustrate the year 2006 forecast weekday PM peak hour and weekend Midday peak hour traffic volumes with the inclusion of the trips generated by the proposed Long Beach Sports Park project, respectively. ***Figures 6-7*** and ***6-8*** illustrate the year 2006 forecast weekday PM peak hour and weekend Midday peak hour driveway traffic volumes with the inclusion of the trips generated by the proposed project, respectively.

Figure 6-9 presents the Year 2006 forecast ADT traffic volumes with the inclusion of the trips generated by the proposed Long Beach Sports Park project for a "typical" weekday and weekend (Saturday).

7.0 TRAFFIC IMPACT ANALYSIS METHODOLOGY

7.1 Impact Criteria and Thresholds

The relative impacts of the added peak hour project traffic volumes generated by the proposed Long Beach Sports Park have been evaluated based on the analysis of future operating conditions at eighteen key study intersections. Operating conditions at the key study intersections were evaluated during the weekday PM peak hour and the weekend day Midday peak hour for existing 2002 traffic conditions and future 2006 traffic conditions without, then with the proposed project. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each study intersection. The significance of the potential impacts of the project at each key intersection was then evaluated using the City's LOS standards and the Los Angeles County CMP traffic impact criteria.

As indicated earlier, impacts to local and regional transportation systems are considered significant if:

- An unacceptable peak hour Level of Service (LOS) (i.e. LOS E or F) at any of the key intersections is projected. The City of Long Beach and the City of Signal Hill consider LOS D (ICU = 0.81 - 0.90) to be the minimum acceptable LOS for all other intersections. For the City of Long Beach, the current LOS, if worse than LOS D (i.e. LOS E or F), should also be maintained; and

- The project increases traffic demand at the study intersection by 2% of capacity (ICU increase ≥ 0.02), causing or worsening LOS E or F (ICU > 0.90). At unsignalized intersections, a "significant" adverse traffic impact is defined as a project that: adds 2% of more traffic to delay (seconds per vehicle) at an intersection operating LOS E or F.

7.2 Traffic Impact Analysis Scenarios

The following scenarios are those for which volume/capacity calculations have been performed at the key intersections for the 2006 horizon year conditions:

A. 2002: Existing Traffic Conditions;
B. 2006: Future Background (Existing plus Ambient Growth to horizon year 2002 at 2.0% per year plus cumulative projects);
C. 2006 Future Background plus the Long Beach Sports Park Project; and
D. Scenario (C) with planned area improvements and/or project specific mitigation, if necessary.

8.0 PEAK HOUR INTERSECTION CAPACITY ANALYSIS

8.1 Weekday Traffic Conditions

Table 8-1 summarizes the PM peak hour Level of Service results at the eighteen key study intersections during a "typical" weekday for the Year 2006. The first column (1) of ICU/LOS values in *Table 8-1* presents a summary of existing PM peak hour traffic conditions (which were also presented in Table 3). The second column (2) lists forecast 2006 background conditions (existing plus ambient growth plus cumulative project traffic) based on existing intersection geometry, but without any traffic generated from the proposed project.

The third column (3) presents future forecast traffic conditions with the addition of traffic generated by the proposed Long Beach Sports Park project. The fourth column (4) shows the increase in ICU value due to added project trips and indicates whether the traffic associated with the project will have a significant impact based on the Level of Service standards and significant impact criteria defined in this report.

The fifth column (5) of *Table 8-1* presents the forecast levels of service for the PM peak commute hour with the implementation of mitigation measures, recommended to achieve/maintain an acceptable Level of Service and/or off-set the significant impact of project-related traffic.

8.1.1 *Year 2002 Existing Conditions*

As previously presented in *Table 3-4*, review of this table indicates that fourteen of the key study intersections currently operate at LOS D or better during the PM peak commute hour. The intersections of Atlantic Avenue at Willow Street, Cherry Avenue at Willow Street, and Cherry Avenue at Spring Street currently operate at unacceptable LOS E during the PM peak commute hour (adverse ICU/LOS values are shown in bold). Although the unsignalized intersection of the I-405 SB Ramps at Orange Avenue, overall operates at LOS B during the PM peak hour, the minor street (I-405 SB Off-Ramp) approach currently operates at LOS F during the PM peak hour.

8.1.2 *Year 2006 Future Background Traffic Conditions*

An analysis of future (Year 2006) background traffic conditions indicates that the addition of ambient traffic growth and cumulative project traffic will adversely impact nine of the eighteen key study intersections.

The intersections of Atlantic Avenue at Willow Street, Cherry Avenue at Willow Street, Atlantic Avenue at Spring Street, Cherry Avenue at Spring Street, as well as the I-405 SB off-ramp approach at Orange Avenue are forecast to deteriorate one service level and operate at LOS F during the weekday PM peak commute hour.

The intersections of Orange Avenue at Willow Street, Orange Avenue at Spring Street, 32nd Street at Orange Avenue and California Avenue at Wardlow Road are forecast to operate at LOS E in the Year 2006 background condition during the PM peak hour with the addition of ambient traffic and related projects traffic. The remaining nine key study intersections are forecast to operate at LOS D or better during the weekday PM peak hour.

TABLE 8-1

YEAR 2006 WEEKDAY PM PEAK HOUR INTERSECTION CAPACITY ANALYSIS

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	ICU	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU Inc.**	**Y/N**	**ICU**	**LOS**
1. Atlantic Avenue at Willow Street	**0.956**	**E**	**1.083**	**F**	**1.094**	**F**	0.011	No	--	--
2. California Avenue at Willow Street	0.782	C	0.871	D	0.896	D	0.025	No	--	--
3. Orange Avenue at Willow Street	0.807	D	**0.901**	**E**	**0.910**	**E**	0.009	No	--	--
4. Walnut Avenue at Willow Street	0.740	C	0.814	D	0.820	D	0.006	No	--	--
5. Cherry Avenue at Willow Street	**0.946**	**E**	**1.075**	**F**	**1.081**	**F**	0.006	No	--	--
6. Orange Avenue at 28th Street	1.34 sec/veh LOS A		1.41 sec/veh LOS A		3.41 sec/veh LOS A		2.00 s/v	No	0.517	A[28]
➢ Minor Approach Delay/LOS	15.1 sec/veh LOS C		17.5 sec/veh LOS C		**61.8 sec/veh LOS F**		**44.3 s/v**	**Yes**	--	--
7. Orange Avenue at 29th Street	1.16 sec/veh LOS A		1.23 sec/veh LOS A		0.86 sec/veh LOS A		0.00 s/v	No	--	--
➢ Minor Approach Delay/LOS	14.3 sec/veh LOS B		16.3 sec/veh LOS C		14.1 sec/veh LOS B		0.00 s/v	No	--	--
8. Atlantic Avenue at Spring Street	0.875	D[29]	**1.040**	**F**	**1.080**	**F**	**0.040**	**Yes**	**1.024**	**F**[30]
9. California Avenue at Spring Street	0.571	A[29]	0.696	B	0.734	C	0.038	No	--	--

[28] Represents anticipated LOS with installation of a traffic signal.

[29] Represents LOS with recently completed Spring Street Widening Project improvements.

[30] Represents anticipated LOS with construction of a separate northbound right-turn lane on Atlantic Avenue at Spring Street, recommended to mitigate the impact of Long Beach Sports Park traffic.

TABLE 8-1 (CONTINUED)

YEAR 2006 WEEKDAY PM PEAK HOUR INTERSECTION CAPACITY ANALYSIS

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	ICU	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU Inc.**	**Y/N**	**ICU**	**LOS**
10. Orange Avenue at Spring Street	0.751	C	**0.908**	**E**	**1.064**	**F**	**0.156**	**Yes**	0.896	D[31]
11. Walnut Avenue at Spring Street	0.660	B	0.747	C	0.759	C	0.012	No	--	--
12. Cherry Avenue at Spring Street	**0.942**	**E**	**1.045**	**F**	**1.045**	**F**	0.000	No	--	--
13. I-405 SB Ramps at Orange Avenue	10.28 sec/veh LOS B		21.29 sec/veh LOS C		**36.36 sec/veh LOS E**		**15.07 s/v**	**Yes**	0.567	A[32]
➢ Minor Approach Delay/LOS	**100.6 sec/veh LOS F**		**246.5 sec/veh LOS F**		**480.2 sec/veh LOS F**		**233.7 s/v**	**Yes**	--	--
14. 32nd Street at Orange Avenue	0.796	C	**0.916**	**E**	**0.981**	**E**	**0.065**	**Yes**	NF[33]	--
15. I-405 NB Ramps at 32nd Street	8.17 sec/veh LOS A		10.24 sec/veh LOS B		13.17 sec/veh LOS B		2.93 s/v	No	--	--
➢ Minor Approach Delay/LOS	14.2 sec/veh LOS B		17.4 sec/veh LOS C		21.8 sec/veh LOS C		4.4 s/v	No	--	--
16. Atlantic Avenue at I-405 SB Ramps	0.699	B	0.856	D	0.894	D	0.038	No	--	--
17. Orange Avenue at Wardlow Road	0.524	A	0.585	A	0.589	A	0.004	No	--	--
18. California Avenue at Wardlow Road	0.864	D	**0.962**	**E**	**0.969**	**E**	0.007	No	--	--

[31] Represents anticipated LOS with conversion of a southbound right-turn lane on Orange Avenue at Spring Street to a shared through/right-turn lane and a separate eastbound right-turn lane, recommended to mitigate the impact of Long Beach Sports Park project traffic.

[32] Represents anticipated LOS with installation of a traffic signal, which is warranted under existing traffic conditions.

[33] NF = none feasible. Intersection Improvements at this key intersection are not feasible due to physical and right-of-way constraints.

8.1.3 *Year 2006 Background Conditions With Project Traffic*

Review of columns 3 and 4 of *Table 8-1* shows that traffic generated by the Long Beach Sports Park will have a significant impact at the following five study intersections identified below when compared to the LOS standards and significant impact criteria specified in this report.

	Key Intersection	City/Jurisdiction	PM Peak Hour LOS
6.	Orange Avenue at 28th Street	Long Beach/Signal Hill	61.8 s/v / F
8.	Atlantic Avenue at Spring Street	Long Beach	1.080 / F
10.	Orange Avenue at Spring Street	Signal Hill	1.064 / F
13.	I-405 SB Ramps at Orange Avenue	Long Beach/Caltrans	480.2 s/v / F
14.	32nd Street at Orange Avenue	Signal Hill	0.981 / E

The proposed Long Beach Sports Park project cumulatively impacts the intersections of Atlantic Avenue at Spring Street, Orange Avenue at Spring Street and 32nd Street at Orange Avenue, causing these intersections adverse service levels to further deteriorate.

Although the unsignalized intersection of Orange Avenue and 28th Street, overall, is forecast to operate at LOS A during the PM peak hour, the addition of project traffic directly impacts this intersection and will cause the minor street (28th Street/Project Driveway #3) approach to operate at LOS F. The addition of project traffic at Orange Avenue and I-405 SB Ramps cumulatively impacts this unsignalized intersection, worsening the LOS F conditions of the minor street (I-405 SB off-ramp) to further deteriorate.

With the exception of the 32nd Street and Orange Avenue intersection, the implementation of planned and/or recommended improvements at four of the five study intersections completely offsets the impact of project traffic (See column 5 of *Table 8-1*). The one exception is the Orange Avenue and 32nd Avenue intersection. Due to physical and right-of-way restrictions that prohibit any widening or restriping at the 32nd Street/Orange Avenue intersection, intersection capacity enhancing improvements at this key intersection do not appear feasible. A description of planned intersection improvements and recommended mitigation measures are discussed in the following section of this report. The remaining 13 key study intersections will not be impacted by the Long Beach Sports Park project, based on the LOS standards and significant impact criteria specified in this report.

8.2 Weekend Day (Saturday) Traffic Conditions

As stated earlier, the traditional focus of traffic impact studies is weekday traffic conditions, especially the PM peak commuter hours when traffic volumes are greatest (See *Figure 3-5* for a graphical illustration of "Weekday ADT versus Weekend ADT" volumes on an hourly basis for key roadways in the study area). Further, intersection and roadway improvements are typically recommended/identified to offset a project's weekday peak hour impact and ensure acceptable service levels throughout the week (Monday through Friday). However, since the Long Beach Sports Park has the potential to generate a significant amount of traffic on the weekend, and especially on Saturdays during scheduled sports tournaments, a weekend analysis was prepared.

Table 8-2 summarizes the Midday peak hour Level of Service results at the eighteen key study intersections during a "typical" weekend day for the Year 2006. The structure of this table is similar to the weekday capacity analysis presented in *Table 8-1*.

8.2.1 *Year 2006 Future Background Traffic Conditions*

An analysis of future (Year 2006) background traffic conditions indicates that the addition of ambient traffic growth and cumulative project traffic will adversely impact one of the eighteen key study intersections. Although the unsignalized intersection of the I-405 SB Ramps at Orange Avenue overall operates at LOS A during the weekend day Midday peak hour, the minor street (I-405 SB Off-Ramp) approach is forecast to operate at LOS E with the addition of ambient traffic and related projects traffic. The remaining seventeen key study intersections are forecast to operate at LOS D or better during the weekend day Midday peak hour.

8.2.2 *Year 2006 Background Conditions With Project Traffic*

Review of columns 3 and 4 of *Table 8-2* shows that the Long Beach Sports Park project will have a significant traffic impact at two of the eighteen key study intersections. Although, overall the unsignalized intersections of Orange Avenue/28th Street and the I-405 SB Ramps/Orange Avenue are forecast to operate at LOS A during the weekend day Midday peak hour, the addition of project traffic will cause the minor street approach to operate at LOS E and F, respectively. The remaining sixteen key study intersections are projected to continue to operate with the inclusion of project traffic, at an acceptable service level during the weekend day, Midday peak hour.

TABLE 8-2

YEAR 2006 WEEKEND (SATURDAY) MIDDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	ICU	LOS	ICU	LOS	ICU	LOS	ICU Inc.	Y/N	ICU	LOS
1. Atlantic Avenue at Willow Street	0.723	C	0.834	D	0.841	D	0.007	No	--	--
2. California Avenue at Willow Street	0.458	A	0.525	A	0.556	A	0.031	No	--	--
3. Orange Avenue at Willow Street	0.639	B	0.725	C	0.785	C	0.060	No	--	--
4. Walnut Avenue at Willow Street	0.421	A	0.458	A	0.468	A	0.010	No	--	--
5. Cherry Avenue at Willow Street	0.769	C	0.866	D	0.876	D	0.010	No	--	--
6. Orange Avenue at 28th Street	0.36 sec/veh LOS A		0.33 sec/veh LOS A		4.95 sec/veh LOS A		4.62 s/v	No	0.463	A[34]
➢ Minor Approach Delay/LOS	11.1 sec/veh LOS B		12.1 sec/veh LOS B		**39.5 sec/veh LOS E**		**27.4 s/v**	**Yes**	--	--
7. Orange Avenue at 29th Street	0.15 sec/veh LOS A		0.15 sec/veh LOS A		0.11 sec/veh LOS A		0.00 s/v	No	--	--
➢ Minor Approach Delay/LOS	13.5 sec/veh LOS B		15.4 sec/veh LOS C		18.9 sec/veh LOS C		3.50 s/v	No	--	--
8. Atlantic Avenue at Spring Street	0.538	A[35]	0.674	B	0.710	C	0.036	No	0.691	B[36]
9. California Avenue at Spring Street	0.254	A[35]	0.411	A	0.451	A	0.041	No	--	--

[34] Represents anticipated LOS with installation of a traffic signal.

[35] Represents LOS with recently completed Spring Street Widening Project improvements.

[36] Represents anticipated LOS with construction of a separate northbound right-turn lane on Atlantic Avenue at Spring Street, recommended to mitigate the impact of Long Beach Sports Park traffic.

TABLE 8-2 (CONTINUED)

YEAR 2006 WEEKEND (SATURDAY) MIDDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	ICU	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU Inc.**	**Y/N**	**ICU**	**LOS**
10. Orange Avenue at Spring Street	0.476	A	0.630	B	0.768	C	0.138	No	0.639	B[37]
11. Walnut Avenue at Spring Street	0.277	A	0.349	A	0.372	A	0.023	No	--	--
12. Cherry Avenue at Spring Street	0.636	B	0.713	C	0.713	C	0.000	No	--	--
13. I-405 SB Ramps at Orange Avenue	3.65 sec/veh LOS A		4.60 sec/veh LOS A		7.62 sec/veh LOS A		3.02 s/v	No	0.477	A[38]
➢ Minor Approach Delay/LOS	23.4 sec/veh LOS C		**35.9 sec/veh LOS E**		**79.9 sec/veh LOS F**		**40.0 s/v**	**Yes**	--	--
14. 32nd Street at Orange Avenue	0.572	A	0.703	C	0.778	C	0.075	No	NF[39]	--
15. I-405 NB Ramps at 32nd Street	5.34 sec/veh LOS A		6.75 sec/veh LOS A		7.71 sec/veh LOS A		0.96 s/v	No	--	--
➢ Minor Approach Delay/LOS	10.8 sec/veh LOS B		12.3 sec/veh LOS B		13.8 sec/veh LOS B		1.5 s/v	No	--	--
19. Atlantic Avenue at I-405 SB Ramps	0.597	A	0.718	C	0.730	C	0.012	No	--	--
20. Orange Avenue at Wardlow Road	0.277	A	0.327	A	0.338	A	0.011	No	--	--
21. California Avenue at Wardlow Road	0.564	A	0.646	B	0.660	B	0.014	No	--	--

[37] Represents anticipated LOS with conversion of a southbound right-turn lane on Orange Avenue at Spring Street to a shared through/right-turn lane and a separate eastbound right-turn lane, recommended to mitigate the impact of Long Beach Sports Park project traffic.

[38] Represents anticipated LOS with installation of a traffic signal, which is warranted under existing traffic conditions.

[39] NF = none feasible. Intersection Improvements at this key intersection are not feasible due to physical and right-of-way constraints.

9.0 SITE ACCESS AND INTERNAL CIRCULATION EVALUATION

9.1 Site Access

Access to the proposed Long Beach Sports Park Project will be provided by a total of five full access driveways along California Avenue, Spring Street and Orange Avenue. All project driveways are proposed to be one-way stop controlled. ***Tables 9-1*** and ***9-2*** summarize the weekday PM peak hour and the weekend day Midday peak hour level of service results at the five project driveways for the Year 2006, respectively.

Review of the left side of *Tables 9-1* and *9-2* shows that all five project driveways, overall, are forecast to operate at LOS A in the Year 2006 background condition with project traffic during the weekday PM peak hour and the weekend day Midday peak hour. However, the minor approach of Project Driveway #3 is projected to operate at LOS E during the weekday PM peak hour and weekend day Midday peak hour with delays of 35.7 seconds per vehicle and 41.1 seconds per vehicle, respectively. The minor approach of Project Driveway #4 (Orange Avenue at 28th Street) is projected to operate at LOS F during the weekday PM peak hour with a delay of 61.8 seconds per vehicle and at LOS E during the weekend day Midday peak hour with a delay of 39.5 seconds per vehicle. Appendix B contains the HCM/LOS calculation worksheets for the five project driveways.

To minimize delays for vehicles exiting the project site at Project Driveway #4 (Orange Avenue at 28th Street), a five-phase traffic signal with protected northbound and southbound left-turns along Orange Avenue is recommended at this location. Based on the results of a traffic signal warrant analysis, the Year 2006 traffic volumes with project traffic warrants the installation of a traffic signal at Driveway #4 (Orange Avenue at 28th Street). Implementation of this traffic signal will minimize vehicular delays for vehicles entering and exiting the project site and improve safety conditions at this project driveway. Project Driveway #4 (Orange Avenue at 28th Street) will operate at LOS A during the weekday PM peak hour and weekend day Midday peak hour with the installation of a five-phase traffic signal.

9.1.1 *Alternative Access Evaluation*

With respect to Project Driveway #3, restricting access at this driveway to "right-turns only" and re-routing left-turn project traffic at this location to Driveway #4 (Orange Avenue at 28th Street), would mitigate the impact of the project and ensure acceptable services levels are maintained on all approaches of this project access point.

Figures 9-1 and ***9-2*** show the alternative access traffic volumes at the project driveways for the weekday PM peak hour and the weekend day Midday peak hour assuming the installation of a five-phase traffic signal at Project Driveway #4 (Orange Avenue at 28th Street) and that Project Driveways #3 and #5 be restricted to "right-turns only".

TABLE 9-1

YEAR 2006 WEEKDAY PM PEAK HOUR

LEVEL OF SERVICE SUMMARY FOR PROJECT DRIVEWAYS

Project Driveways	TYPE OF ACCESS AT PROJECT DRIVEWAYS			
	With full access at Project Driveways #1 through #5		With Right-turn Only Restrictions at Project Driveways #3 and #5	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1. California Avenue at Driveway #1	1.09 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	14.7 sec/veh	B	--	--
2. Spring Street at Driveway #2	0.87 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	28.8 sec/veh	D	--	--
3. Orange Avenue at Driveway #3	1.34 sec/veh	A	0.09 sec/veh	A
➢ Minor Approach Delay/LOS	**35.7 sec/veh**	**E**	11.9 sec/veh	B
4. Orange Avenue at 28th St/Driveway #4	3.41 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	**61.8 sec/veh**	**F**	--	--
With Signalization (ICU/LOS)	0.517	A[40]	0.589	A[40]
5. Orange Avenue at Driveway #5	0.31 sec/veh	A	0.05 sec/veh	A
➢ Minor Approach Delay/LOS	16.2 sec/veh	C	10.5 sec/veh	B

[40] Represents anticipated LOS with installation of a traffic signal.

TABLE 9-2

YEAR 2006 WEEKEND (SATURDAY) MIDDAY PEAK HOUR

LEVEL OF SERVICE SUMMARY FOR PROJECT DRIVEWAYS

Project Driveways	TYPE OF ACCESS AT PROJECT DRIVEWAYS			
	With full access at Project Driveways #1 through #5		With Right-turn Only Restrictions at Project Driveways #3 and #5	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1. California Avenue at Driveway #1	0.90 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	11.1 sec/veh	B	--	--
2. Spring Street at Driveway #2	0.07 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	12.1 sec/veh	B	--	--
3. Orange Avenue at Driveway #3	4.06 sec/veh	A	0.26 sec/veh	A
➢ Minor Approach Delay/LOS	**41.1 sec/veh**	**E**	11.1 sec/veh	B
4. Orange Avenue at 28th St/Driveway #4	4.95 sec/veh	A	--	--
➢ Minor Approach Delay/LOS	**39.5 sec/veh**	**E**	--	--
With Signalization (ICU/LOS)	0.463	A[41]	0.584	A[41]
5. Orange Avenue at Driveway #5	0.64 sec/veh	A	0.17 sec/veh	A
➢ Minor Approach Delay/LOS	13.7 sec/veh	B	9.90 sec/veh	A

[41] Represents anticipated LOS with installation of a traffic signal.

Review of the right side of *Tables 9-1* and *9-2* shows that Project Driveway #3, Project Driveway #4 (Orange Avenue at 28th Street) and Project Driveway #5 are projected to operate at LOS A during the weekday PM peak hour and weekend day Midday peak hour with the aforementioned access restrictions. In addition, all minor street approaches are forecast to operate at LOS B or better.

9.1.2 *Sight Distance*

Sight distances at the project driveways appear to be adequate as California Avenue, Spring Street and Orange Avenue are relatively straight (i.e., nominal horizontal curves). However, due to the vertical grades, it is recommended that a detailed sight distance analysis be prepared for the project driveways, especially those along Orange Avenue, as part of the project's grading, landscape, and street improvement plans to ensure safe access and egress is provided. A vertical sight distance analysis for the project driveways was not performed since the vertical profiles of California Avenue and Orange Avenue adjacent to the project site were not available.

Because of potential sight distance restrictions/limitations due to the vertical alignment of Orange Avenue, restricting turning movements at Project Driveway #3 as well as Project Driveway #5 to "right-turns only" would minimize safety concerns at these locations.

The sight distance analysis should be prepared according to the CALTRANS *Highway Design Manual* standards and guidelines, and indicate limited use areas (i.e., low-height landscaping), and on-street parking restrictions (i.e., red curb), if necessary.

9.2 Internal Circulation

The on-site circulation layout of the proposed project, on an overall basis, is adequate. Curb return radii have been confirmed and are adequate for small service/delivery (Fedex, UPS) trucks, and trash trucks. Vehicle turning templates (ASSHTO P_M and SU-30) have been used to ensure that passenger cars and trucks can properly access and circulate through the site. In addition, all internal drive aisle widths, project driveway widths, and parking stall widths satisfy the City's minimum requirements. The proposed throat lengths at the project driveways are sufficient for storing potential queuing vehicles.

10.0 AREA-WIDE TRAFFIC IMPROVEMENTS

For those intersections where projected traffic volumes are expected to result in unacceptable operating conditions, this report recommends (identifies) improvement measures that change the intersection geometry to increase capacity. These capacity improvements involve roadway widening and/or re-striping to reconfigure (add lanes) to specific approaches of a key intersection. The identified improvements are expected to:

- mitigate the impact of existing traffic, project traffic and future non-project (ambient traffic growth and cumulative project) traffic, and
- improve Levels of Service to an acceptable range and/or to pre-project conditions.

10.1 Planned Improvements

The following improvements, completed earlier in 2004 as are part of the Spring Street Widening Project, were included the intersection operations analyses for Existing 2002 and Year 2006 Future Background traffic conditions. The improvements, nonexistent in the Year 2002, included the widening of Spring Street, between Long Beach Boulevard and California Avenue to provide 84-feet of paved street within 100-foot right of way, providing left turn lanes and traffic signal improvements, and two travel lanes in each direction.

- **Atlantic Avenue at Spring Street:** Provide a separate eastbound left-turn lane and a separate westbound right-turn lane on Spring Street to proceed northbound on Atlantic Avenue.

- **California Avenue at Spring Street:** Provide separate left-turn lanes on Spring Street at California Avenue for eastbound and westbound traffic, and a separate eastbound right-turn lane. Provide a single left-turn, through lane and right-turn lane on the northbound and southbound approaches on California Avenue.

10.2 Recommendation Mitigation Measures

Tables 8-1 and *8-2* show the forecast weekday and weekend operating conditions at the key study intersections with the implementation of recommended mitigation measures. As shown, the project's significant traffic impacts were offset with the implementation of recommended mitigation measures. The mitigation measures recommended at the intersections impacted by the Long Beach Sports Park are as follows:

- **Atlantic Avenue at Spring Street:** Widen Atlantic Avenue to provide a separate northbound right-turn lane to proceed eastbound on Spring Street. The implementation of this improvement will require the acquisition of right-of-way at the southeast corner of this intersection, and is subject to the approval of the City of Long Beach.

  Alternatively, in the event that the right-of-way cannot be acquired, it is recommended that that the traffic signal be modified to provide protected/permissive southbound left-turn phasing on Atlantic Avenue. Projected Year 2006 PM peak hour traffic volumes warrant the installation of

separate left-turn phasing on Atlantic Avenue. The potential benefit of this traffic signal operations upgrade is summarized in the table below:

Key Intersections	Time Period	(1) Year 2006 Background Traffic Conditions			(2) Year 2006 Traffic Conditions with Project Traffic			(3) Year 2006 Traffic Conditions with Project Traffic & Recommended Signal Operations Upgrade		
		Delay (sec/veh)	V/C Ratio	LOS	Delay (sec/veh)	V/C Ratio	LOS	Delay (sec/veh)	V/C Ratio	LOS
8. Atlantic Ave at Spring St	Weekday PM Peak	37.4	1.27	D	50.0	1.67	D	54.9	1.06	D
	Weekend Noon Peak	18.1	0.56	B	19.0	0.66	B	20.6	0.67	C

As shown above, implementation of this "operational" improvement marginally increases the overall intersection delay (compare column 2 and 3) but reduces the v/c ratio during the critical Weekday PM peak hour to pre-project levels (compare column 1 and 3). Hence, it can be concluded that implementation of this alternative mitigation measure will mitigate the impact of the Long Beach Sports Park project.

- **Orange Avenue at Spring Street:** Convert the existing southbound right-turn lane to a provide a second through lane on Orange Avenue, and restripe Orange Avenue south of Spring Street to provide two southbound departure lanes. Provide a separate eastbound right-turn lane on Spring Street to proceed southbound on Orange Avenue, and a separate westbound right-turn lane on Spring Street to proceed northbound on Orange Avenue. In addition, modify traffic signal to provide protected/permissive left-turn phasing in all directions. Based on projected left-turn volumes at this location, protected left-turn phasing is justified. Implementation of this improvement is subject to the approval of the City of Signal Hill.

- **I-405 SB Ramps at Orange Avenue:** Install a three-phase traffic signal. According to City staff, preliminary traffic signal and interconnect plans have been developed for this intersection. Per City of Long Beach, the Long Beach Sports Park project can be expected to pay a "fair-share" of the improvement costs associated with the installation of a three-phase traffic signal at the I-405 SB Ramps and Orange Avenue intersection. Implementation of this improvement is subject to the approval of the City of Signal Hill and Caltrans.

- **32nd Street at Orange Avenue:** No physical mitigation measure feasible; any additional turn lanes will require widening and additional right-of-way. However, to improve operations at this location, it is recommended that the traffic signal be upgraded from a pretimed (fixed time) signal to an actuated signal. The potential benefit of this traffic signal operations upgrade is summarized in the table below:

Key Intersection	Time Period	(1) Year 2006 Background Traffic Conditions			(2) Year 2006 Traffic Conditions with Project Traffic			(3) Year 2006 Traffic Conditions with Project Traffic & Recommended Signal Operations Upgrade		
		Delay (sec/veh)	V/C Ratio	LOS	Delay (sec/veh)	V/C Ratio	LOS	Delay (sec/veh)	V/C Ratio	LOS
14. 32nd Street at Orange Avenue	Weekday PM Peak	54.4	0.99	D	80.0	1.08	E	51.6	1.07	D
	Weekend Noon Peak	16.7	0.67	B	26.5	0.76	C	15.9	0.80	B

As shown above, implementation of this "operational" improvement reduced the overall intersection delay (compare column 2 and 3) during the critical Weekday PM peak hour to pre-project levels (compare column 1 and 3). Hence, it can be concluded that implementation of this signal upgrade will mitigate the impact of the Long Beach Sports Park project.

Appendix E contains the conceptual improvement plans that illustrate implementation of recommended mitigation measures.

10.3 Recommended Project Circulation Improvements

In addition, the Long Beach Sports Park will be directly responsible for implementing the improvements on the streets bordering the project site:

- **Spring Street:** The improvement of Spring Street, bordering the project site, will be completed as part of the Spring Street Widening Project. To ensure adequate access to the project site, the channelization plan of Spring Street should be designed to accommodate a full access project driveway for the proposed Commercial Center parcel. Implementation of this improvement is subject to the approval of the City of Signal Hill.

- **Orange Avenue:** In conjunction with the development of the Long Beach Sports Park, widen and improve Orange Avenue bordering the project site to City of Signal Hill Secondary Highway street standards. Orange Avenue, south of Spring Street is designated as a Secondary Highway in the City of Signal Hill Circulation Element with an 80-foot right-of way section, 64-foot paved width, and 8-foot sidewalk areas. Implementation of this improvement is subject to the approval of the City of Signal Hill.

- **California Avenue:** In conjunction with the development of the Long Beach Sports Park, widen and improve California Avenue along project frontage to City of Signal Hill Secondary Modified Highway street standards. California Avenue, south of Spring Street is designated as a Secondary Modified Highway in the City of Signal Hill Circulation Element with a 70-foot right-of way section and 60-foot paved width, and 5-foot sidewalk areas. Implementation of this improvement is subject to the approval of the City of Signal Hill.

- **Orange Avenue at Project Driveway #4/28th Street:** Install a five-phase traffic signal with protected northbound and southbound left-turn phasing. Implementation of this improvement is subject to the approval of the city of Signal Hill.

11.0 PROJECT FAIR-SHARE PERCENTAGE

To determine the percentage of net traffic impact due to the proposed Long Beach Sports Park, the project's net traffic increment has been calculated for the near-term (2006) weekday PM peak hour at the four intersections cumulatively impacted by the project:

Key Intersection		City/Jurisdiction
8.	Atlantic Avenue at Spring Street	Long Beach
10.	Orange Avenue at Spring Street	Signal Hill
13.	I-405 SB Ramps at Orange Avenue	Long Beach/Caltrans
14.	32nd Street at Orange Avenue	Signal Hill

Table 11-1 presents the weekday PM peak hour percentage of net traffic impact for the four aforementioned key study intersections. The first column (1) presents Year 2002 existing traffic. The second column (2) shows Year 2006 cumulative traffic (ambient growth plus related projects), and the third column (3) represents Year 2006 cumulative traffic conditions with Long Beach Sports Park project traffic. The fourth column (4) shows what percentage of total added traffic is project-related traffic.

Review of *Table 11-1* shows that the Long Beach Sports Park project's percentage of net traffic impact ranges from 12.5% at the intersection of Atlantic Avenue/Spring Street to 42.2% at the intersection of the I-405 Southbound Ramps/Orange Avenue. These percentages represent the project's "fair-share" cost responsibility associated with implementation of the recommended mitigation measures identified on pages 49 through 51 of this report.

TABLE 11-1

PERCENTAGE OF NET TRAFFIC IMPACT

WEEKDAY PM PEAK COMMUTE HOUR TRAFFIC

	Key Intersections	(1) Existing Traffic Conditions	(2) Year 2006 Background Traffic	(3) Year 2006 w/Project Traffic	(4) Net Project Percent Increase
8.	Atlantic Avenue at Spring Street	3,964	4,880	5,011	12.5%
10.	Orange Avenue at Spring Street	3,164	3,885	4,348	39.1%
13.	I-405 SB ramps at Orange Avenue	1,998	2,280	2,486	42.2%
14.	32nd Street at Orange Avenue	1,967	2,291	2,417	28.0%

Notes:
Net Project Percent Increase (4) = [Column (3) – Column (2)] / [Column (3) – Column (1)].

12.0 CONGESTION MANAGEMENT PROGRAM COMPLIANCE ASSESSMENT

The Congestion Management Program (CMP) was created statewide as a result of Proposition 111 and has been implemented locally by the Los Angeles County Metropolitan Transportation Authority (LACMTA). The CMP for Los Angeles County requires that the traffic impact of individual development projects of potential regional significance be analyzed. A specific system of arterial roadways plus all freeways comprise the CMP system. A total of 164 intersections are identified for monitoring on the system in Los Angeles County. This section describes the analysis of project-related impacts on the CMP system. The analysis has been conducted according to the guidelines set forth in the Congestion Management Program for Los Angeles County.

12.1 Traffic Impact Review

Per CMP Transportation Impact Analysis (TIA) Guidelines, a traffic impact analysis must be conducted where:

- At CMP arterial monitoring intersections, including freeway on- or off-ramps, where the proposed project will add 50 or more trips during either AM or PM weekday peak hours.

- At CMP mainline freeway-monitoring locations, where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.

- For the purpose of a CMP TIA, a significant project impact occurs when the proposed project increases traffic demand on a CMP facility by two percent of capacity (change in V/C ≥ 0.02), causing or worsening LOS F (V/C > 1.00). Lead agencies may apply more stringent criteria if desired.

12.1.1 *Freeways*

The following CMP freeway monitoring locations in the project vicinity have been identified:

CMP Station	Location
1064	I-405 Freeway n/o Route 22
1065	I-405 Freeway at Sante Fe Ave
1066	I-405 Freeway s/o Rte 110 at Carson scales
1077	I-710 Freeway n/o Jct Rte 1 (PCH) at Willow Street
1078	I-710 Freeway n/o Jct Rte 405, s/o Del Amo

The proposed project will not add 150 or more trips (in either direction) during the weekday PM peak hours at CMP mainline freeway monitoring locations as stated in the CMP manual as the threshold for a traffic impact assessment. Therefore a CMP freeway traffic impact analysis is not required.

12.1.2 *Intersections*

The following CMP intersection monitoring locations in the project vicinity have been identified:

CMP Station	Location
35	Lakewood Boulevard at Willow Street
37	Pacific Coast Highway at Alamitos Boulevard
41	7th Street at Alamitos Boulevard
42	7th Street at Redondo Boulevard

As stated earlier, the CMP guidelines require that arterial monitoring intersection locations must be examined if the proposed project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic) at CMP monitoring intersections. Based on the proposed project's trip generation potential, trip distribution and trip assignment, the Long Beach Sorts Park will not add 50 or more trips at the identified CMP intersections during the weekday PM peak hour. Therefore a CMP intersection traffic impact analysis is not required.

Based on the result of this CMP evaluation, it is concluded that the proposed project will not have any significant traffic impact on the Congestion Management Program Highway System.

12.2 Transit Impact Review

As required by the 2002 Congestion Management Program for Los Angeles County, a review has been made of the CMP transit service. As previously discussed, a number of transit services exist in the project area, necessitating the following transit impact review.

The project trip generation, as shown in Table 5, was adjusted by values set forth in the CMP (i.e., person trips equal 1.4 times vehicle trips, and transit trips equal 3.5 percent of the total person trips; consistent with our prior assumptions, person trips equal 1.25 times vehicle trips for the sports park facility) to estimate the project-related transit trip generation. Pursuant to the CMP guidelines, the proposed project is forecasted to generate 30 transit trips (20 inbound and 10 outbound) during weekday PM peak hour and 35 transit trips (18 inbound and 17 outbound) during the weekend Midday peak hour. Over a 24-hour period the proposed project is forecasted to generate 174 daily weekday transit trips and 317 daily weekend transit trips.

It is anticipated that the existing transit service in the project area would be able to accommodate the project generated transit trips. As indicated earlier, the project site is currently serviced by Long Beach Transit (LBT) route 7, which travels north and south on Orange Avenue adjacent to the site, with a bus stop at the intersection of Orange Avenue and Willow Street, as well as LBT route 102, which, runs east and west on Willow Street just south of the proposed project.

Since the CMP does not provide guidance as to what constitutes a transit impact, it cannot be determined whether these person trips would have a significant impact. Nevertheless, given the number of transit trips generated by the project and the existing transit routes in the project vicinity, it can be concluded that the public transit system would not be significantly impacted by the proposed project.

However, it is recommended that the Long Beach Sports Park project work with Long Beach Transit to determine if it would be possible to provide new bus stops along Orange Avenue at 28th Street/Project Driveway #4 to serve future transit patrons destined for the sports park.

13.0 STATE OF CALIFORNIA (CALTRANS) METHODOLOGY

13.1 Highway Capacity Manual (HCM) Method Of Analysis (Signalized Intersections)

In conformance with the State of California Department of Transportation (Caltrans) requirements, existing and projected AM and PM peak hour operating conditions at the three state-controlled study intersections within the study area have been evaluated using the *Highway Capacity Manual 2000* method of analysis.

In Chapter 16 of the HCM, only the portion of total delay attributed to the control facility is quantified. This delay is called *control delay*. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle. The six qualitative categories of Level of Service that have been defined along with the corresponding HCM control delay value range for signalized intersections are shown in ***Table 13-1***; the level of service criteria for unsignalized intersection was previously presented in *Table 3-3*.

13.2 Future Traffic Conditions

Tables 13-2 and ***13-3*** summarize the weekday PM peak hour and weekend midday peak hour level of service results at the three state-controlled study intersections within the study area based on the HCM methodology. The first column (1) of HCM/LOS values in both tables presents a summary of Year 2002 existing traffic conditions. The second column (2) presents Year 2006 background traffic conditions based on existing intersection geometry, but without any project traffic.

The third column (3) presents future forecast traffic conditions with the addition project traffic. The fourth column (4) indicates the forecast operating conditions with planned and/or recommended intersection improvements.

Review of Column 3 of *Tables 13-2* and *13-3* indicates that the Long Beach Sports Park project will contribute to the significant traffic impact at one of the three State study intersections, I-405 SB Ramps at Orange Avenue.

To offset the significant traffic impact of the proposed project, as well as ambient growth and future background traffic, intersections improvements will be required at this intersection. Based on implementation of the previously detailed improvement at the I-405 SB Ramps/Orange Avenue intersection, the projected service level will be improved to an acceptable condition. The remaining two State study intersections are expected to operate at acceptable service levels with the addition of project traffic.

Appendix C presents the Year 2006 HCM/LOS calculations for the three State study intersections for the AM and PM peak hour periods.

TABLE 13-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS[42]

BASED ON THE HCM/LOS METHOD OF ANALYSIS

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	$\leq$ 10.0	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10.0 and $\leq$ 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 and $\leq$ 35.0	Average traffic delays. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and $\leq$ 55.0	Long traffic delays At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 and $\leq$ 80.0	Very long traffic delays This level is considered by many agencies (i.e. SANBAG) to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent occurrences.
F	$\geq$ 80.0	Severe congestion This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

[42] Source: *Highway Capacity Manual 2000,* Chapter 16 (Signalized Intersections).

TABLE 13-2

YEAR 2006 WEEKDAY PM PEAK COMMUTE HOUR

HCM/LOS SUMMARY FOR STATE FACILITIES

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay Increase**	**Y/N**	**Delay (sec/veh)**	**LOS**
13. I-405 SB Ramps at Orange Avenue	10.28 sec/veh	B	21.29 sec/veh	C	**36.36 sec/veh**	**E**	**15.07 sec/veh**	**Yes**	21.0 sec/veh	C[43]
▪ Minor Approach Delay/LOS	**100.6 sec/veh**	**F**	**246.5 sec/veh**	**F**	**480.2 sec/veh**	**F**	**233.7 sec/veh**	**Yes**	--	--
15. I-405 NB Ramps at 32nd Street	8.17 sec/veh	A	10.24 sec/veh	B	13.17 sec/veh	B	2.93 sec/veh	No	--	--
▪ Minor Approach Delay/LOS	10.28 sec/veh	B	21.29 sec/veh	C	21.8 sec/veh	C	4.4 sec/veh	No	--	--
16. Atlantic Avenue at I-405 SB Ramps	13.3 sec/veh	B	16.9 sec/veh	B	18.1 sec/veh	B	1.2 sec/veh	No	--	--

[43] Represents anticipated LOS with installation of a traffic signal, which is warranted under existing traffic conditions.

TABLE 13-3

YEAR 2006 WEEKEND (SATURDAY) MIDDAY PEAK COMMUTE HOUR

HCM/LOS SUMMARY FOR STATE FACILITIES

Key Intersections	(1) Year 2002 Existing Traffic Conditions		(2) Year 2006 Background Traffic Conditions		(3) Year 2006 Traffic Conditions with Project Traffic		(4) Project Impact/ Significance		(5) Future Conditions With Mitigation	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay Increase**	**Y/N**	**Delay (sec/veh)**	**LOS**
13. I-405 SB Ramps at Orange Avenue	3.65 sec/veh	A	4.60 sec/veh	A	7.62 sec/veh	A	3.02 sec/veh	No	19.0 sec/veh	B[44]
▪ Minor Approach Delay/LOS	23.4 sec/veh	C	**35.9 sec/veh**	**E**	**79.9 sec/veh**	**F**	**40.0 sec/veh**	**Yes**	--	--
15. I-405 NB Ramps at 32nd Street	5.34 sec/veh	A	6.75 sec/veh	A	7.71 sec/veh	A	0.96 sec/veh	No	--	--
▪ Minor Approach Delay/LOS	10.8 sec/veh	B	12.3 sec/veh	B	13.8 sec/veh	B	1.5 sec/veh	No	--	--
16. Atlantic Avenue at I-405 SB Ramps	12.0 sec/veh	B	13.5 sec/veh	B	14.0 sec/veh	B	0.5 sec/veh	No	--	--

[44] Represents anticipated LOS with installation of a traffic signal, which is warranted under existing traffic conditions.

14.0 PARKING ANALYSIS

14.1 City Code Parking Requirements

To determine the number of parking spaces required to support the proposed Long Beach Sports Park project, parking demand was calculated using the City of Long Beach zoning code (recreation section, office section and retail section).

The City of Long Beach zoning code specifies a parking ratio of 1 space per tee and 3 spaces per hole for golf range and golf course facilities, 4 spaces per 1,000 square-feet (SF) for retail uses, 1 space per 1,000 SF of gross land area (GLA) for open recreation facilities, 5 spaces per court for volleyball/arena soccer court, 1 space per batting cage. For office uses, the City parking code is 4 spaces per 1,000 gross floor area (GFA) of office/administrative uses up to 20,000 GFA and 2 spaces per 1,000 GFA of office/administrative uses for GFA more than 20,000.

Table 14-1 summarizes the parking requirements for the proposed Long Beach Sports Park project using the above code parking ratios. As shown in the upper portion of *Table 14-1*, application of City parking ratios to the youth golf center uses and the sports park uses results in a total parking requirement of 899 parking spaces. With a proposed parking supply of 746 spaces, the Long Beach Sports Park will have a theoretical parking deficiency of 153 parking spaces.

Review of the lower portion of *Table 14-1* shows that application of City parking ratios to the commercial parcel (assumed to be a 30,000 SF office building) results in a total parking requirement of 100 parking spaces.

TABLE 14-1

CITY CODE PARKING REQUIREMENT[45]

Project Description/Land Use	Size[46]	City of Long Beach Code Parking Ratio	Spaces Required
Youth Golf Center			
Golf Range	8 Tees	1 Space per Tee	8
Golf Course (3 Holes)	3 Holes	3 Spaces per Hole	9
Club House	15,000 SF	4 Spaces per 1,000 SF	60
		Subtotal	*77*
Sports Park			
Six Full Sized Softball Diamonds	473,509 SF	1 Space per 1,000 SF per GLA	474
Four Full Sized Soccer Fields	277,200 SF	1 Space per 1,000 SF per GLA	277
Four Sand Volleyball Courts	4 Courts	5 Spaces per Court	20
Two Indoor Arena Soccer Courts	2 Courts	5 Spaces per Court	10
Softball/Batting Cages	9 Cages	1 Space per Cage	9
Skate Park	23,000 SF	1 Space per 1,000 SF per GLA	23
Three Concession/Service Buildings[47]	16,600 SF	10 Spaces per 1,000 SF	----
Two Children's Play Areas[47]	---- ----	----	----
Maintenance Building[47]	2,000 SF	----	----
Administration Building	2,300 SF	4 Spaces per 1,000 SF up to 20,000 SF and 2 Spaces per 1,000 SF for more than 20,000	9
		Subtotal	*822*
		Total Parking Requirement (Youth Golf Center and Sports Park):	**899**
		Proposed Parking Supply:	**746**
		Parking Surplus/Deficiency (+/-):	**-153**
Commercial Use			
Office Building	30,000 SF	4 Spaces per 1,000 SF up to 20,000 SF and 2 Spaces per 1,000 SF for more than 20,000	100
		Subtotal	*100*
		Total Parking Requirement (Commercial Use):	**100**

[45] Source: City of Long Beach Title 21 Zoning Regulations: Chapter 21.41 - Off-street parking and loading requirements. Note: GLA – Gross Land Area, SF – Square Footage.

[46] Source: RJM Design Group.

[47] Parking requirement for ancillary uses (concession buildings, tot lots, maintenance building, etc.) included in parking for primary recreation components of the project.

14.2 Operational Parking Analysis

Analyzing the parking supply-demand relationships of the proposed Long Beach Sports Park sports facilities involves determining the parking needs in relationship to the future parking area supply. The parking requirements for the sports complex vary, depending on the schedule of activities, number of participants and anticipated number of spectators. Similar to the trip generation estimates prepared for the project, the peak parking demand forecast for the proposed Long Beach Sport Park sports facilities was also estimated based on the expected attendance figures, and daily league and weekend tournament schedules. ***Appendix F*** contains the detailed parking generation worksheets prepared for the Long Beach Sports Park for peak weekday and weekend day (Saturday) operations.

14.2.1 *Weekday Parking Requirements*

During peak weekday operations, for which 770 players and spectators will be on-site during the peak hour, a total of 616 spaces will be required. This parking forecast is based on an average vehicle ridership of 1.25 persons per vehicle. This is to reflect that during the week, participants come from many different places (work, school, home, etc.) and thus do not rideshare as much.

When combined with a code-parking requirement of 77 spaces for the Youth Golf Facility, 23 spaces for the Skate Park, and 9 spaces for the batting cages, the Long Beach Sports Park is forecast to require a total of 725 parking spaces during weekdays (616 + 77 + 23 + 9 = 725 spaces). With a proposed parking supply of 746 spaces, a parking surplus of 21spaces can be expected during peak weekday parking conditions.

14.2.2 *Weekend Parking Requirements*

A total of 625 spaces will be required to support the peak parking demand of the Long Beach Sports Park when sporting tournaments are scheduled on weekends (Saturdays). The weekend parking forecast is based on an average vehicle ridership of 1.5 persons per vehicle. This higher average vehicle ridership reflects that many trip origins to the site will come from home, with families, couples, and friends carpooling on the weekend. During this peak, a total of 937 players and spectators will be on-site.

When combined with a code-parking requirement of 77 spaces for the Youth Golf Facility, 23 spaces for the Skate Park, and 9 spaces for the batting cages, the Long Beach Sports Park is forecast to require a total of 734 parking spaces during weekends (625 + 77 + 23 + 9 = 734 spaces). When compared against the 746-space supply, the 734-space demand estimate corresponds to a parking surplus of 12 spaces.

Please note that the parking analysis assumes all sports activities are running concurrently throughout the year. Based on information provided by City staff, the sporting events will be staggered throughout the 52 weeks of operation, with minimal over lap.

15.0 SUMMARY OF FINDINGS AND CONCLUSIONS

- ***Project Description*** – The Long Beach Sports Park project site is a rectangular-shaped 55.5±-acre parcel of land in the City of Long Beach that is located south of Spring Street, bounded by California Avenue on the west, Orange Avenue on the east, and the Sunnyside/Long Beach Cemetery on the south. The Sports Park, in general, will have six (6) lighted, full sized softball/baseball diamonds, four (4) lighted, full size soccer fields, four (4) lighted sand volleyball courts, two (2) large indoor arena soccer courts, nine (9) batting cages and a 23,000 SF skate park. Also proposed is a site for a future 30,000 SF commercial/office center and a youth golf center with 15,000 SF of floor area, an eight (8) tee driving range, three (3) pitch-n-putt practice holes, and a putting green.

- ***Study Scope*** – The following eighteen intersections were selected for detailed peak hour level of service analyses under Existing (Year 2002) Traffic Conditions, Year 2006 Background Traffic Conditions and Year 2006 Future Background plus the Sports Park Project Traffic Conditions:

  1) Atlantic Avenue at Willow Street (Long Beach)
  2) California Avenue at Willow Street (Signal Hill)
  3) Orange Avenue at Willow Street (Signal Hill)
  4) Walnut Avenue at Willow Street (Signal Hill)
  5) Cherry Avenue at Willow Street (Signal Hill)
  6) Orange Ave at 28th Street (Long Beach/Signal Hill)
  7) Orange Ave at 29th Street (Long Beach/Signal Hill)
  8) Atlantic Avenue at Spring Street (Long Beach)
  9) California Ave at Spring St (Long Beach/Signal Hill)
  10) Orange Ave at Spring St (Long Beach/Signal Hill)
  11) Walnut Ave at Spring St (Long Beach/Signal Hill)
  12) Cherry Ave at Spring St (Long Beach/Signal Hill)
  13) I-405 SB Ramps at Orange Avenue (Long Beach)
  14) 32nd Street at Orange Avenue (Signal Hill)
  15) I-405 NB Ramps at 32nd Street (Signal Hill)
  16) Atlantic Avenue at I-405 SB Ramps (Long Beach)
  17) California Avenue at Wardlow Road (Long Beach)
  18) Orange Avenue at Wardlow Road (Long Beach)

  The analysis is focused on assessing the potential traffic impacts during the weekday PM peak hour and weekend day (Saturday) Midday peak hour.

- ***Existing Traffic Conditions*** – Four of the eighteen key study intersections currently operate at an unacceptable LOS during the weekday PM peak commute hour. The signalized intersections of Atlantic Avenue at Willow Street, Cherry Avenue at Willow Street, and Cherry Avenue at Spring Street currently operate at unacceptable LOS E during the PM peak commute hour (adverse ICU/LOS values are shown in bold). Although the unsignalized intersection of the I-405 SB Ramps at Orange Avenue, overall operates at LOS B during the PM peak hour, the minor street (I-405 SB Off-Ramp) approach currently operates at LOS F during the PM peak hour. The remaining fourteen key study intersections currently operate at LOS D or better during the PM peak commute hour.

  All eighteen key study intersections currently operate at LOS D or better during the weekend day (Saturday), Midday peak hour.

- ***Project Trip Generation*** – On a "typical" weekday, the sports complex can be expected to generate 3,970 daily trips with 687 trips (459 entering and 228 exiting) produced during the PM peak commute hour. During a "typical" weekend day (Saturday) when tournaments are

scheduled, the Long Beach Sports Park is expected to generate 7,240 daily trips, with 798 trips (421 entering and 377 exiting) generated during the mid-day peak hour.

- ***Year 2006 Future Background Traffic Conditions*** – An analysis of future (Year 2006) background traffic conditions indicates that the addition of ambient traffic growth and cumulative project traffic will adversely impact nine of the eighteen key study intersections during the weekday PM peak commute hour. The intersections of Atlantic Avenue at Willow Street, Cherry Avenue at Willow Street, Atlantic Avenue at Spring Street, Cherry Avenue at Spring Street, as well as the I-405 SB off-ramp approach at Orange Avenue are forecast to deteriorate one service level and operate at LOS F during the weekday PM peak commute hour. The intersections of Orange Avenue at Willow Street, Orange Avenue at Spring Street, 32nd Street at Orange Avenue and California Avenue at Wardlow Road are forecast to operate at LOS E in the Year 2006 background condition during the PM peak hour with the addition of ambient traffic and related projects traffic. The remaining nine key study intersections are forecast to operate at LOS D or better during the weekday PM peak hour.

  An analysis of future (Year 2006) background traffic conditions indicates that the addition of ambient traffic growth and cumulative project traffic will adversely impact one of the eighteen key study intersections during the weekend day Midday peak hour. Although the unsignalized intersection of the I-405 SB Ramps at Orange Avenue overall operates at LOS A during the weekend day Midday peak hour, the minor street (I-405 SB Off-Ramp) approach is forecast to operate at LOS E with the addition of ambient traffic and related projects traffic. The remaining seventeen key study intersections are forecast to operate at LOS D or better during the weekend day Midday peak hour.

- ***Year 2006 with Project Traffic*** – The results of the weekday PM peak hour traffic analysis indicates that the proposed Long Beach Sports Park will have an impact at the following five study intersections:

Key Intersection	City/Jurisdiction	PM Peak Hour LOS
6. Orange Avenue at 28th Street	Long Beach/Signal Hill	61.8 s/v / F
8. Atlantic Avenue at Spring Street	Long Beach	1.080 / F
10. Orange Avenue at Spring Street	Signal Hill	1.064 / F
13. I-405 SB Ramps at Orange Avenue	Long Beach/Caltrans	480.2 s/v / F
14. 32nd Street at Orange Avenue	Signal Hill	0.981 / E

The results of the weekend day Midday peak hour traffic analysis indicates that the proposed Long Beach Sports Park project will have an impact at two of the eighteen key study intersections. Although, overall the unsignalized intersections of Orange Avenue/28th Street and the I-405 SB Ramps/Orange Avenue are forecast to operate at LOS A during the weekend day Midday peak hour, the addition of project traffic will cause the minor street approach to operate at LOS E and F, respectively. The remaining sixteen key study intersections are projected to continue to operate with the inclusion of project traffic, at an acceptable service level during the weekend day, Midday peak hour.

- ***Recommended Mitigation Measures:*** The significant traffic impacts of the Long Beach Sports Park can be mitigated through implementation of the following recommended mitigation measures. The Long Beach Sports Park project can be expected to pay a "fair-share" of the improvement costs associated with the construction of these improvements.

  - **Atlantic Avenue at Spring Street:** Widen Atlantic Avenue to provide a separate northbound right-turn lane to proceed eastbound on Spring Street. Alternatively, in the event that the right-of-way cannot be acquired, it is recommended that that the traffic signal be modified to provide protected/permissive southbound left-turn phasing on Atlantic Avenue. Projected Year 2006 PM peak hour traffic volumes warrant the installation of separate left-turn phasing on Atlantic Avenue. The project's percentage fair share responsibility to implement this improvement totals 12.5%.

  - **Orange Avenue at Spring Street:** Convert the existing southbound right-turn lane to provide a second through lane on Orange Avenue, and restripe Orange Avenue south of Spring Street to provide two southbound departure lanes. Provide a separate eastbound right-turn lane on Spring Street to proceed southbound on Orange Avenue. The project's percentage fair share responsibility to implement this improvement totals 39.1%.

  - **I-405 SB Ramps at Orange Avenue:** Install a three-phase traffic signal. The project's percentage fair share responsibility to implement this improvement totals 42.2%.

  - **32nd Street at Orange Avenue:** No capacity enhancing improvements/mitigation feasible. Any additional turn lanes will require widening and additional right-of-way. However, to improve operations at this location, it is recommended that the traffic signal be upgraded from a pretimed (fixed time) signal to an actuated signal. The project's percentage fair share responsibility to implement this improvement totals 28%.

- ***Recommended Project Circulation Improvements:*** In conjunction with the Long Beach Sports Park development, the following roadway improvements bordering the project site will be completed:

  - **Spring Street:** The improvement of Spring Street, bordering the project site, will be completed as part of the Spring Street Widening Project. To ensure adequate access to the project site, the channelization plan of Spring Street should be designed to accommodate a full access project driveway for the proposed Commercial Center parcel.

  - **Orange Avenue:** In conjunction with the development of the Long Beach Sports Park, widen and improve Orange Avenue bordering the project site to City of Signal Hill Secondary Highway street standards. Orange Avenue, south of Spring Street is designated as a Secondary Highway in the City of Signal Hill Circulation Element with an 80-foot right-of way section, 64-foot paved width, and 8-foot sidewalk areas.

- **California Avenue:** In conjunction with the development of the Long Beach Sports Park, widen and improve California Avenue along project frontage to City of Signal Hill Secondary Modified Highway street standards. California Avenue, south of Spring Street is designated as a Secondary Modified Highway in the City of Signal Hill Circulation Element with a 70-foot right-of way section and 60-foot paved width, and 5-foot sidewalk areas.

- **Orange Avenue at 28th Street/Project Driveway #4:** Install a five-phase traffic signal with protected northbound and southbound left-turn lane phasing on Orange Avenue.

- ***Site Access*** – Based on our review of the project site plan and our operations analysis at the project driveways, on-site circulation and access to the proposed Long Beach Sports Park project is adequate. It is recommended that a detailed sight distance analysis be prepared for the proposed project driveways along Orange Avenue as part of the project's grading, landscape, and street improvement plans. A vertical sight distance analysis for the project driveways was not performed since the vertical profiles of Orange Avenue adjacent to the project site were not available. The sight distance analysis should be prepared according to the CALTRANS *Highway Design Manual* standards and guidelines, and indicate limited use areas (i.e., low-height landscaping), and on-street parking restrictions (i.e., red curb), if necessary.

- ***Congestion Management Program System Analysis –*** No significant transportation impacts are expected to occur on the Los Angeles County Congestion Management Program roadway network or transit system due to the development and full occupancy of the proposed Long Beach Sports Park. However, it is recommended that the Long Beach Sports Park project work with Long Beach Transit to determine if it would be possible to provide new bus stops for LBT route 7 along Orange Avenue at 28th Street/Project Driveway #3 to serve future transit patrons destined for the sports park.

- ***City Code Parking Requirements*** – The required number of parking spaces for the proposed Long Beach Sports Park project, based on City parking code, totals 899 spaces. With a parking supply of 746 parking spaces, the proposed project will have a theoretical parking deficiency of 153 spaces when compared to City parking code requirements.

- ***Operational Parking Analysis*** – Based on anticipated operations/schedules, the Long Beach Sports Park is forecast to require a total of 734 parking spaces to accommodate its peak parking demand. With a proposed parking supply of 746 spaces, the 734-space demand estimate corresponds to a parking surplus of 12 spaces, or a parking contingency of 2%.

APPENDIX A

EXISTING TRAFFIC COUNTS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

24-HOUR TRAFFIC COUNTS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

WEEKDAY PM PEAK PERIOD TRAFFIC COUNTS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

WEEKEND (SATURDAY) MIDDAY PEAK PERIOD TRAFFIC COUNTS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

APPENDIX B

SIGNAL WARRANT ANALYSIS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

APPENDIX C

LEVEL OF SERVICE CALCULATION Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

WEEKDAY PM PEAK HOUR LOS CALCULATION Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

WEEKEND (SATURDAY) MIDDAY PEAK HOUR LOS CALCULATION Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

PROJECT DRIVEWAY LOS CALCULATION Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

ALTERNATIVE ACCESS LOS CALCULATION Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

HCM/LOS Operation Analysis Worksheets

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

APPENDIX D

LONG BEACH SPORTS PARK
TRIP GENERATION ESTIMATES

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

Weekend Tournament Play

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

APPENDIX E

CONCEPTUAL IMPROVEMENT PLANS

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

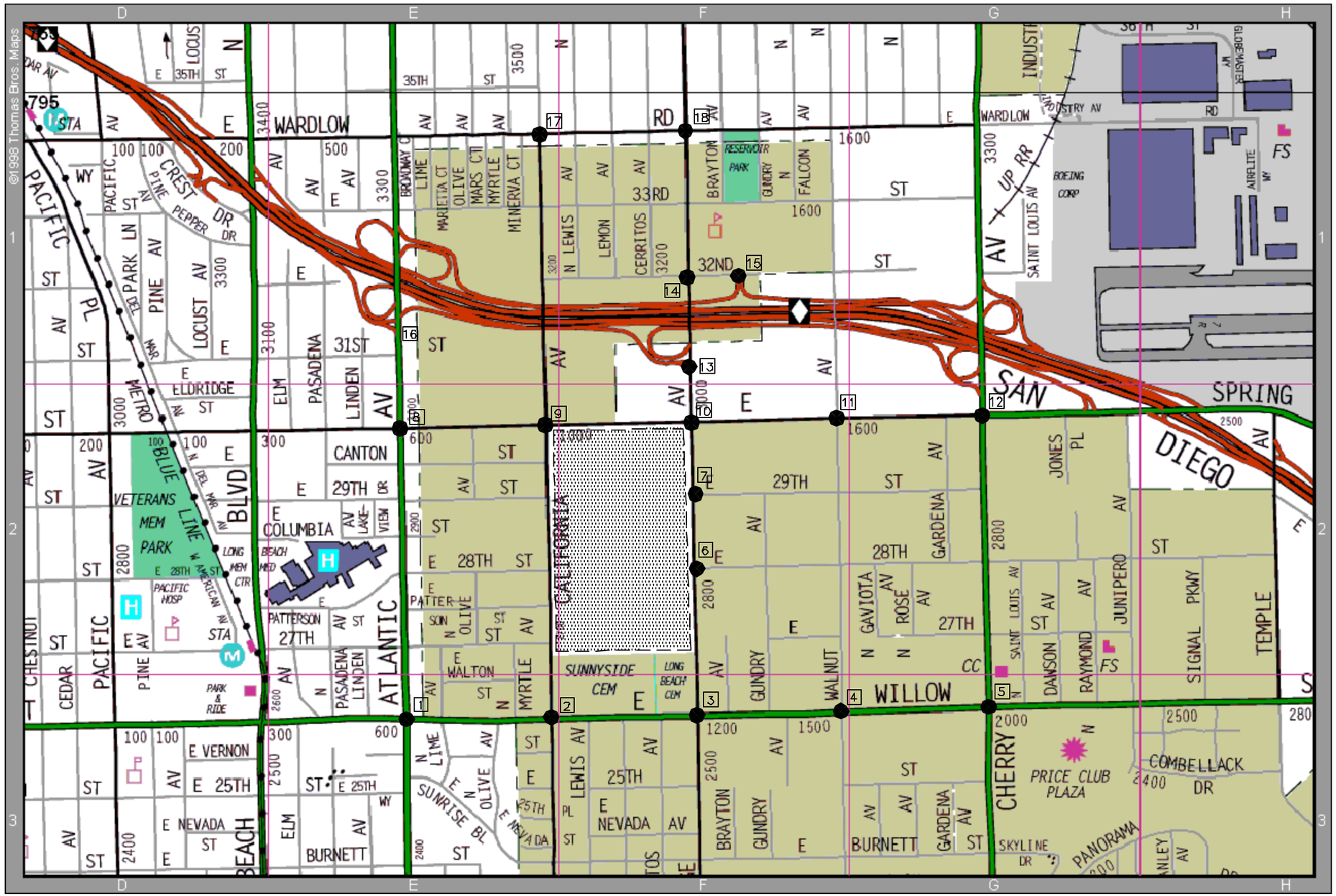
APPENDIX F

PARKING DEMAND ESTIMATES

AVAILABLE FOR PUBLIC REVIEW AT THE CITY OF LONG BEACH COMMUNITY DEVELOPMENT DEPARTMENT

APPENDIX G

FIGURES



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NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

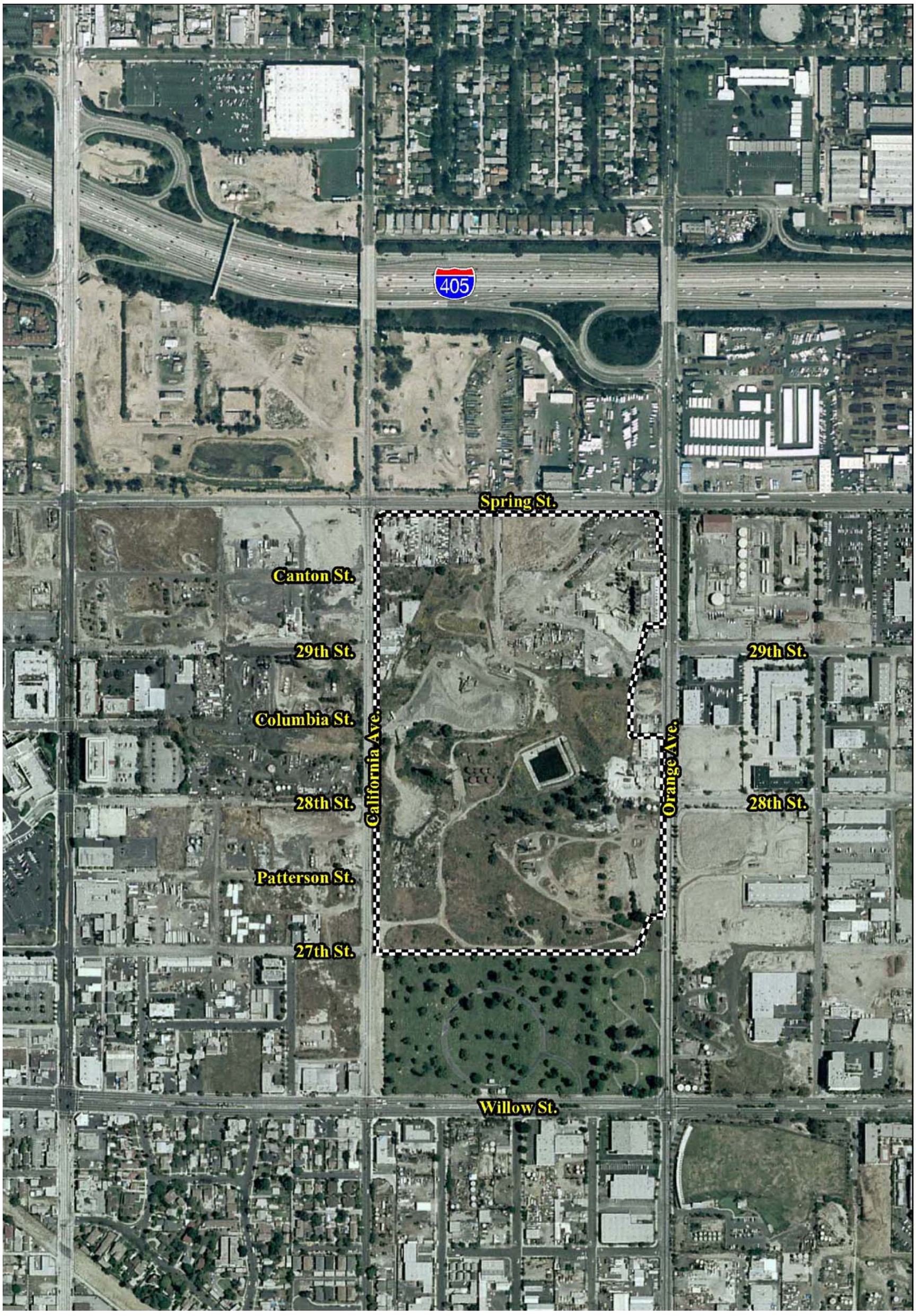
▨ = PROJECT SITE

[1] = STUDY INTERSECTION

FIGURE 1-1

VICINITY MAP

LONG BEACH SPORTS PARK, LONG BEACH



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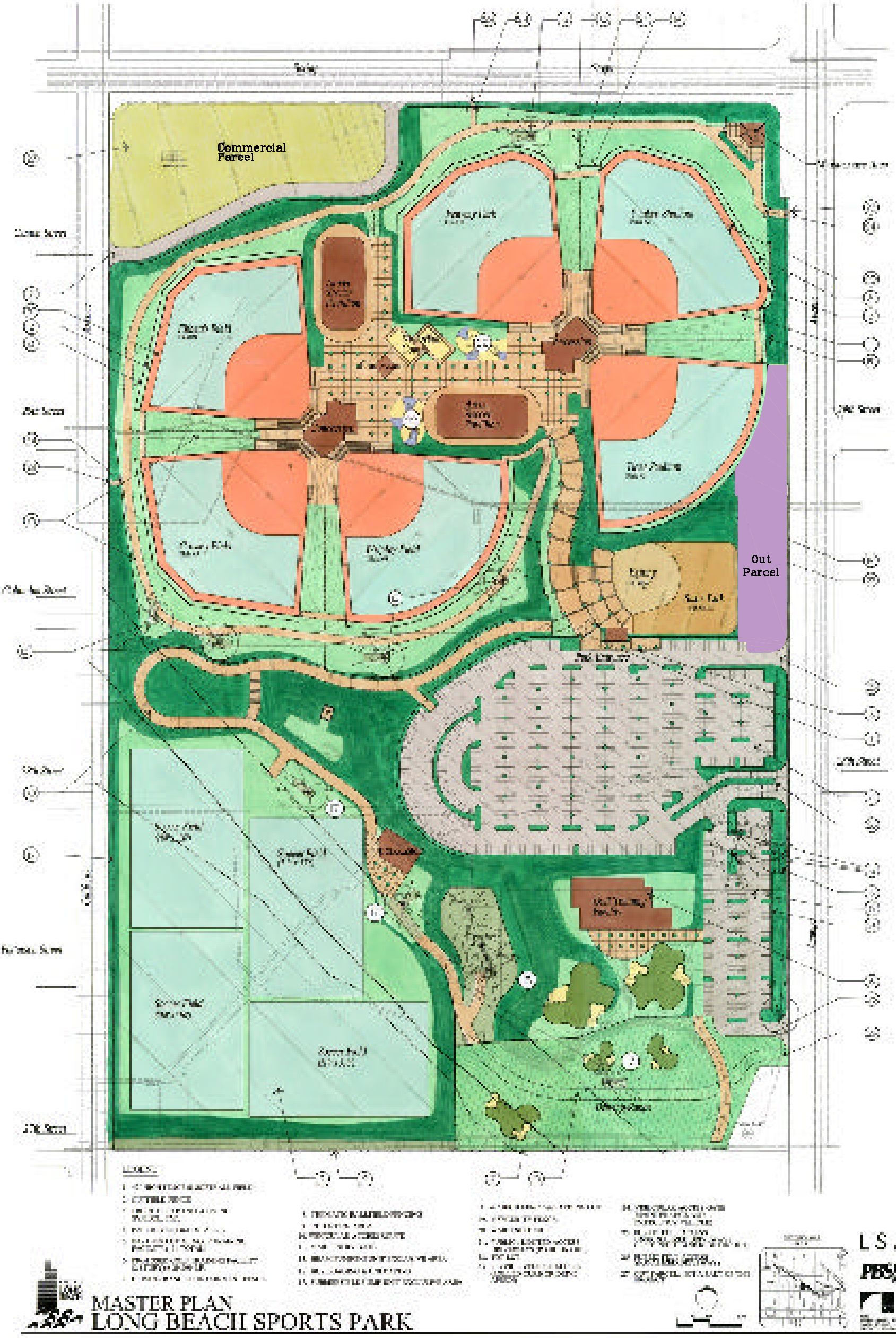
SOURCE: LSA

LINSCOTT LAW & GREENSPAN ENGINEERS

EXHIBIT 2-1

EXISTING AERIAL

LONG BEACH SPORTS PARK, LONG BEACH



SOURCE: RJM DESIGN GROUP

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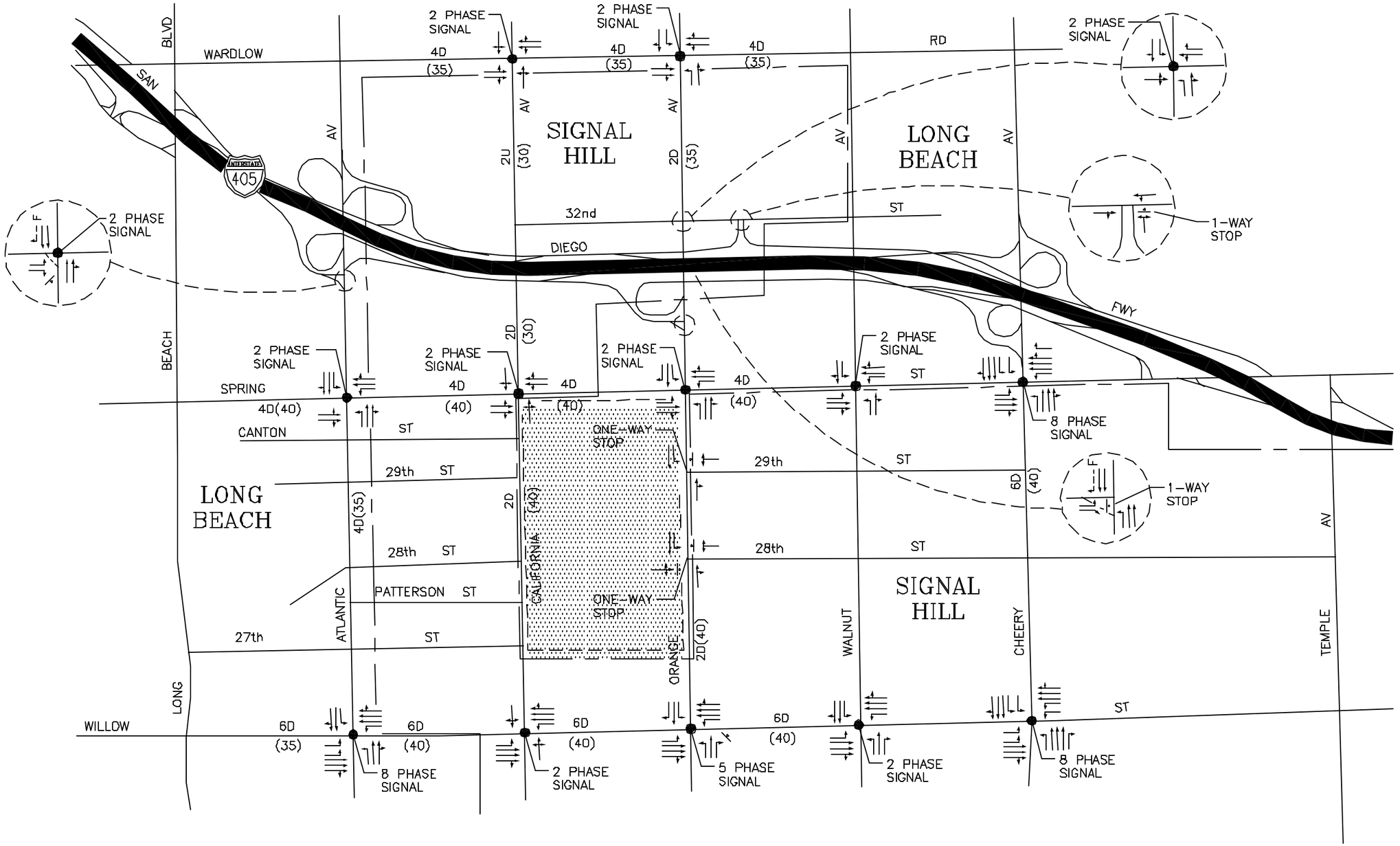
LINSCOTT LAW & GREENSPAN ENGINEERS

FIGURE 2-2

CONCEPTUAL SPORTS PARK SITE PLAN
LONG BEACH SPORTS PARK, LONG BEACH



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LINSCOTT LAW & GREENSPAN ENGINEERS

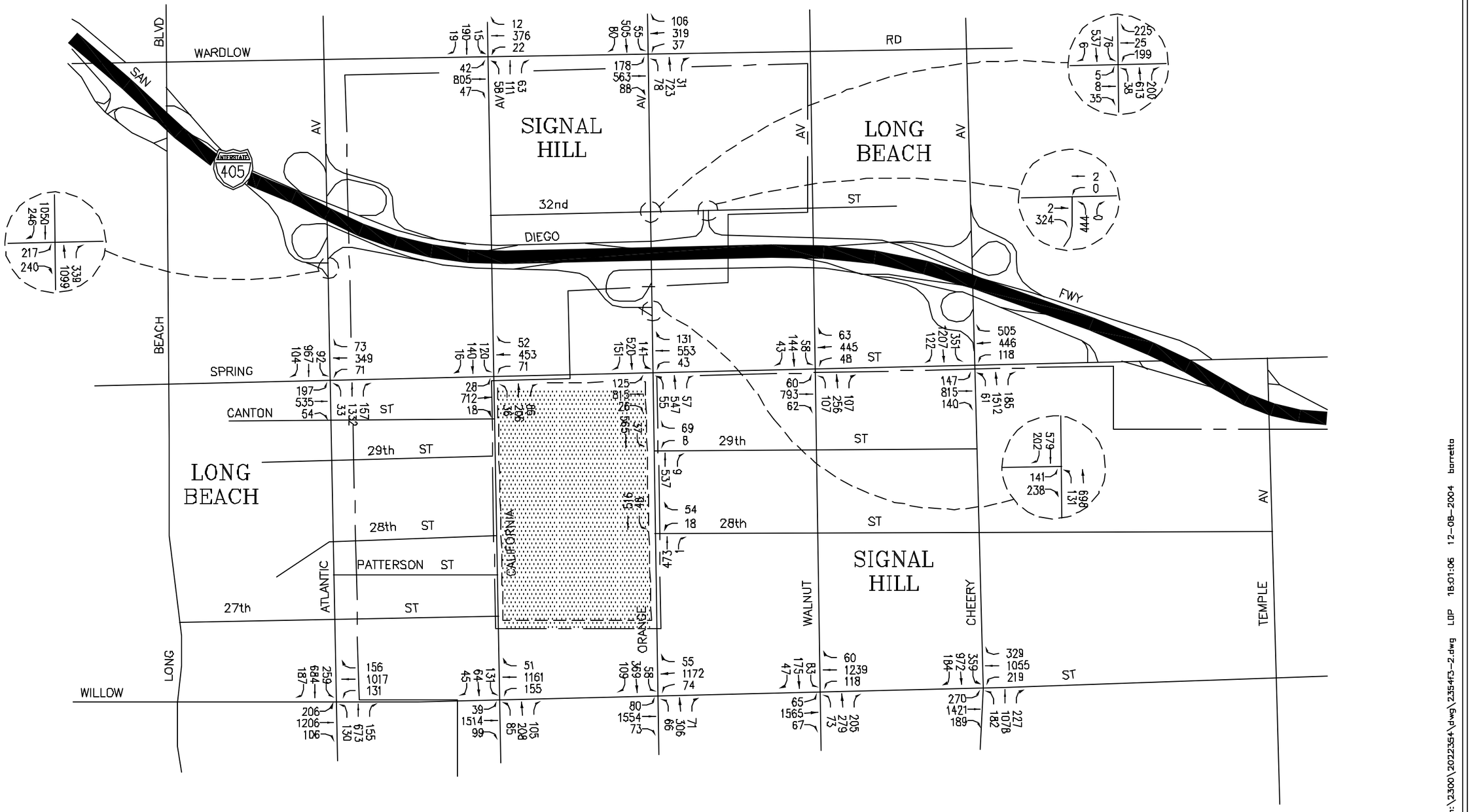
KEY

- ← = APPROACH LANE ASSIGNMENT
- F = FREE RIGHT-TURN LANE
- ● = TRAFFIC SIGNAL, ⊥ = STOP SIGN
- (XX) = POSTED SPEED LIMIT
- 2 = NUMBER OF TRAVEL LANES
- D = DIVIDED U = UNDIVIDED

FIGURE 3-1

EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

LONG BEACH SPORTS PARK, LONG BEACH



KEY

PROJECT SITE

NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

FIGURE 3–2

EXISTING WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH

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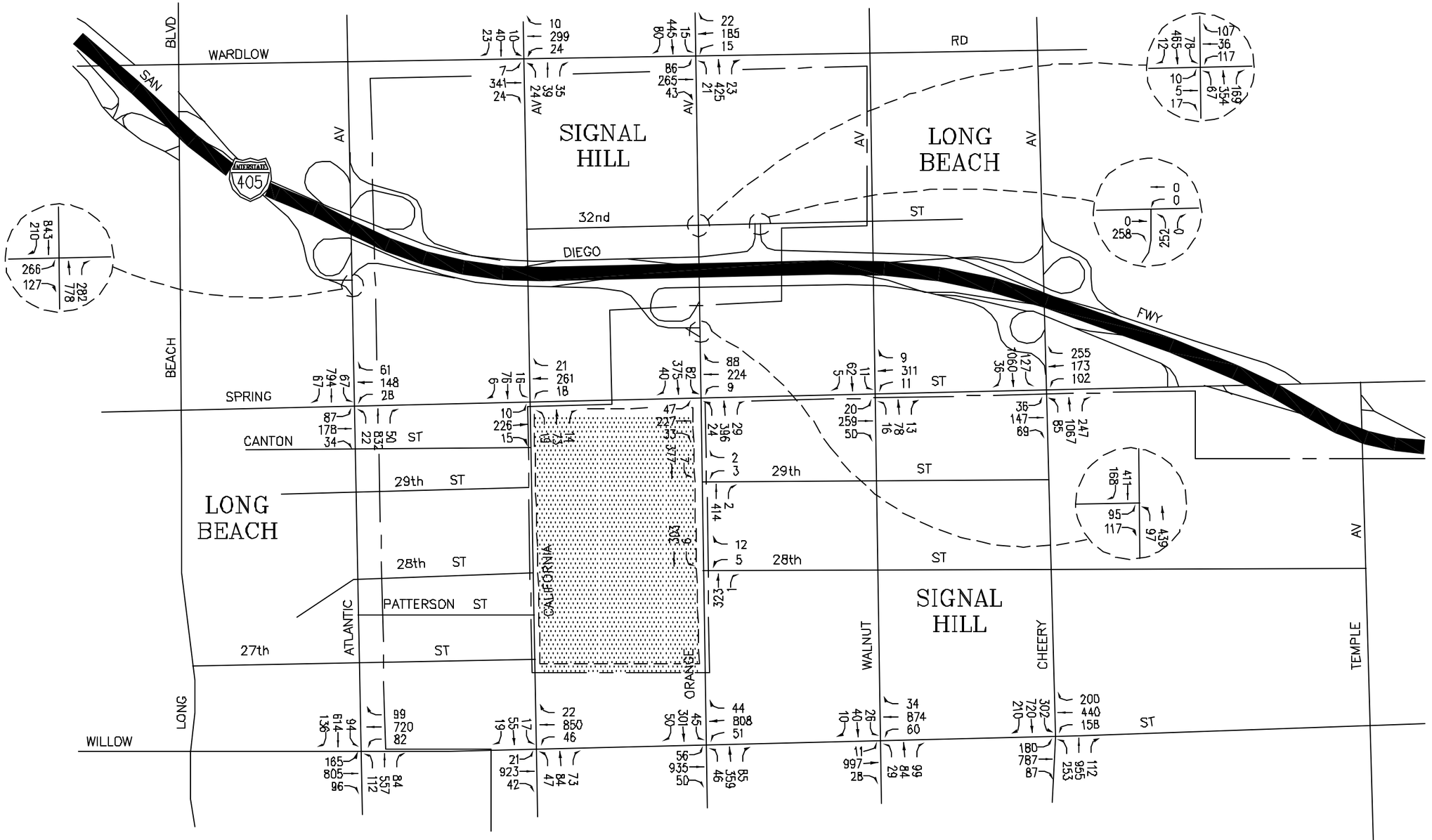

KEY

PROJECT SITE

NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

FIGURE 3–3

EXISTING WEEKEND DAY NOON PEAK HOUR TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH

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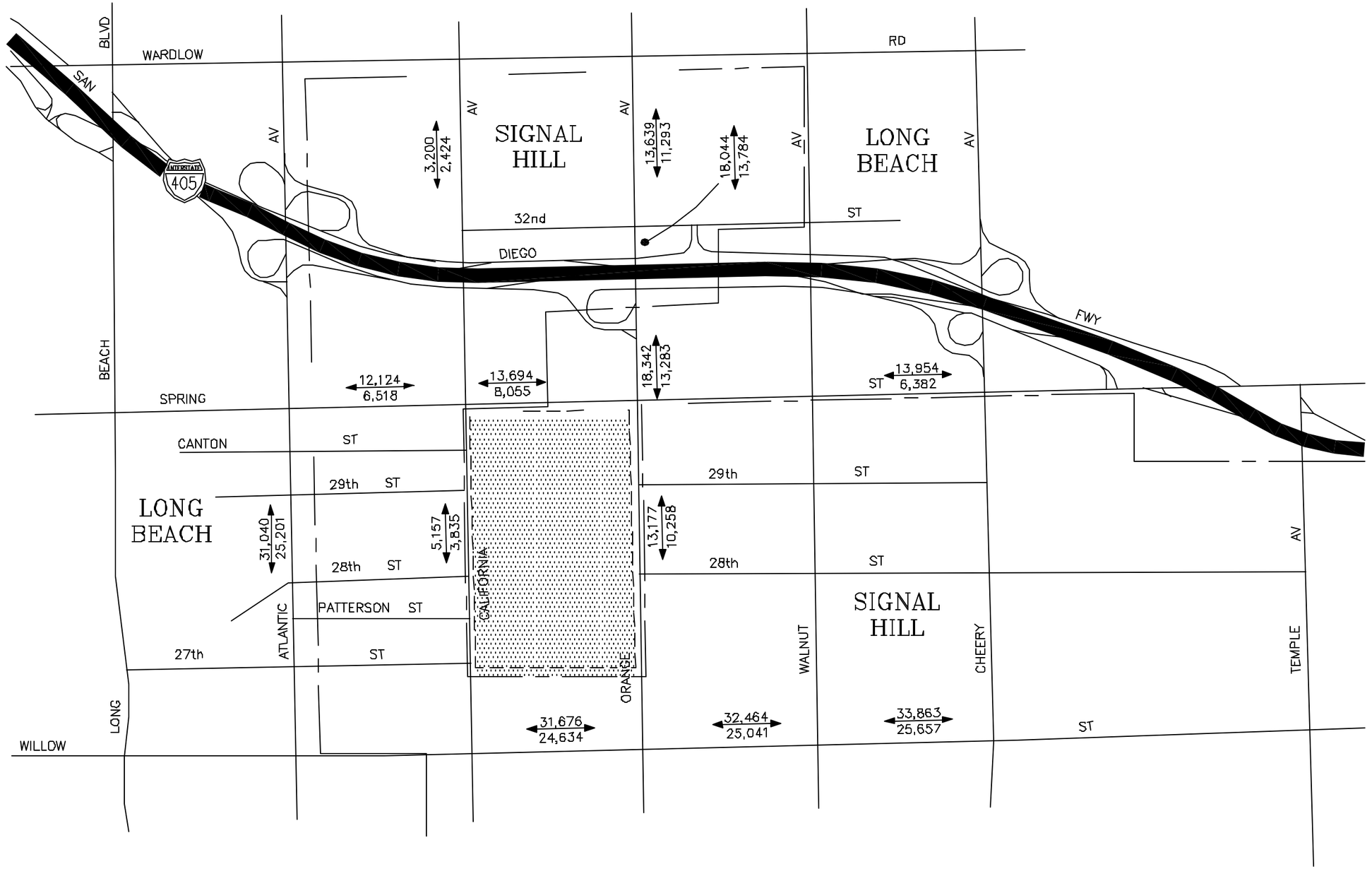


NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

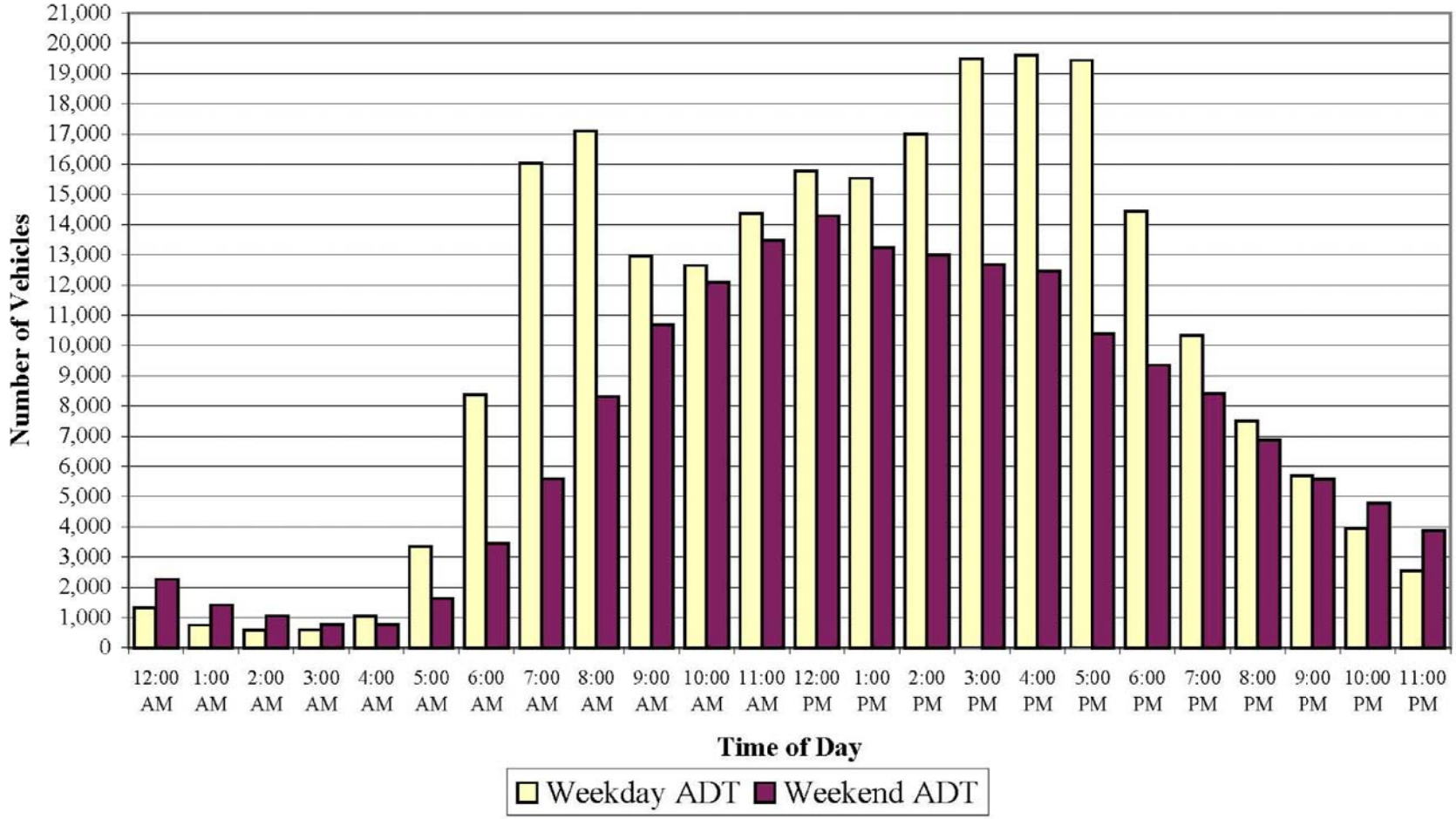
X,XXX / X,XXX = THURSDAY DAILY TRAFFIC VOLUMES / SATURDAY DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 3-4

EXISTING WEEKDAY AND WEEKEND DAY DAILY TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH



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N NO SCALE

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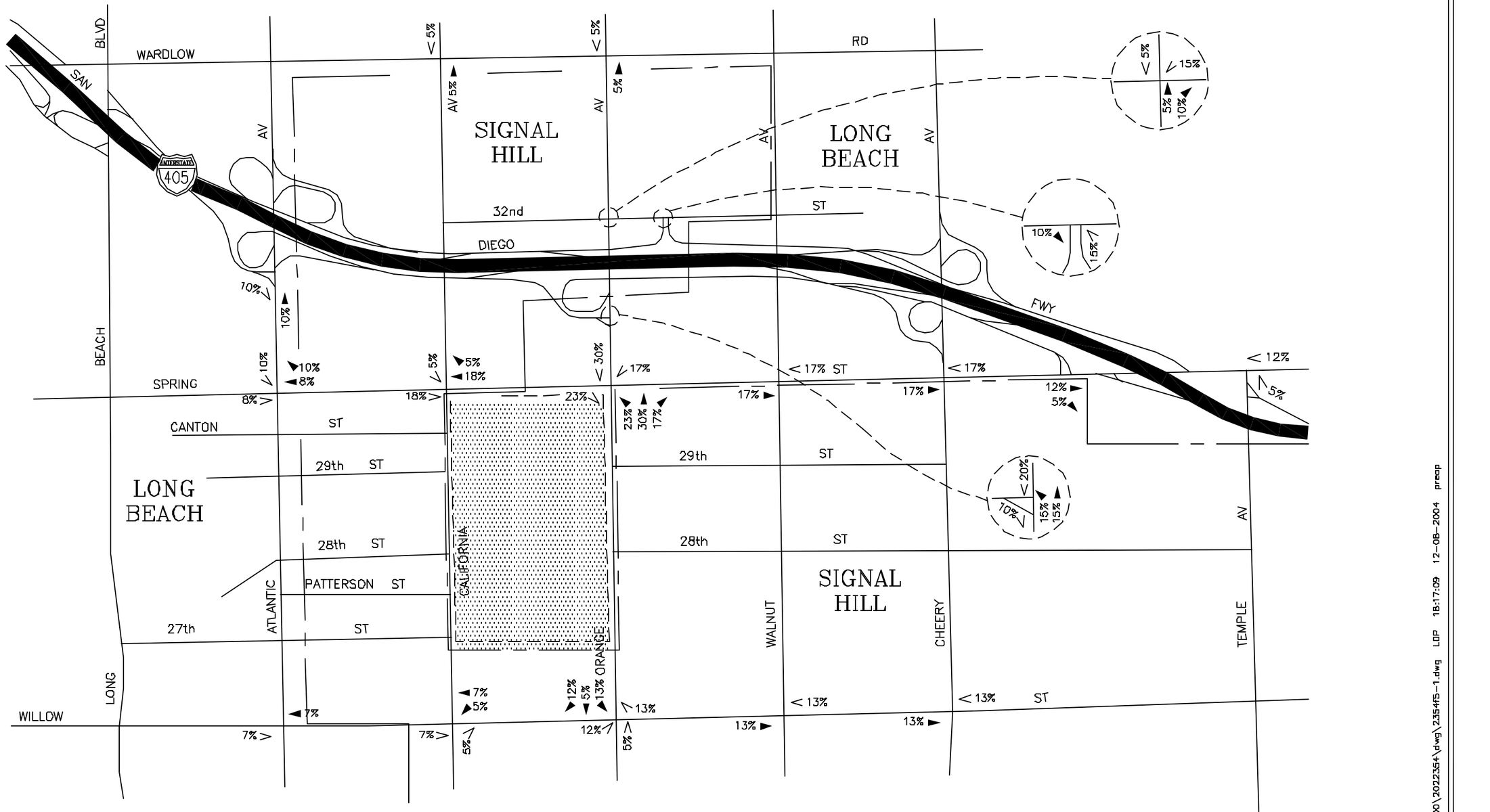
FIGURE 3-5

EXISTING WEEKDAY VS WEEKEND DAILY TRAFFIC VOLUMES COMPARISON

LONG BEACH SPORTS PARK, LONG BEACH



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N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

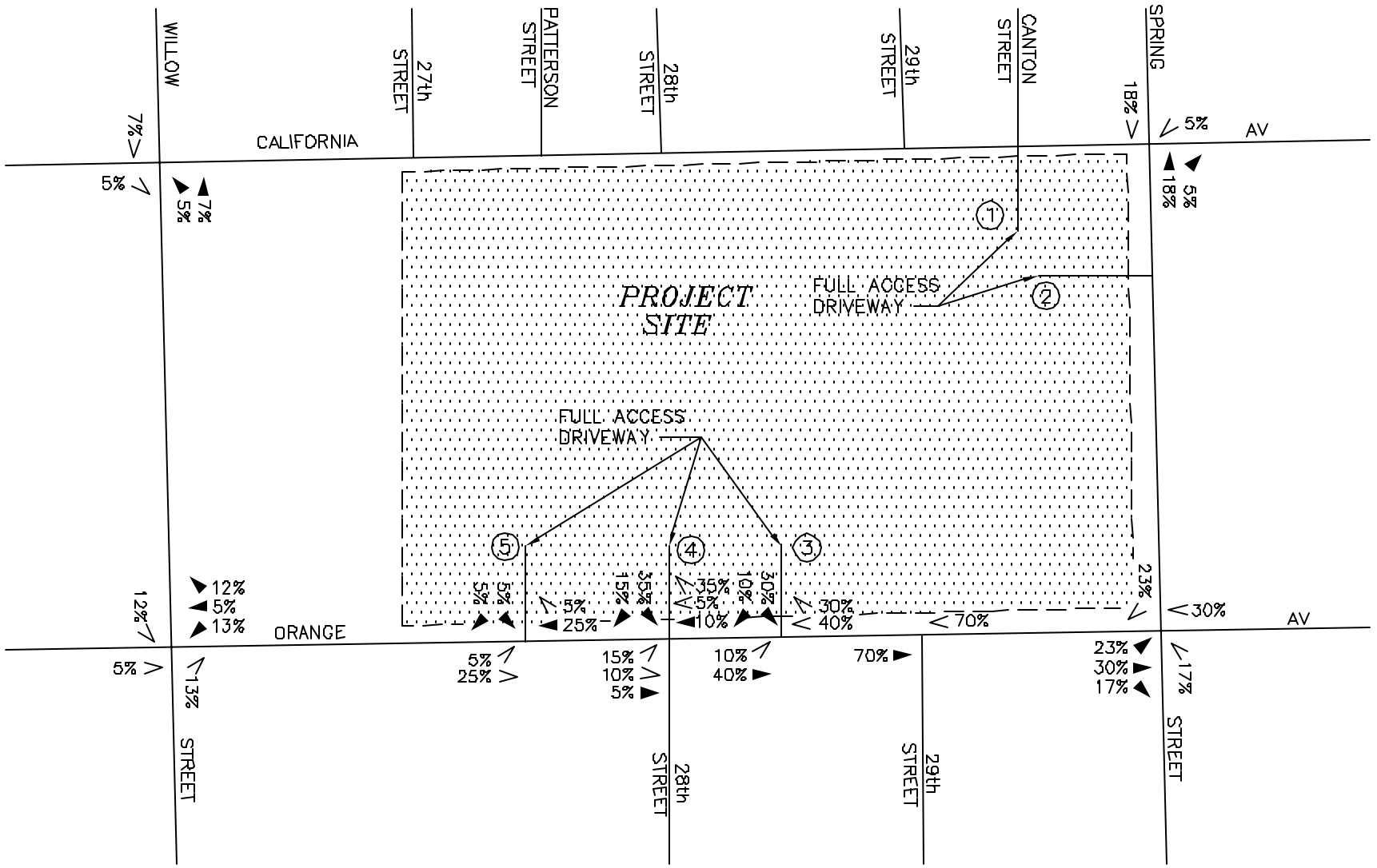
< XX% = INBOUND PERCENTAGE

◄ XX% = OUTBOUND PERCENTAGE

▨ = PROJECT SITE

FIGURE 5-1

PROJECT TRAFFIC DISTRIBUTION PATTERN
SPORTS PARK AND YOUTH GOLF/PRACTICE FACILITY
LONG BEACH SPORTS PARK, LONG BEACH



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NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

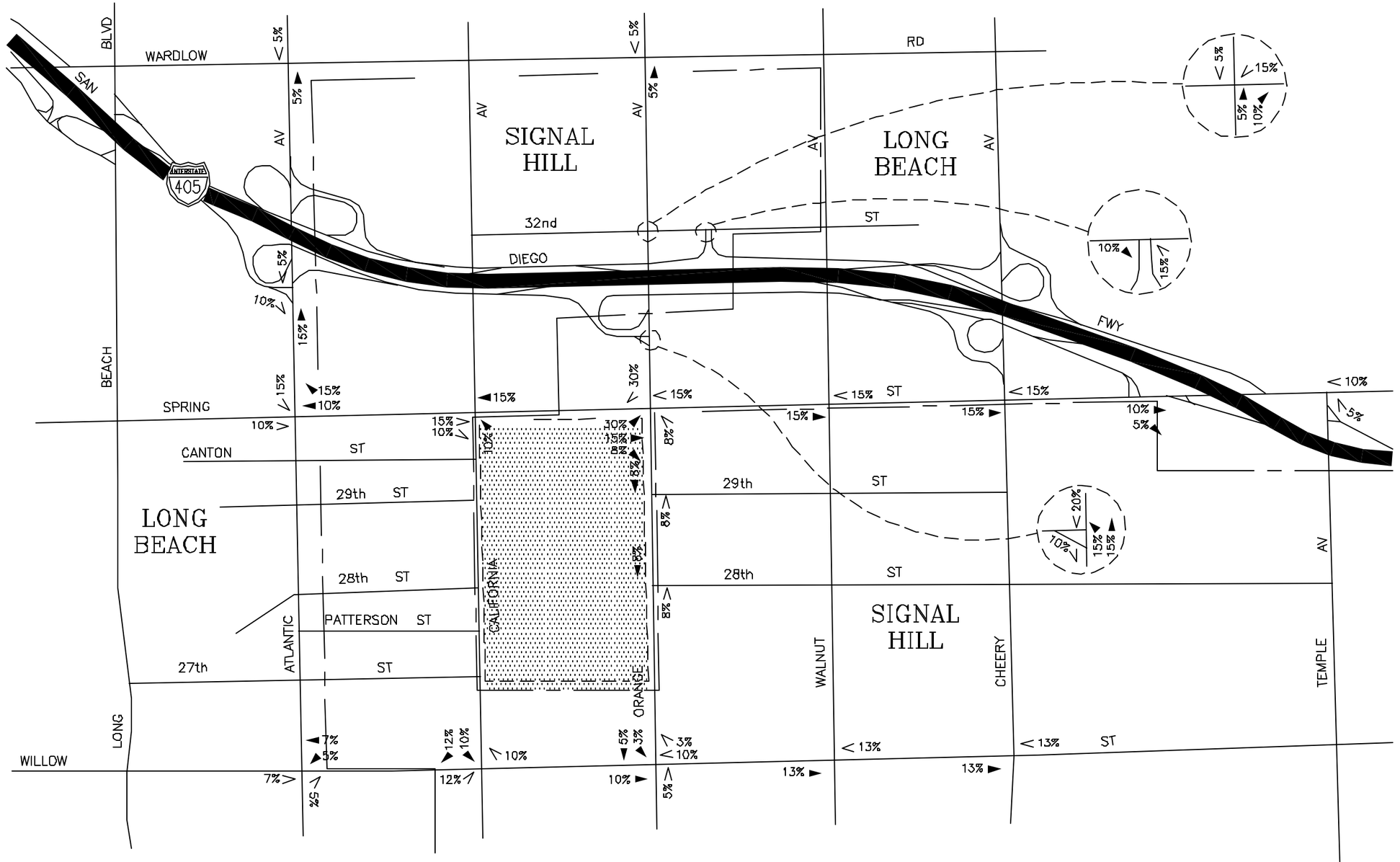
< XX% = INBOUND PERCENTAGE

◄ XX% = OUTBOUND PERCENTAGE

= PROJECT SITE

FIGURE 5-2

DRIVEWAY PROJECT TRAFFIC DISTRIBUTION PATTERN
SPORTS PARK AND YOUTH GOLF/PRACTICE FACILITY
LONG BEACH SPORTS PARK, LONG BEACH



N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

< XX% = INBOUND PERCENTAGE

◄ XX% = OUTBOUND PERCENTAGE

▒ = PROJECT SITE

FIGURE 5–3

PROJECT TRAFFIC DISTRIBUTION PATTERN
OFFICE BUILDING
LONG BEACH SPORTS PARK, LONG BEACH

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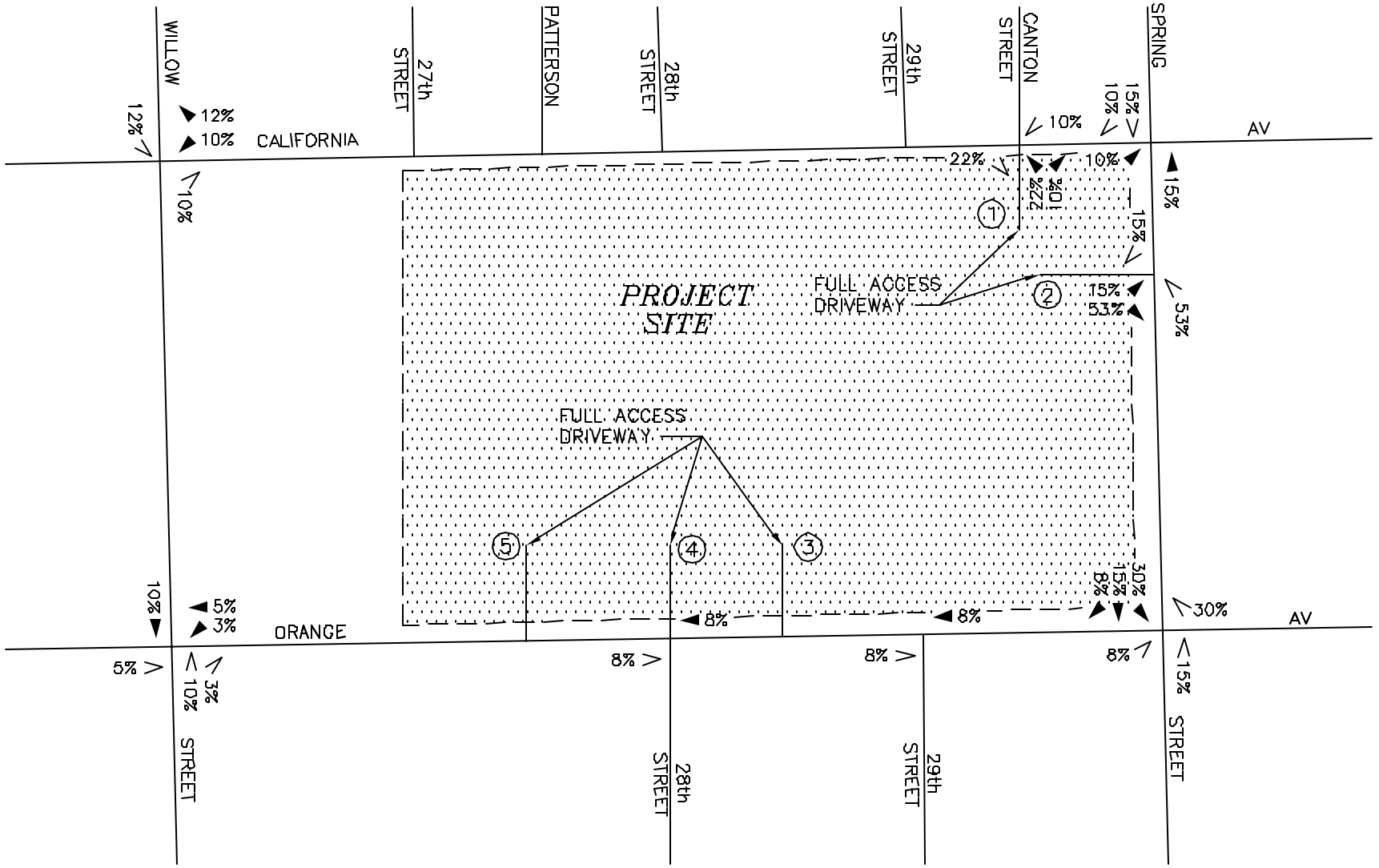


NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

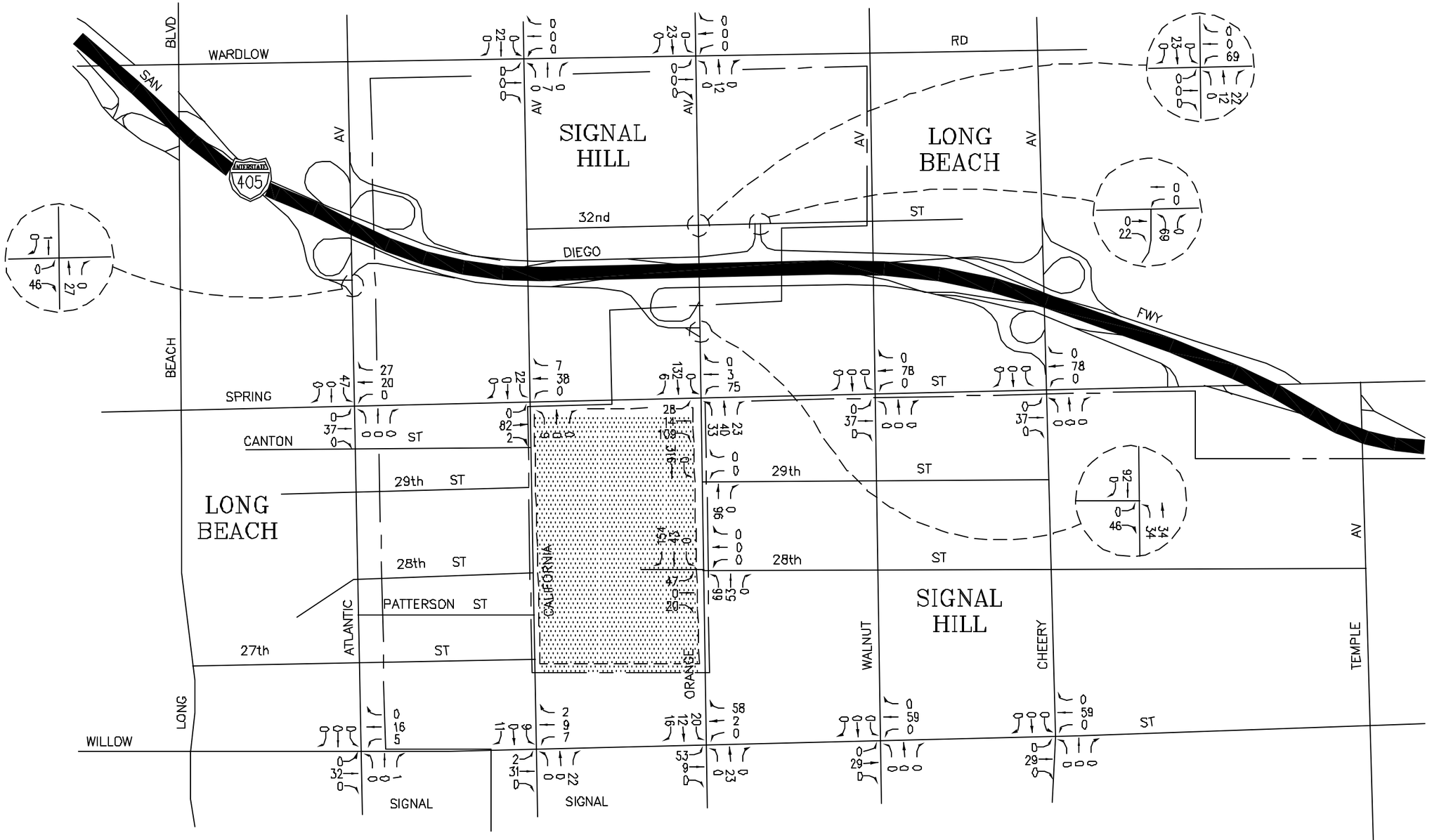
< XX% = INBOUND PERCENTAGE

◄ XX% = OUTBOUND PERCENTAGE

= PROJECT SITE

FIGURE 5–4

DRIVEWAY PROJECT TRAFFIC DISTRIBUTION PATTERN
OFFICE BUILDING
LONG BEACH SPORTS PARK, LONG BEACH



KEY

PROJECT SITE

NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

FIGURE 5–5

WEEKDAY PM PEAK HOUR PROJECT TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH

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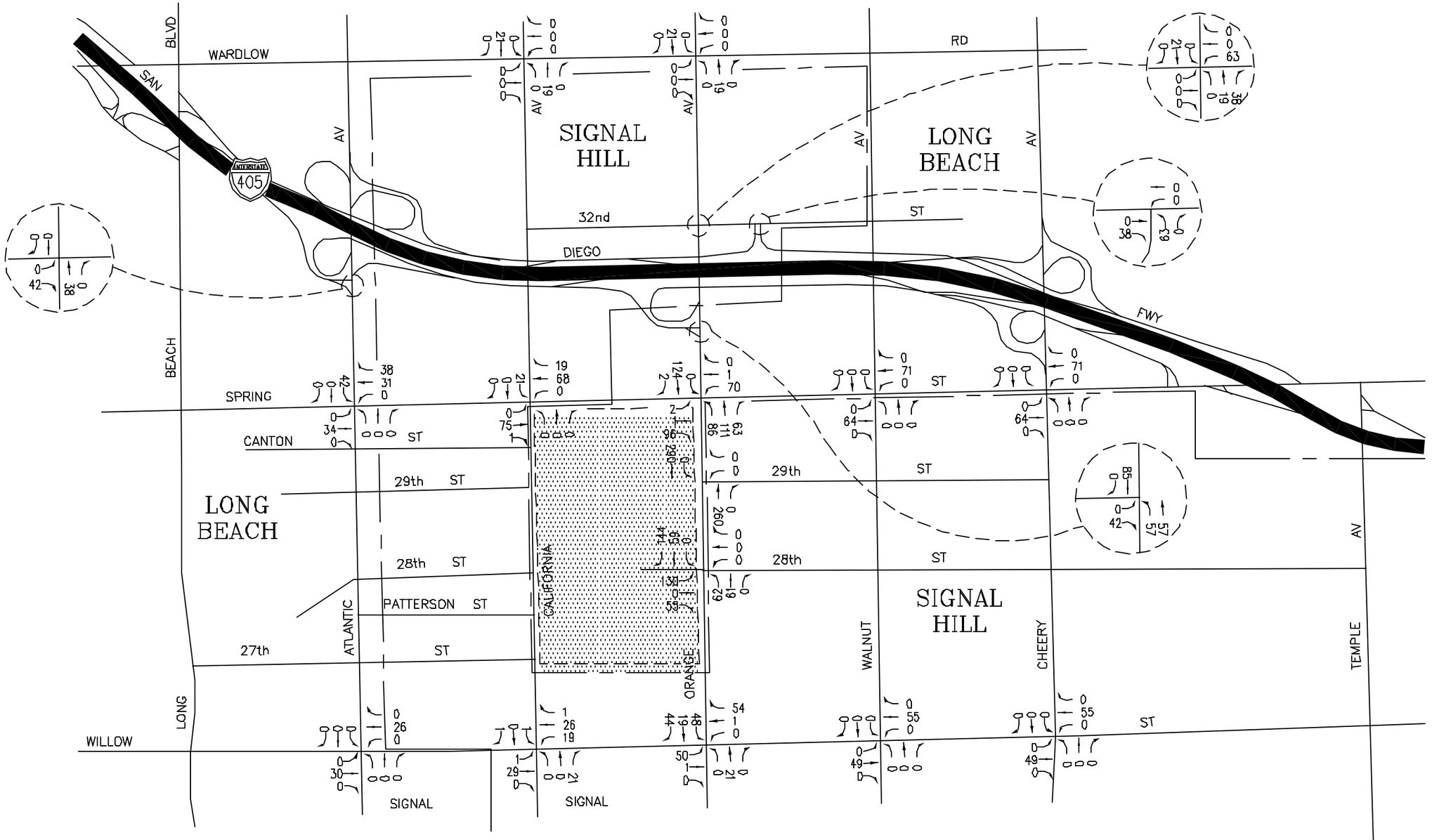


N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

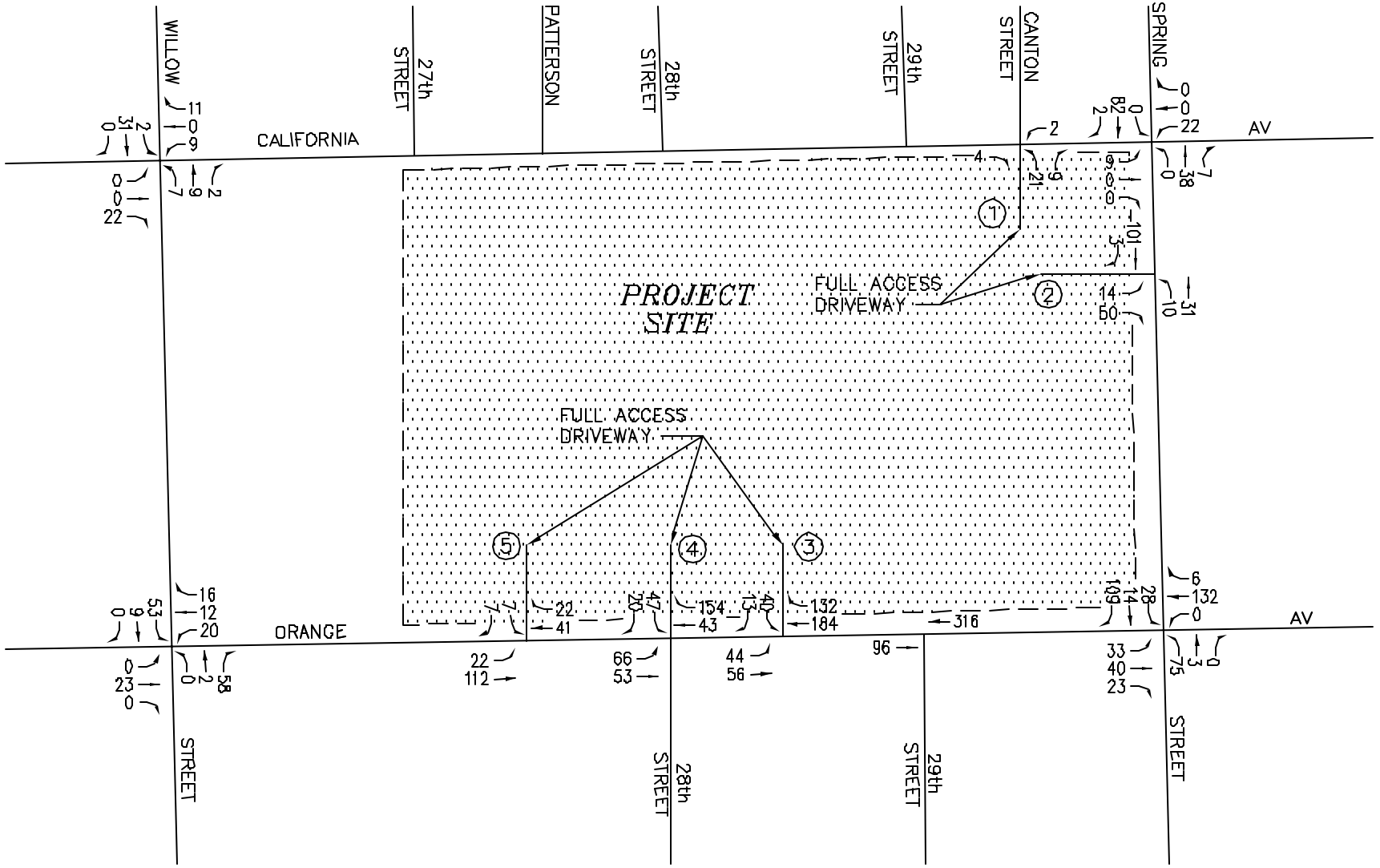
KEY

PROJECT SITE

FIGURE 5-6

WEEKEND DAY NOON PEAK HOUR PROJECT TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

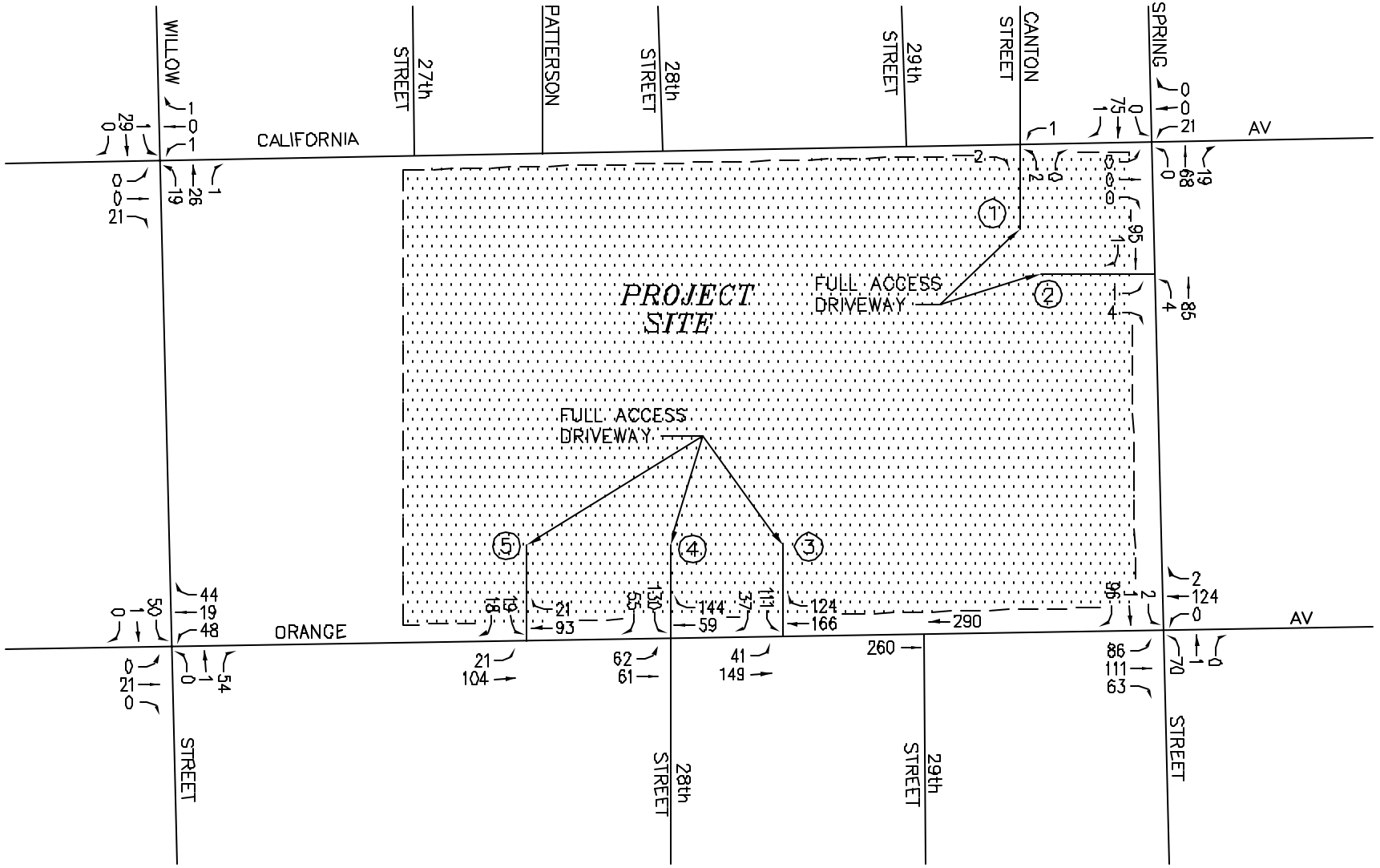
KEY

= PROJECT SITE

FIGURE 5-7

WEEKDAY PM PEAK HOUR PROJECT DRIVEWAY TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

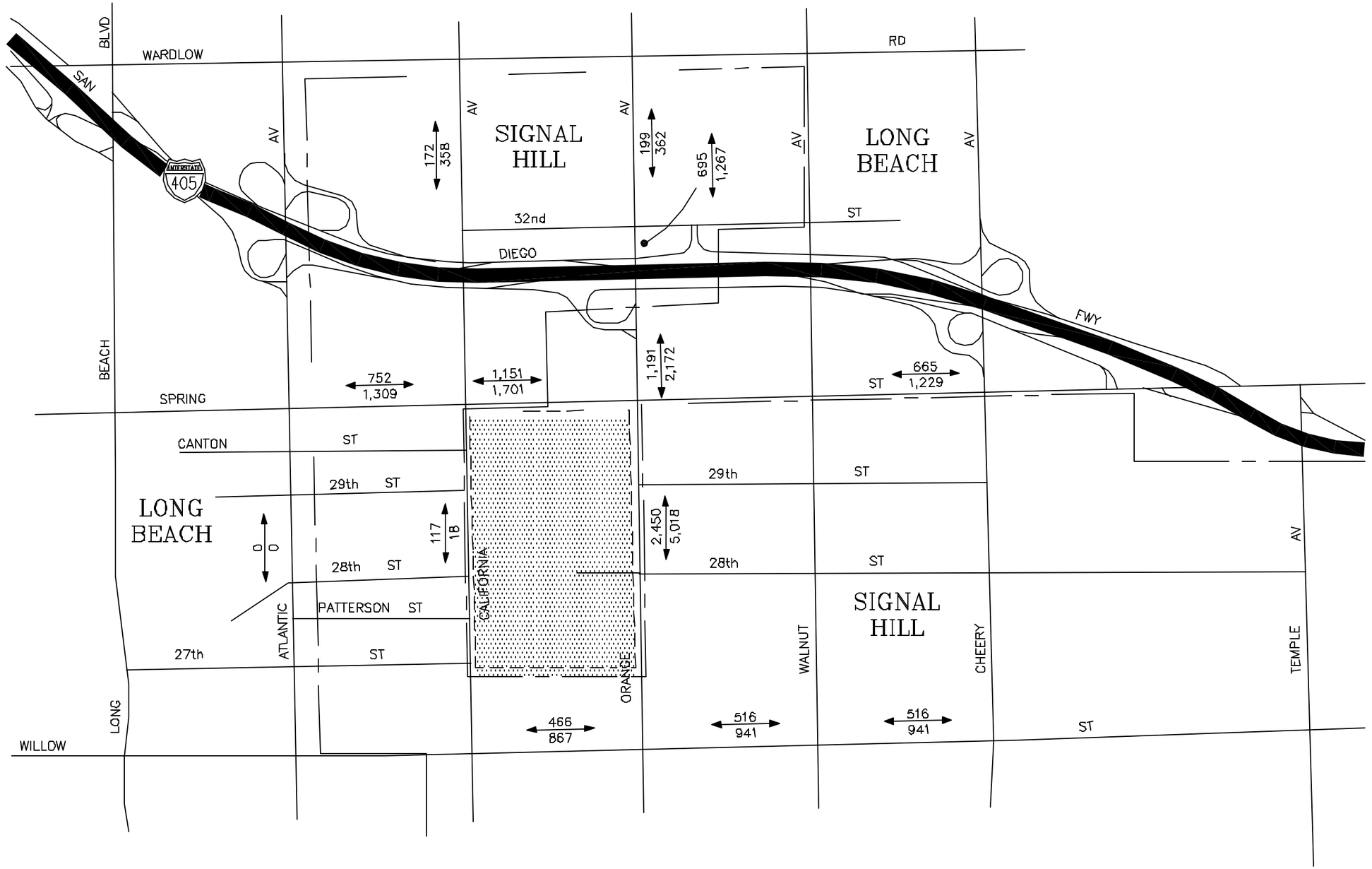
KEY

= PROJECT SITE

FIGURE 5-8

WEEKEND DAY NOON PEAK HOUR PROJECT DRIVEWAY TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH



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N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

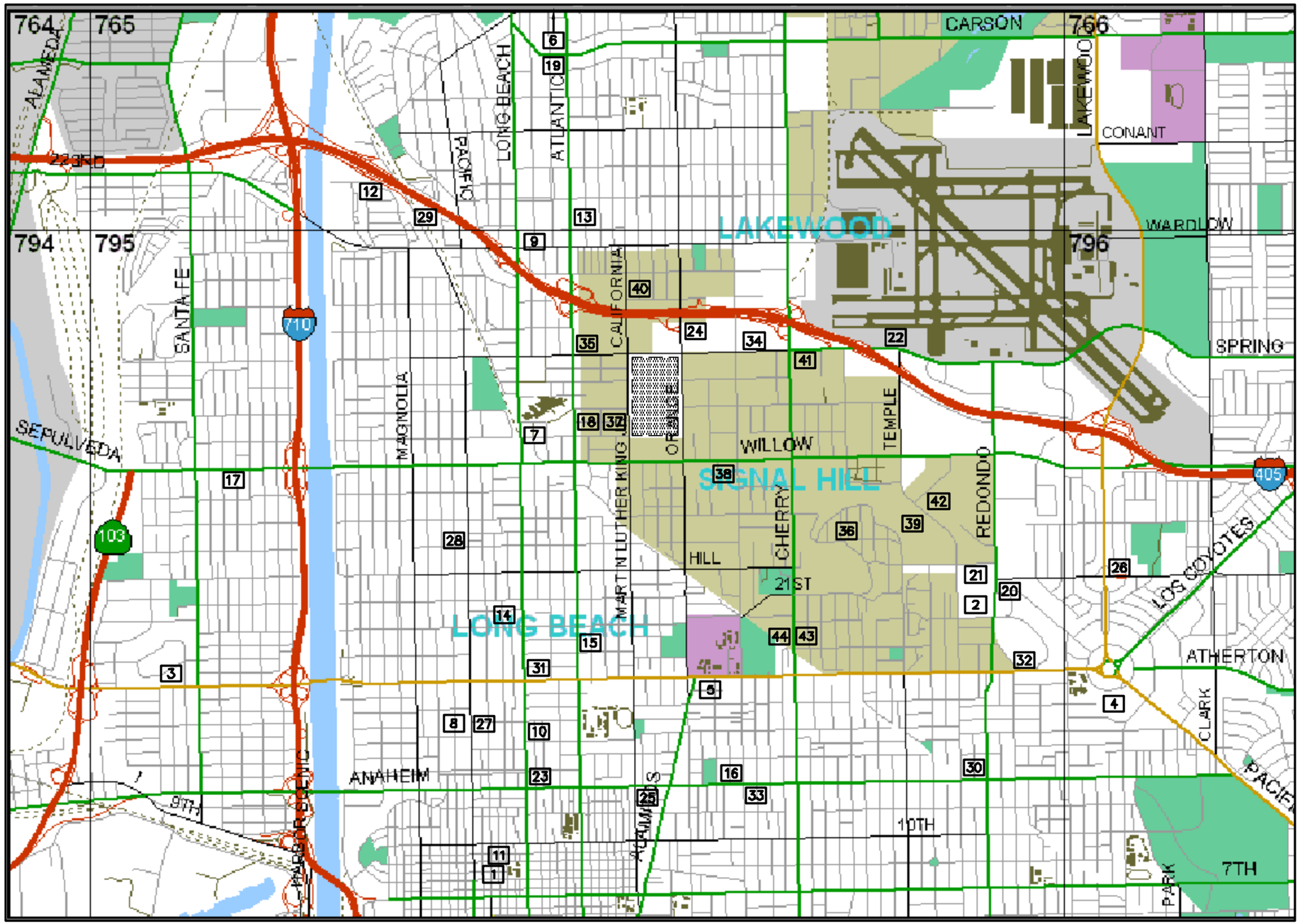
X,XXX / X,XXX = THURSDAY DAILY TRAFFIC VOLUMES / SATURDAY DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 5–9

PROJECT WEEKDAY AND WEEKEND DAY DAILY TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH



1. Pine Villas (Case # 9709-27)
2. Alamitos Ridge Residential (Case # 9809-02)
3. CSULB Technology Park (Case # 9811-05)
4. Self-Storage (Case # 0001-03)
5. Pharmacy (Case # 0012-03)
6. North Long Beach Police Station (Case # 0012-14)
7. Medical Office (Case # 0102-02)
8. Apartments (Case # 0102-05)
9. Retail Center (Case # 0104-19)
10. Retail (Case # 0109-23)
11. Locust Avenue Residential (Case # 0110-05)
12. Self Storage (Case # 0110-07)
13. Pharmacy With Drive Through (Case # 0112-16)
14. Retail (Case # 0202-01)
15. Office/Retail (Case # 0205-05)
16. Mark Twain Public Library (Case # 0207-22)
17. Retail (Case # 0208-04)
18. Medical Office (Case # 0208-15)
19. Retail (Case # 0209-17)
20. Alamitos Green Residential
21. Elementary School
22. Daugherty Sky Harbor
23. Commercial Center (Case # 0207-17)
24. Self-Storage (Case # 0207-24)
25. Commercial Building (Case # 0210-19)
26. Retail (Case # 0301-10)
27. Affordable Housing (Case # 0301-16)
28. Commercial Building (Case # 0301-18)
29. Industrial Center (Case # 0302-03)
30. Walgreen's (Case # 0302-04)
31. Affordable Condominiums (Case # 0304-06)
32. Java Lanes (Case # 0306-02)
33. New Comm. Rehab. Industries (Case # 0307-10)
34. Commercial/Industrial (Case # 0308-02)
35. Home Improvement Center
36. Hill Top Specific Plan
37. A and A Ready Mix
38. Gundry Estates
39. Hathaway Estates
40. U.S. Storage
41. Long Beach BMW
42. DCI Light Industrial
43. Cherry/19th Condominiums
44. LBUSD Middle School

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N NO SCALE

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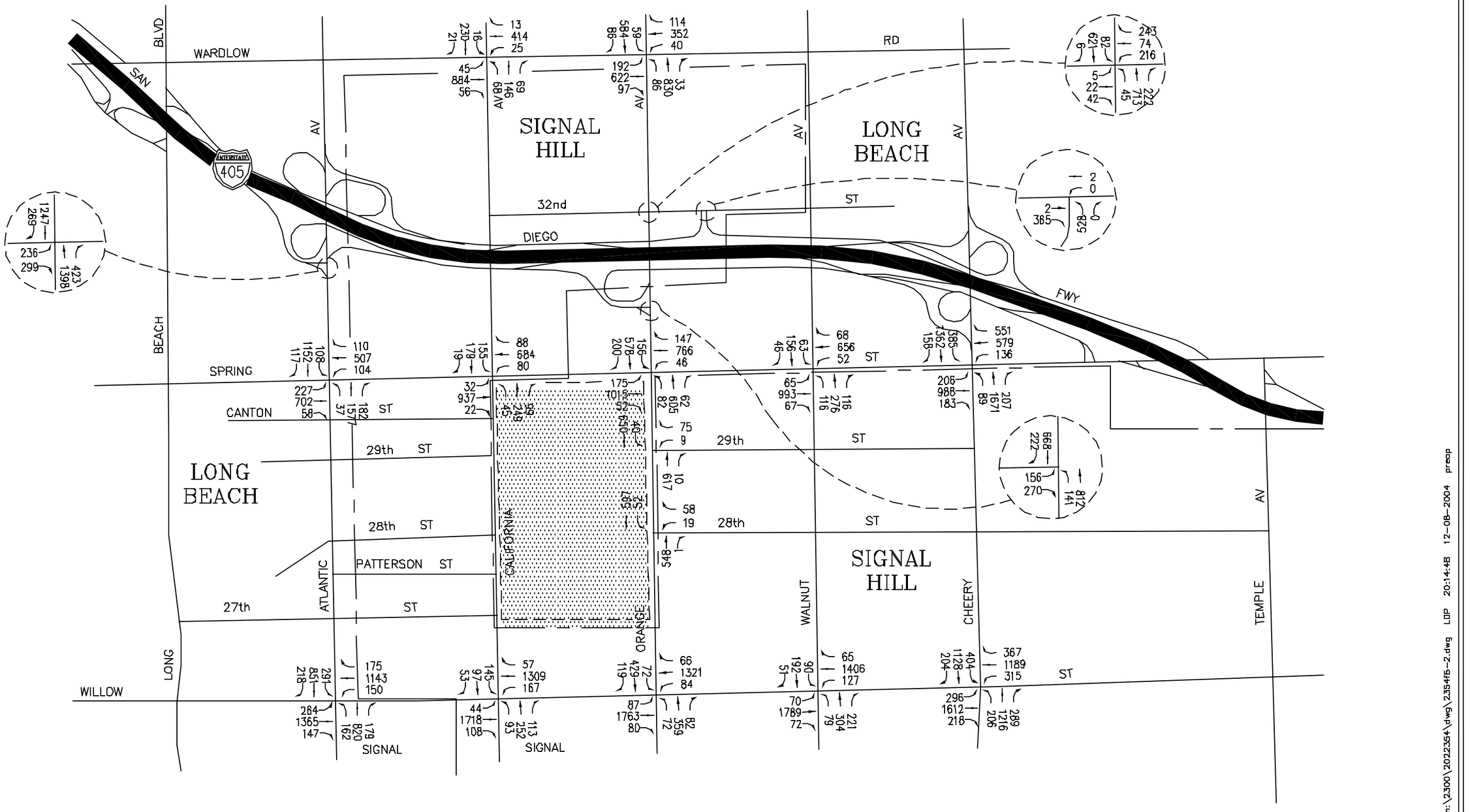
KEY

[#] = RELATED PROJECT LOCATION

= PROJECT SITE

FIGURE 6-1

LOCATION OF RELATED PROJECTS
LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

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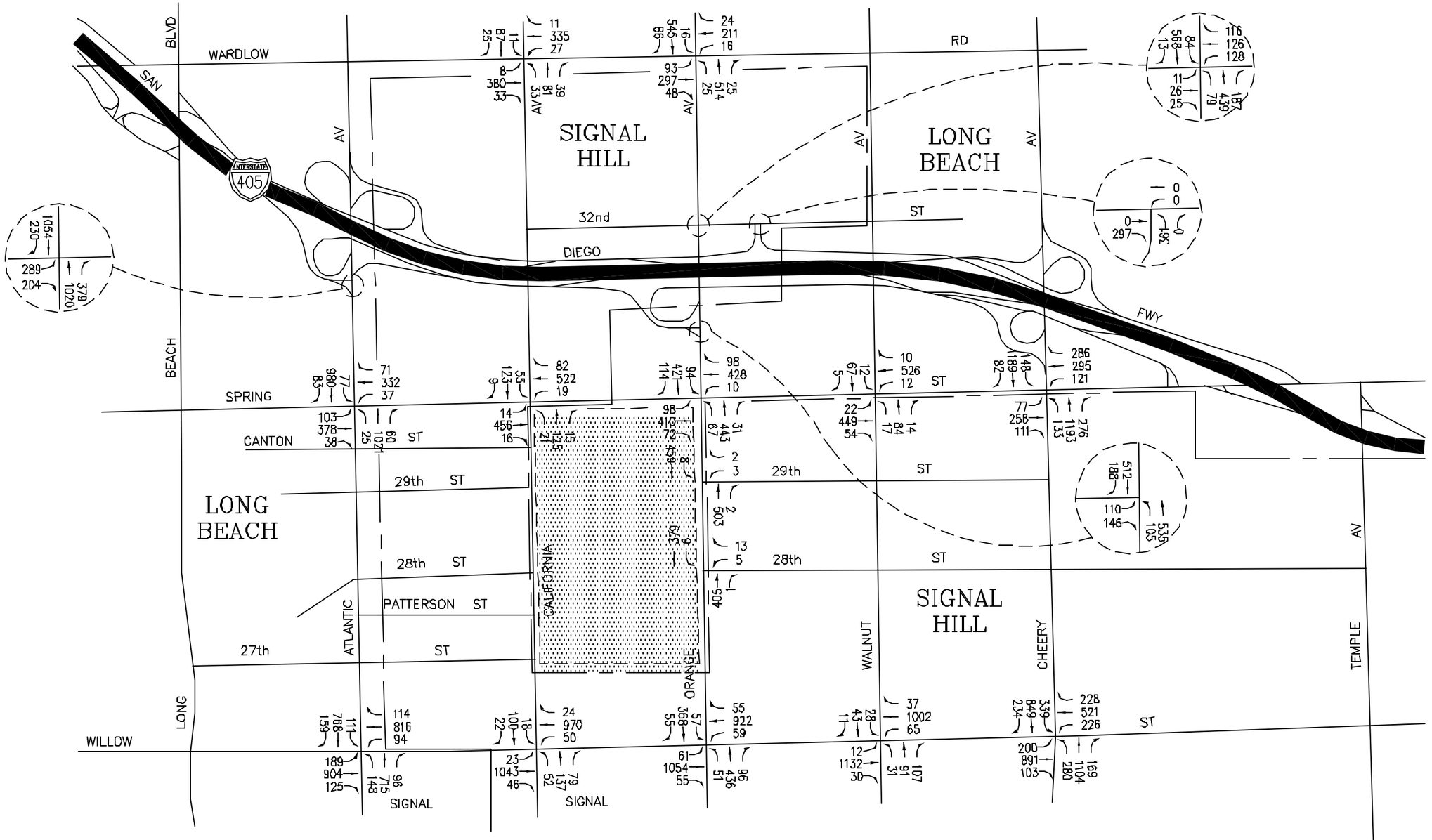
KEY

PROJECT SITE

FIGURE 6-2

YEAR 2006 WEEKDAY PM PEAK HOUR
BACKGROUND TRAFFIC VOLUMES
LONG BEACH SPORTS PARK, LONG BEACH



KEY

PROJECT SITE

NO SCALE

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FIGURE 6-3

YEAR 2006 WEEKEND DAY NOON PEAK HOUR BACKGROUND TRAFFIC VOLUMES

LONG BEACH SPORTS PARK, LONG BEACH

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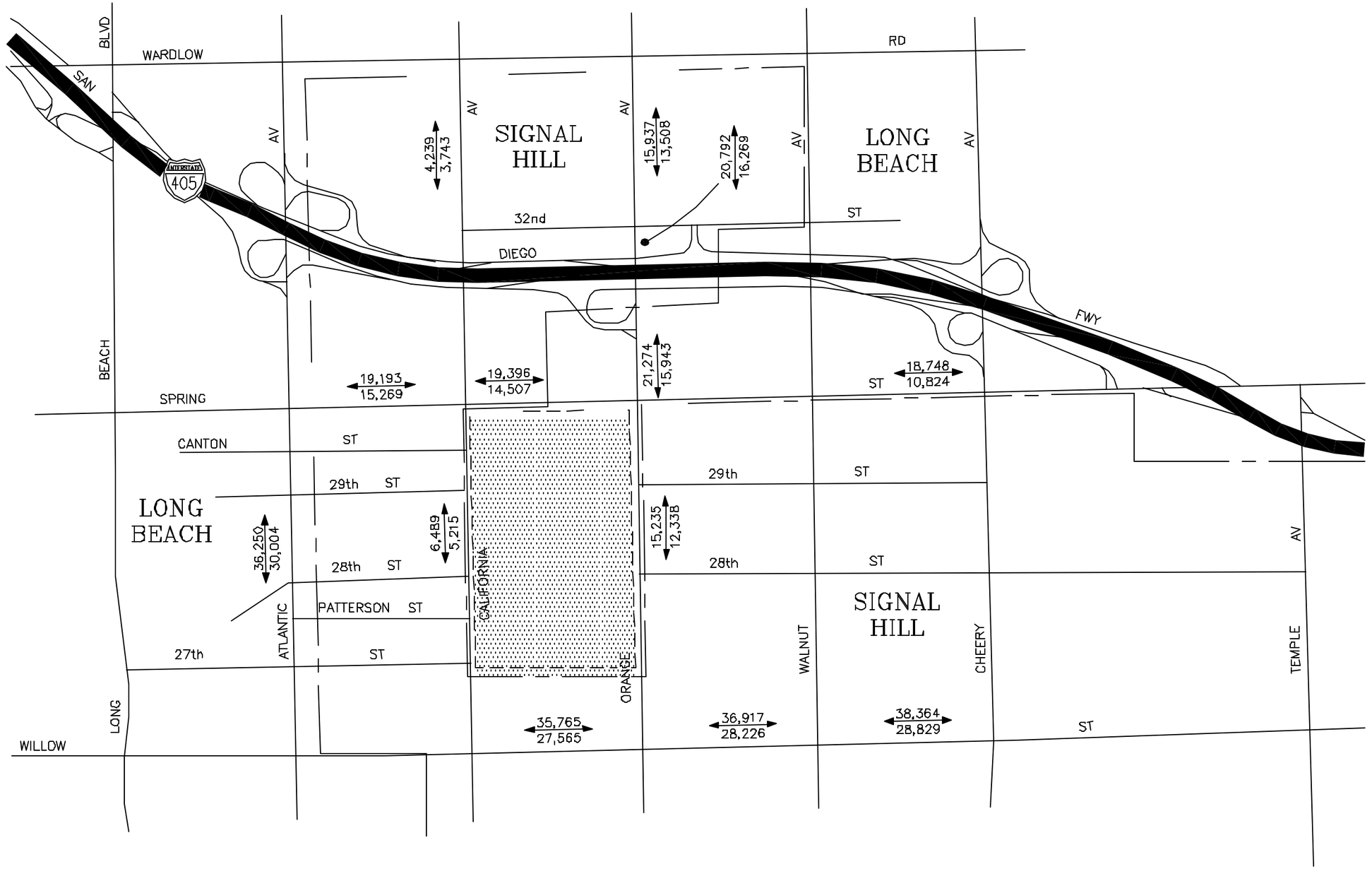

N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

X,XXX / X,XXX = THURSDAY DAILY TRAFFIC VOLUMES / SATURDAY DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 6-4

YEAR 2006 WEEKDAY AND WEEKEND DAY
DAILY BACKGROUND TRAFFIC VOLUMES
LONG BEACH SPORTS PARK, LONG BEACH

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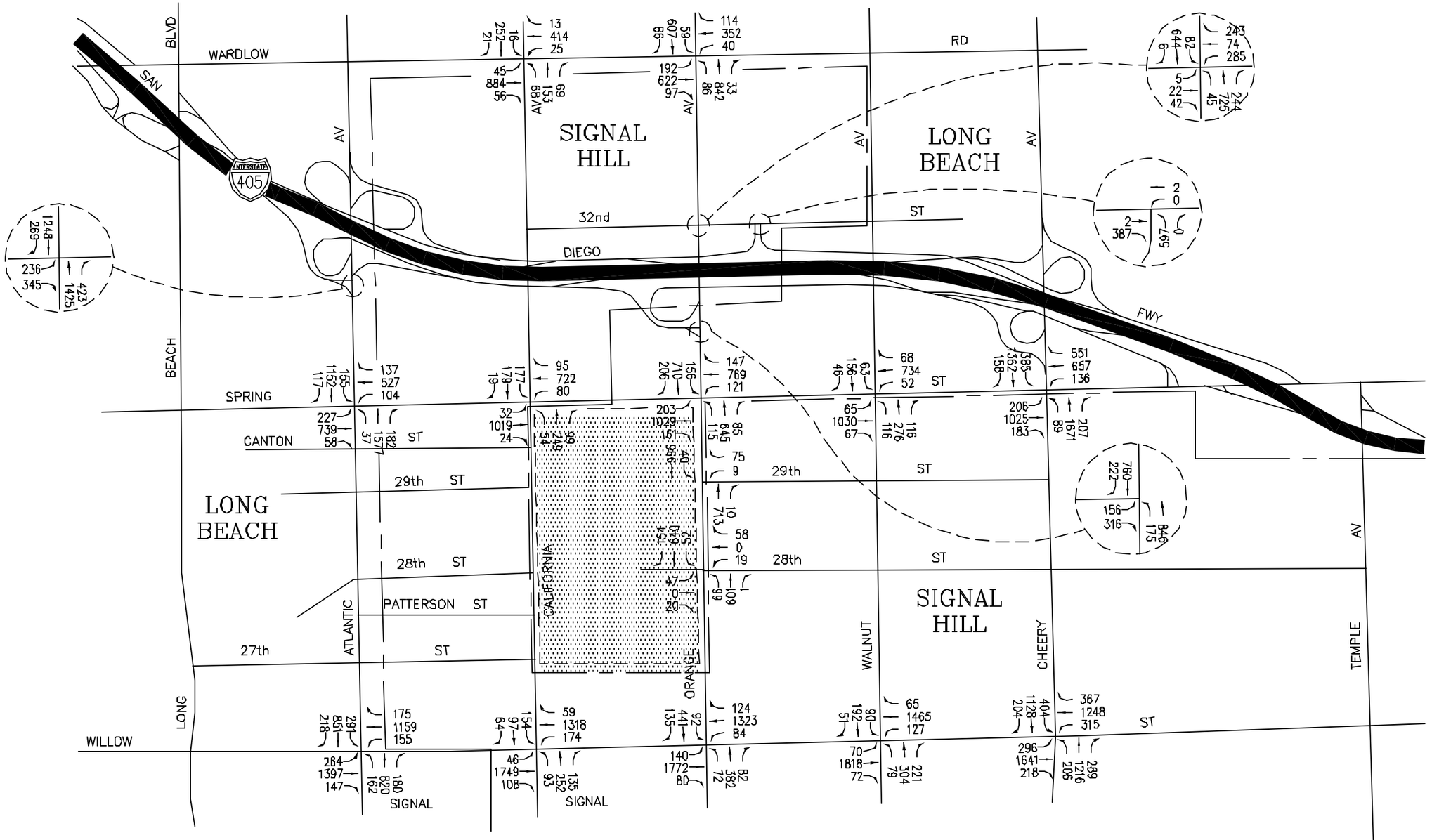

N NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

KEY

PROJECT SITE

FIGURE 6-5

YEAR 2006 WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES WITH PROJECT TRAFFIC
LONG BEACH SPORTS PARK, LONG BEACH

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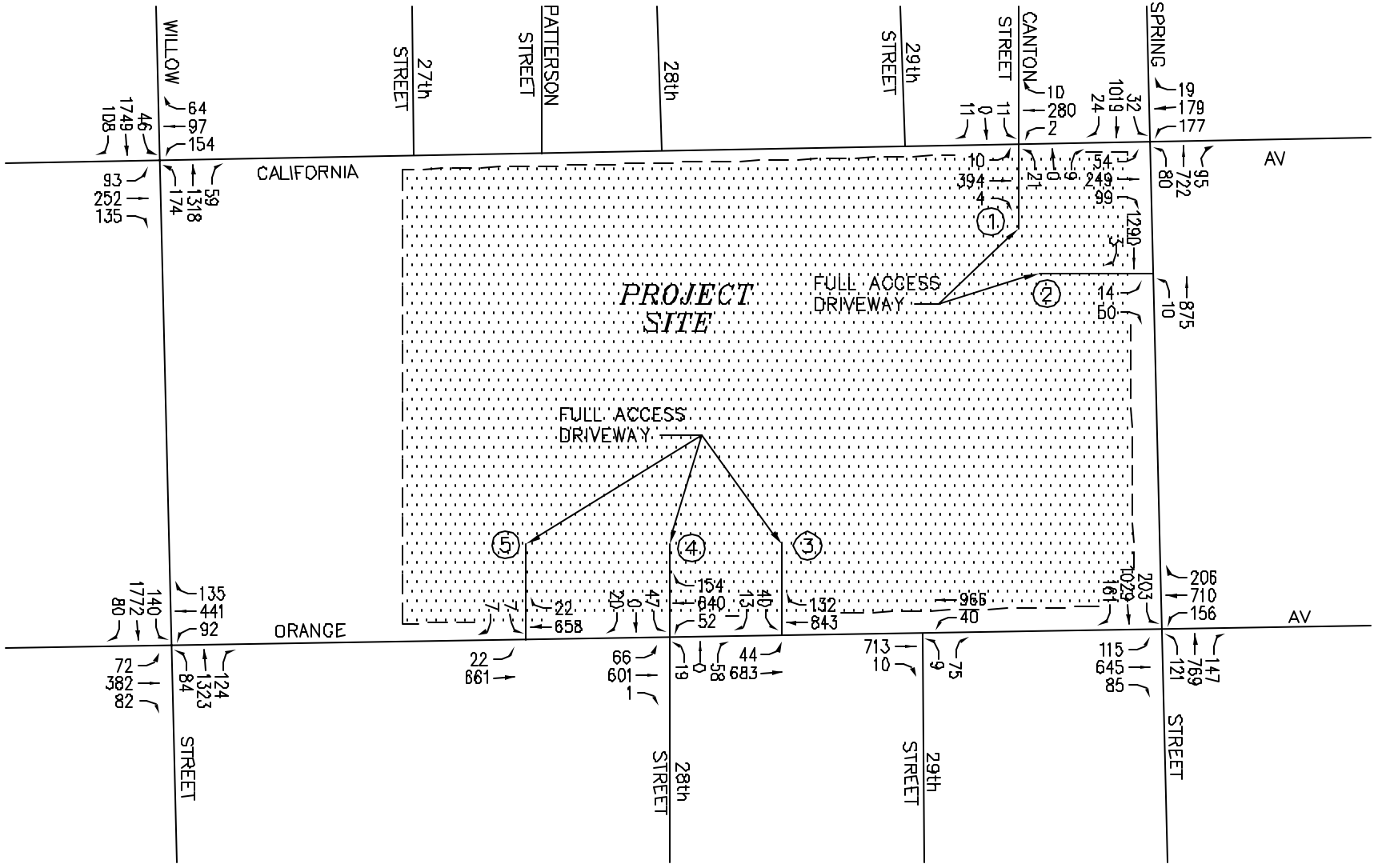


NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

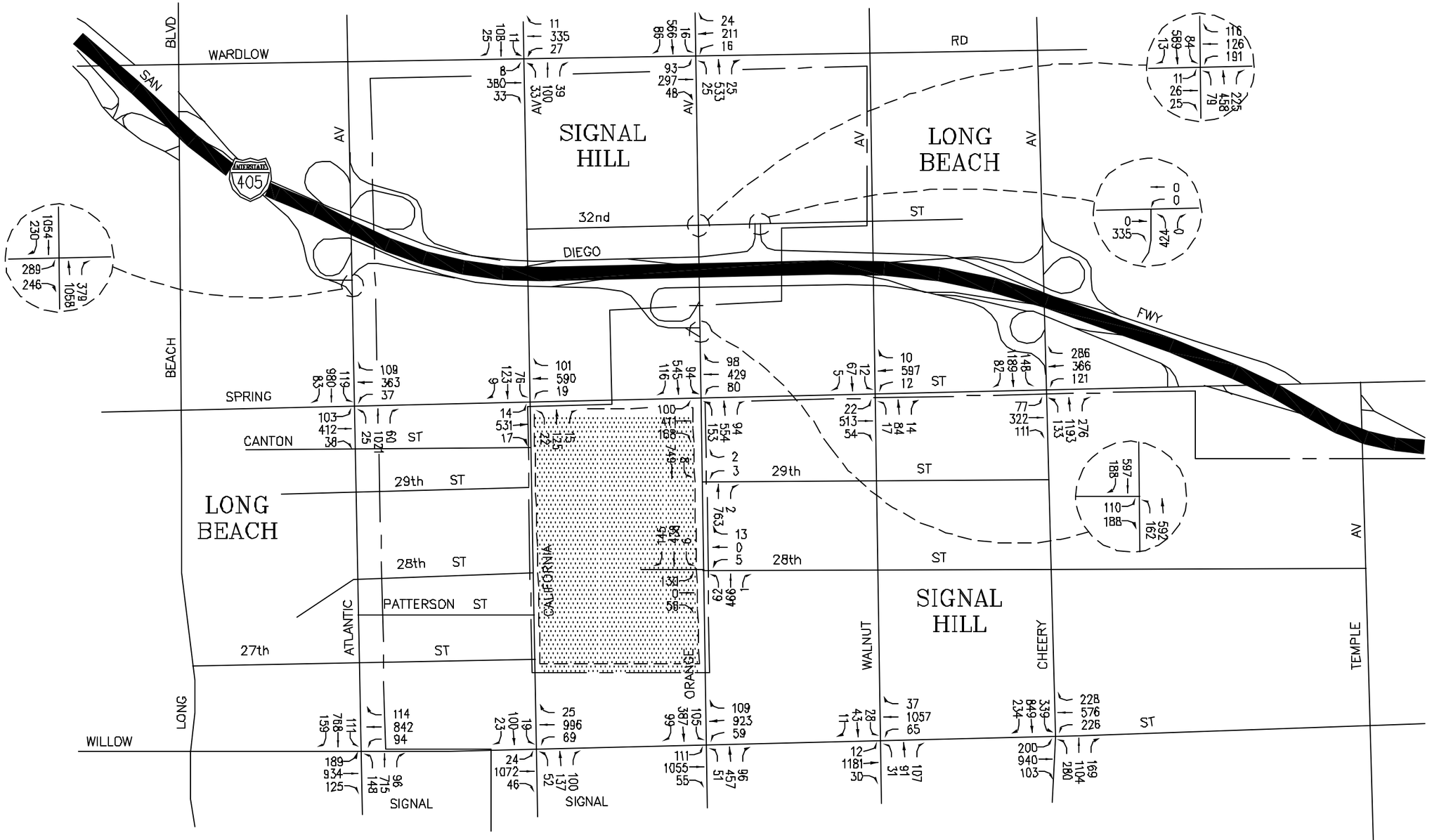
KEY

= PROJECT SITE

FIGURE 6-6

YEAR 2006 WEEKDAY PM PEAK HOUR DRIVEWAY TRAFFIC VOLUMES WITH PROJECT TRAFFIC

LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

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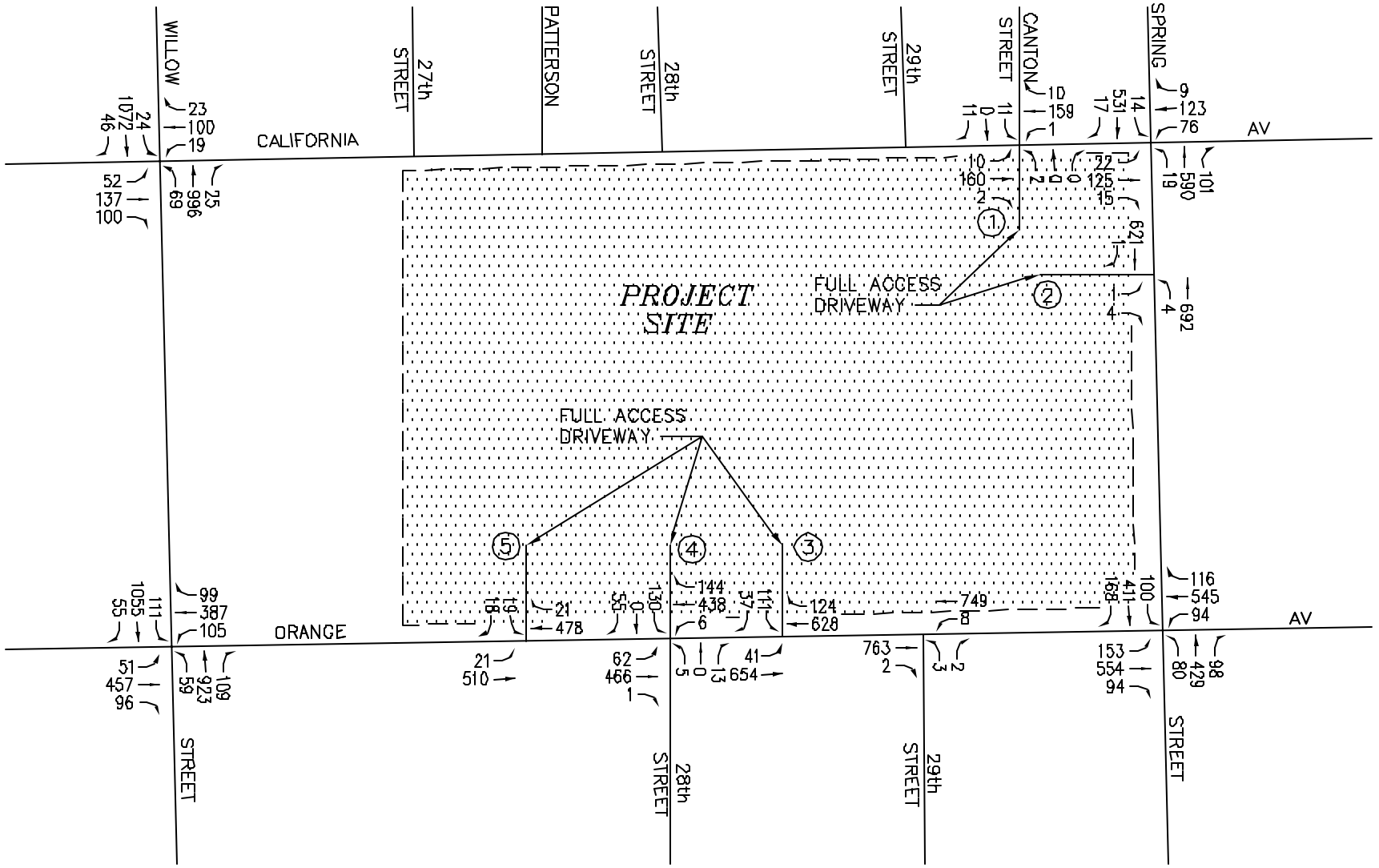
KEY

PROJECT SITE

FIGURE 6-7

YEAR 2006 WEEKEND DAY NOON PEAK HOUR
TRAFFIC VOLUMES WITH PROJECT TRAFFIC
LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

KEY

= PROJECT SITE

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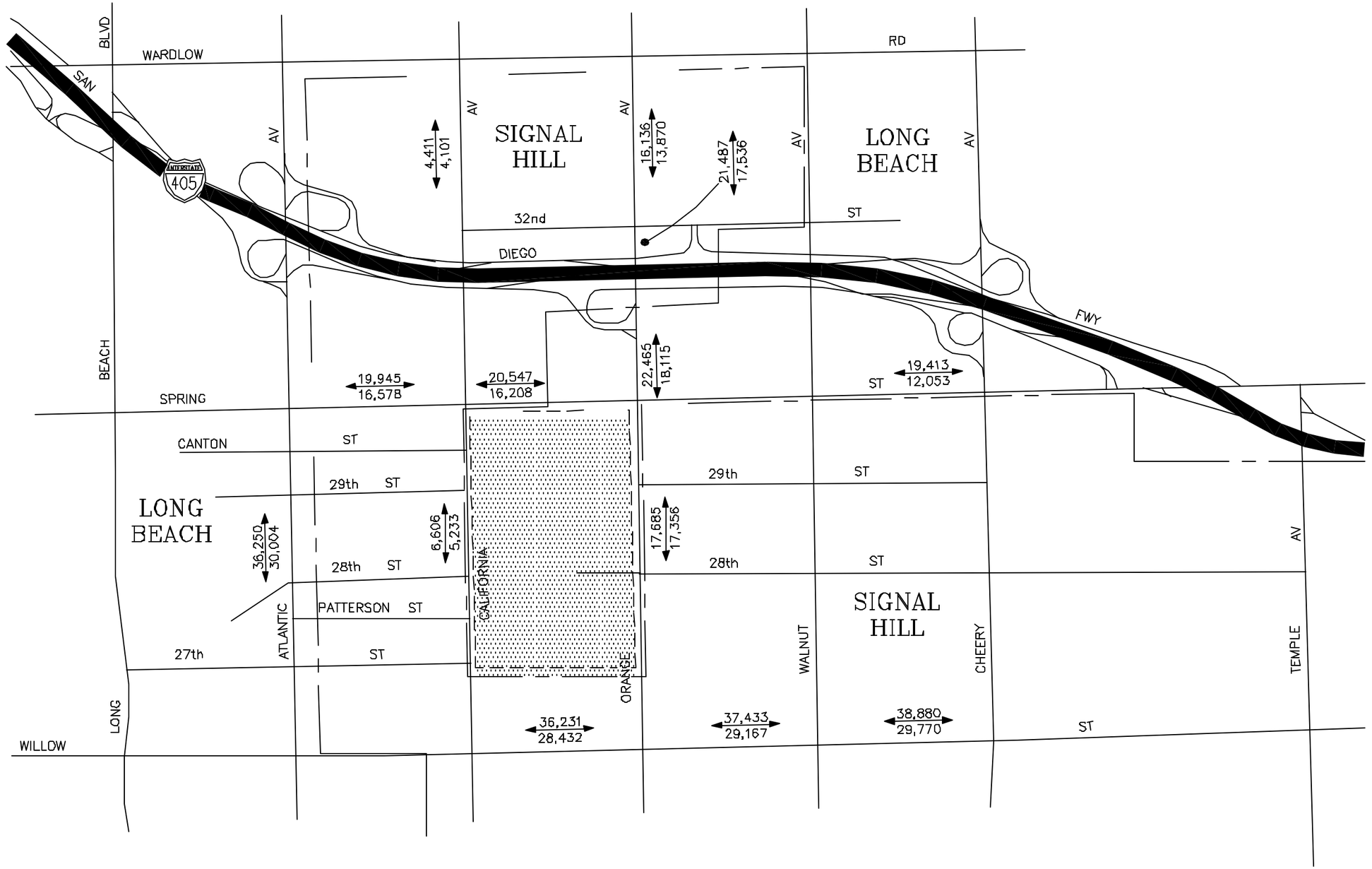
FIGURE 6-8

YEAR 2006 WEEKEND DAY NOON PEAK HOUR DRIVEWAY TRAFFIC VOLUMES WITH PROJECT TRAFFIC

LONG BEACH SPORTS PARK, LONG BEACH



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NO SCALE

LINSCOTT LAW & GREENSPAN ENGINEERS

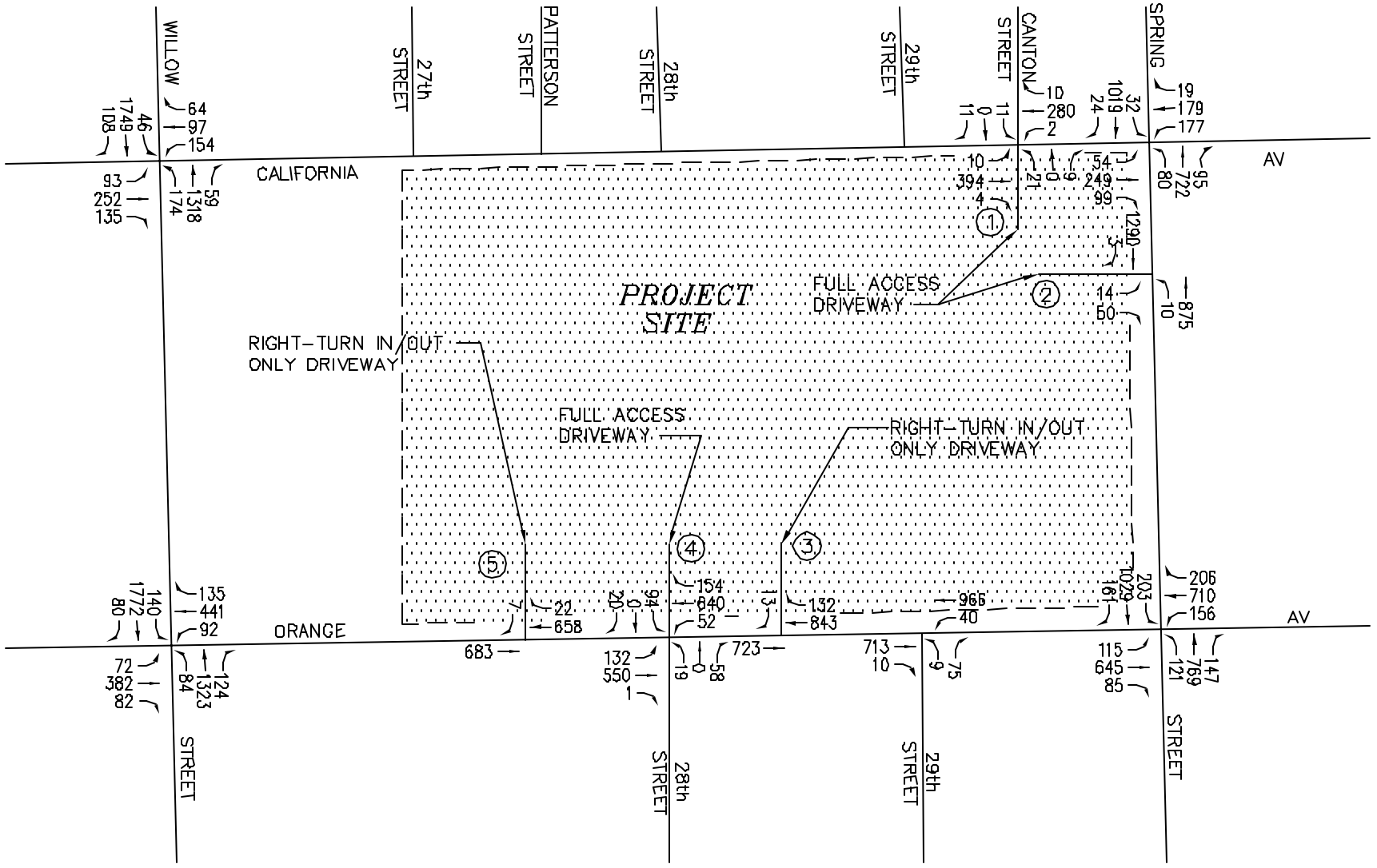
KEY

X,XXX / X,XXX = THURSDAY DAILY TRAFFIC VOLUMES / SATURDAY DAILY TRAFFIC VOLUMES

= PROJECT SITE

FIGURE 6-9

YEAR 2006 WEEKDAY AND WEEKEND DAY
DAILY TRAFFIC VOLUMES WITH PROJECT TRAFFIC
LONG BEACH SPORTS PARK, LONG BEACH



KEY

= PROJECT SITE

NO SCALE

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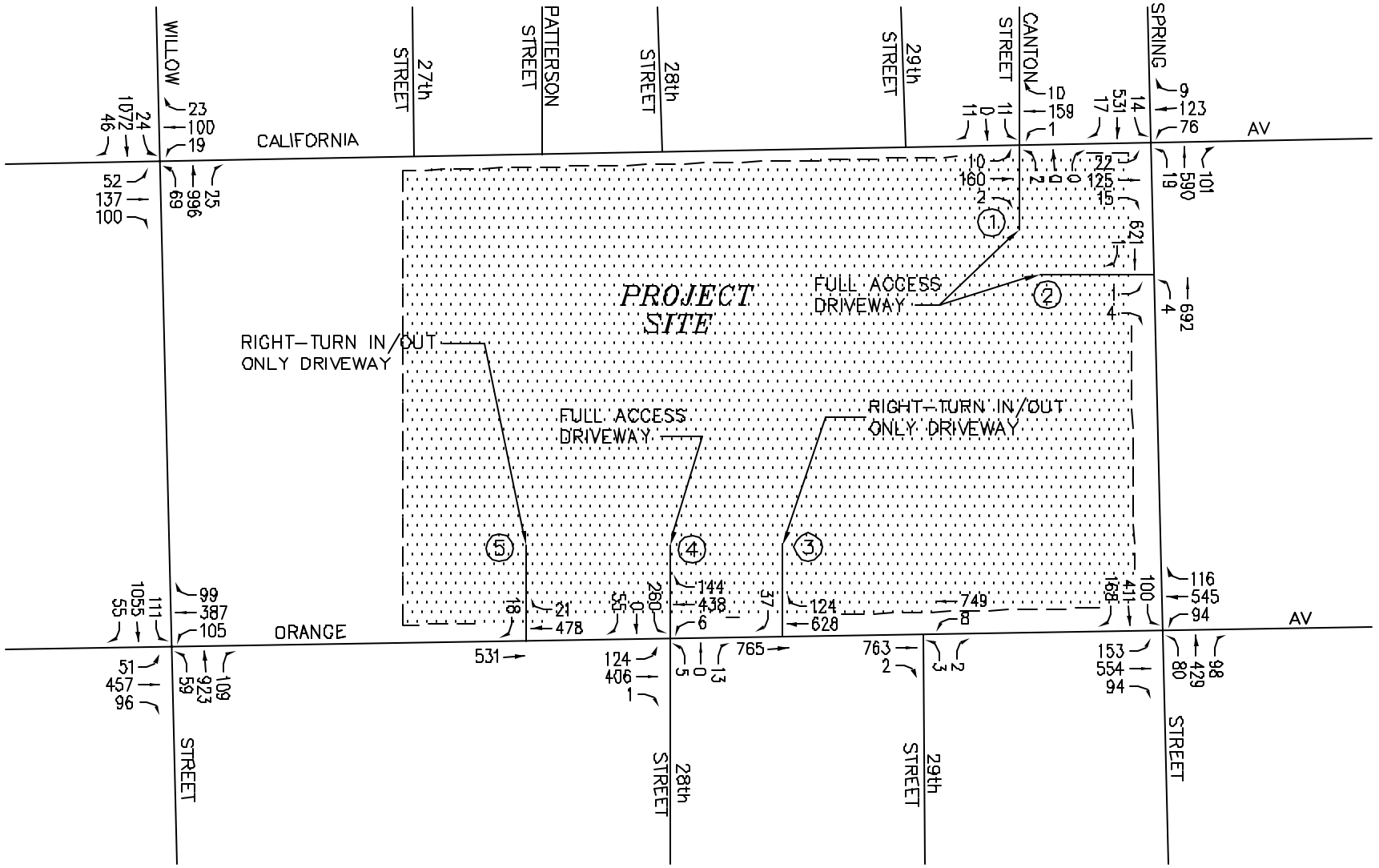
FIGURE 9-1

YEAR 2006 WEEKDAY PM PEAK HOUR DRIVEWAY
TRAFFIC VOLUMES WITH PROJECT TRAFFIC – ALTERNATIVE ACCESS
LONG BEACH SPORTS PARK, LONG BEACH



NO SCALE

KEY

= PROJECT SITE

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FIGURE 9-2

YEAR 2006 WEEKEND DAY NOON PEAK HOUR DRIVEWAY TRAFFIC VOLUMES WITH PROJECT TRAFFIC – ALTERNATIVE ACCESS

LONG BEACH SPORTS PARK, LONG BEACH