

P2012-00304  
P201300086

# Traffic Report

## PROPOSED COMMERCIAL DEVELOPMENT EAGLE RIDGE MARKET ERWIN LAKE, CA

PREPARED FOR:  
**STEENO DESIGN STUDIO**

PREPARED BY:  
**HALL & FOREMAN, INC.**  
14297 CAJON STREET, #101  
VICTORVILLE, CA 92392

DRAFT REPORT  
JUNE 13, 2013



June 13, 2013

Job No. WV.130048.0000

Mr. Tom Steeno  
**Steen Design Studio**  
11774 Hesperia Rd, Suite 1B  
Hesperia, CA, 92345

**RE: TRAFFIC STUDY – EAGLE RIDGE MARKET- STATE HWY 38 and STATE LANE-  
ERWIN LAKE, CALIFORNIA**

Dear Mr. Steeno;

**Hall & Foreman Inc.** is pleased to submit this Traffic Study in the unincorporated community of Erwin Lake for the proposed Eagle Ridge commercial development at the southeast corner of Highway 38 and State Lane. The project is comprised of a Gas Station with Convenience Market and a Residence for the caretaker.

The report examines the traffic impacts specifically for the project and presents recommended traffic improvements. The report also addresses the impacts of overall growth within the area to assure that cumulative traffic mitigations can be addressed.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 760-524-9115.

Respectfully submitted,

**Hall & Foreman Inc.**

  
Robert A. Kilpatrick, P.E., T.E.  
Project Director/Associate



## TABLE OF CONTENTS

|  | Page |
|--|------|
| 1. <b>Introduction</b> .....                                     | 1    |
| 2. <b>Existing Conditions</b>                                    |      |
| Existing Street System .....                                     | 4    |
| Existing Traffic Volumes .....                                   | 4    |
| Existing Traffic Analysis .....                                  | 6    |
| 3. <b>Background Conditions</b>                                  |      |
| Area Growth .....  | 8    |
| Background Traffic Analysis .....                                | 8    |
| 4. <b>Project Conditions</b>                                     |      |
| Project Trip Generation .....                                    | 10   |
| Project Trip Distribution .....                                  | 10   |
| Project Traffic Analysis .....                                   | 14   |
| 5. <b>Future Conditions</b>                                      |      |
| Area Growth .....  | 15   |
| Future Year 2035 without Project Traffic Analysis .....          | 15   |
| Future Year 2035 with Project Traffic Analysis .....             | 18   |
| 6. <b>Project Mitigation and Summary</b> .....                   | 19   |
| 7. <b>Appendix</b> .....   | 20   |
| 1. Other Area Projects   |      |
| 2. Intersection Capacity Analysis Calculations                   |      |
| 3. Traffic Signal Warrant Worksheets – Highway 38 and State Lane |      |

## LIST OF TABLES

|         |  |    |
|---------|--|----|
| Table 1 | Intersection Capacity Analysis - Existing Conditions .....                 | 6  |
| Table 2 | Intersection Capacity Analysis - Background Conditions .....               | 8  |
| Table 3 | Project Trip Generation.....   | 10 |
| Table 4 | Intersection Capacity Analysis – Project Conditions.....                   | 14 |
| Table 5 | Intersection Capacity Analysis –Year 2035 without Project Conditions ..... | 15 |
| Table 6 | Intersection Capacity Analysis – Year 2035 with Project Conditions .....   | 18 |

## LIST OF FIGURES

|           |  |    |
|-----------|--|----|
| Figure 1  | Vicinity Map .....                             | 2  |
| Figure 2  | Site Plan .....                                | 3  |
| Figure 3  | Existing Traffic Volumes .....                 | 5  |
| Figure 4  | Existing Intersection Geometrics.....          | 7  |
| Figure 5  | Year 2013 Background Traffic Conditions .....  | 9  |
| Figure 6  | Project Trip Distribution .....                | 11 |
| Figure 7  | Project Trips .....                            | 12 |
| Figure 8  | Project Conditions.....                        | 13 |
| Figure 9  | Year 2035 Traffic Volume without Project ..... | 16 |
| Figure 10 | Year 2035 Traffic Volume with Project .....    | 17 |
| Figure 11 | Proposed Project Mitigations .....             | 22 |

## 1. INTRODUCTION

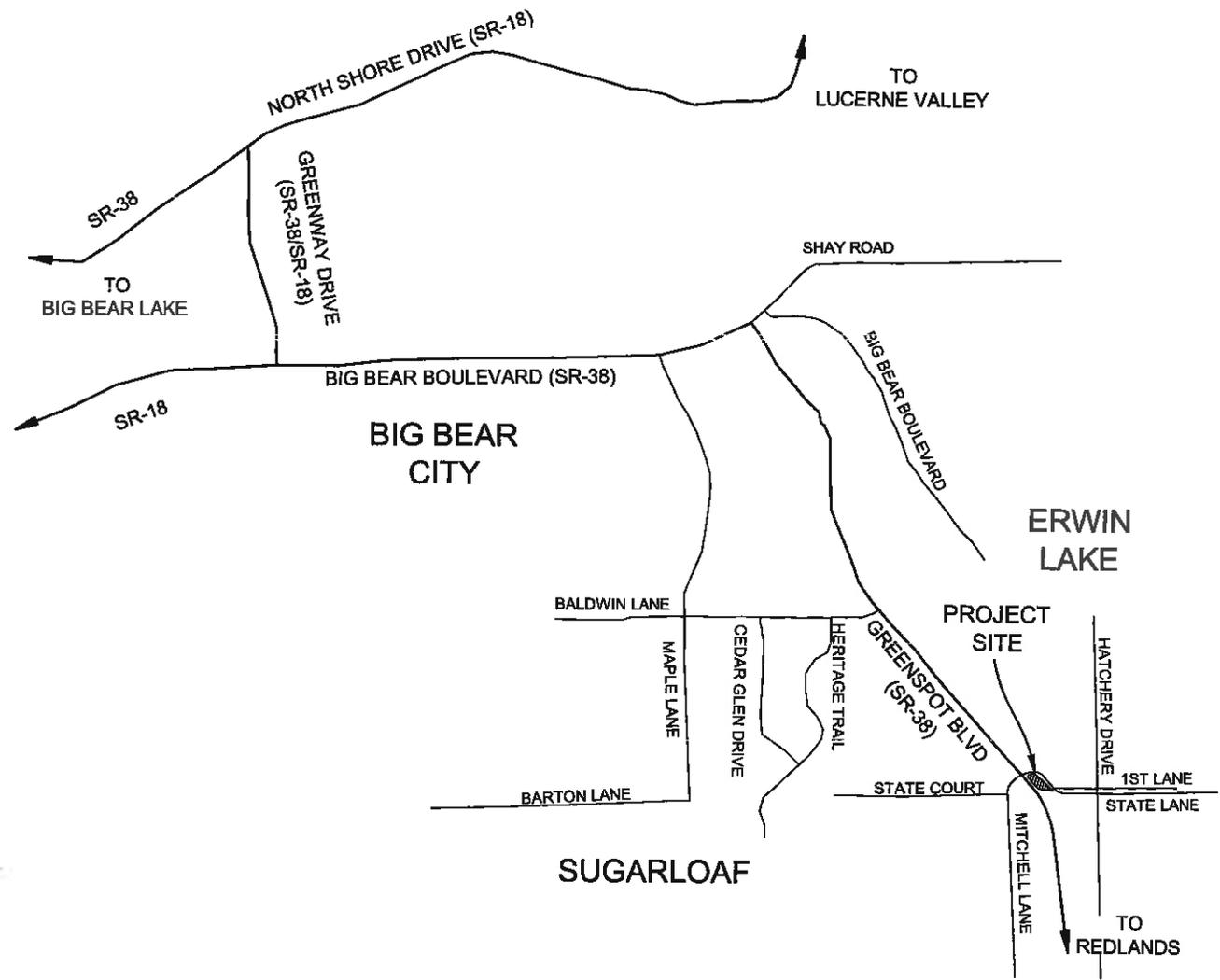
This report identifies the traffic impacts and presents recommendations for access and traffic mitigation for the proposed project located at the southeast corner of Highway 38 and State Lane in the unincorporated community of Erwin Lake, which is southeasterly of the unincorporated community of Big Bear City. The proposed project consists of a Convenient Store with a gas station and a Residence for the caretaker. The site will be accessible from a right turn in only driveway, and a dual entry driveway to be constructed on State Lane east of Highway 38. *Figure 1* illustrates the vicinity map and project location and *Figure 2* illustrates the proposed project site plan.

The project is located in the unincorporated community of Erwin Lake in San Bernardino County. The project is bound by State Lane to the north, Highway 38 to the west, residential homes to the east and south of the project site. Access to the project site is proposed off of State Lane. No direct access is proposed to be from Highway 38.

To address traffic impacts due to the proposed project, a study area encompassing the streets in the area was developed. The study area specifically includes the intersection of Highway 38 and State Lane. Highway 38 provides local and regional access to the study area.

In addition to addressing traffic impacts due specifically to development of the project, this study addresses impacts due to development correlating with the development of the project and cumulative projects up to the year 2035 within the study area. The examination of potential development correlating with the development of the project is known as background traffic. Traffic due to other projects and an estimated straight line growth in the area is added to existing traffic to create a base for analyzing project traffic impacts.

In addition, this report addresses traffic conditions for the future Year 2035 forecast year. Identified as future traffic, the traffic generation of the adjoining projects which is incorporated into the area growth is included. The purpose of the future year analysis is to assure that traffic improvements for the intersection are not needed to accommodate the anticipated future traffic.

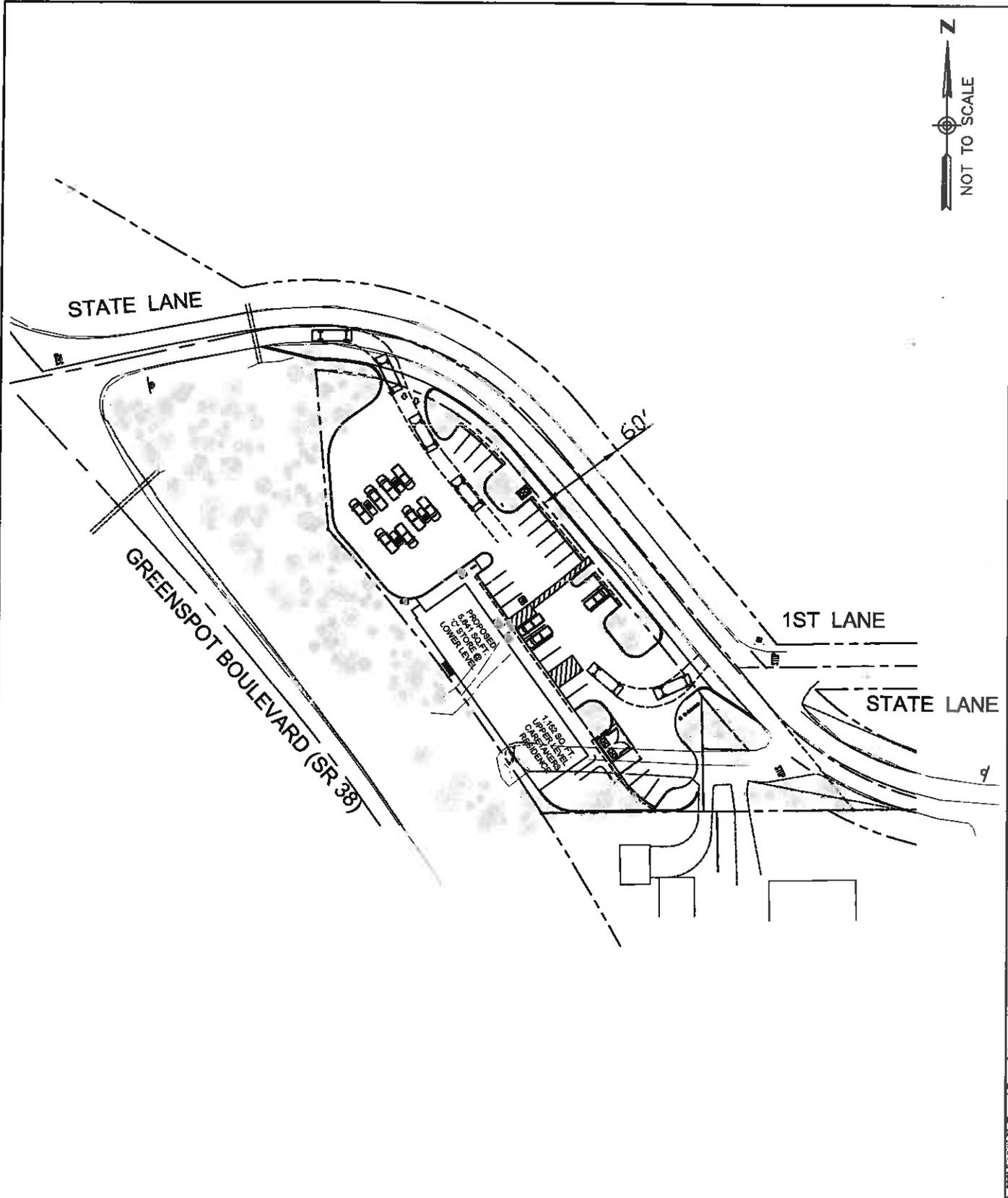


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**VICINITY MAP**  
**EAGLE RIDGE MARKET**  
**ERWIN LAKE, CALIFORNIA**

**FIGURE**  
**1**

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**SITE PLAN**  
**EAGLE RIDGE MARKET**  
**ERWIN LAKE, CALIFORNIA**

**FIGURE**  
**2**

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## 2. EXISTING CONDITIONS

### Existing Street System

The project site currently is vacant and undeveloped. Land uses around the site consist of single family residential developments to the east and south of the project site. Streets in and near the vicinity of the project are mostly paved residential streets with some undeveloped dirt roads. The existing developed roads range in pavement widths of 20 to 50 feet and are in good to fair condition.

The following roadways provide regional access to the project within the study area:

**Greenspot Boulevard/Highway 38** provides local and regional access in the project area. Highway 38 (SR 38) traverses north to south and provides access from the Big Bear Lake area to Redlands/Yucaipa and the Interstate I-10 Freeway. This roadway is primarily a two-lane highway (one lane in each direction). The intersection of Highway 38 and State Lane is currently two-way-stop-controlled.

**State Lane** will provide the primary access to the project site. State Lane is primarily a two-lane paved road (one lane in each direction) fronting the project site east of Highway 38. Currently, State Lane does not consist of a curb and gutter along the property.

**First Lane** is a 25 foot wide local unpaved road. First Lane functions similar to an alley providing access to residential property east of the project.

The project proposes to construct the driveways on State Lane east of Highway 38, as shown on the Site Plan, *Figure 2*. Two existing intersections within the study area has been identified that may potentially be impacted by the project. The intersections are;

- Highway 38 and State Lane
- State Lane and First Lane

Currently both of **these** intersections are controlled by two way stop controls.

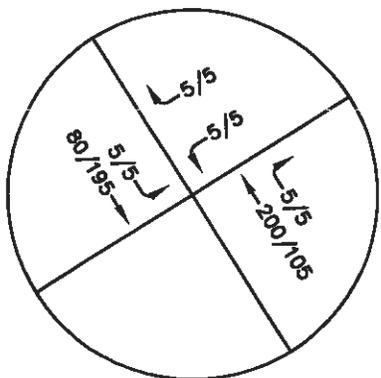
### Existing Traffic Volumes

Newport Traffic Studies staff conducted AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak hour turning movement counts and 24 hour intersection volume count, at the intersection of Highway 38 and State Lane, identified for detailed analysis. These counts were conducted in December of 2012. The resulting volumes are presented in the appendix of this report. *Figure 3* illustrates the existing peak hour traffic volumes in the study area. Turning movement volumes for First lane were not recorded since volumes were so low turning movement volumes were estimated to be conservative.



GREENSPOT BLVD (SR-38)

PROJECT SITE



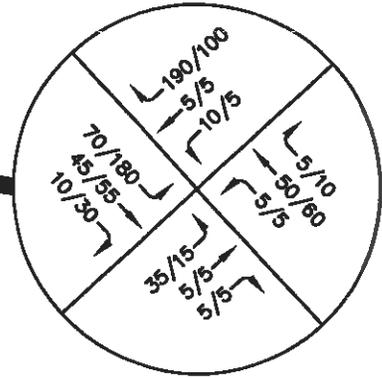
STATE LANE

1ST LANE

STATE COURT

STATE LANE

MITCHELL LANE



**LEGEND**

- - STUDY INTERSECTION
- XX/XX - AM/PM PEAK HOUR VOLUMES

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**EXISTING TRAFFIC VOLUMES**

EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

FIGURE

**3**

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Existing Traffic Analysis

An intersection capacity analysis was conducted for the study intersection to determine a present level-of-service (LOS). Based on the existing intersection geometrics as illustrated in *Figure 4* and traffic volumes during the AM peak hour and PM peak hour, the capacity analysis for the un-signalized intersection was conducted utilizing HCS 2010, which is an un-signalized intersection capacity analysis program, developed by McTrans. This program was developed in accordance with the 2010 Highway Capacity Manual. The analysis determines a level-of-service (LOS), which quantitatively describes the operating characteristics of un-signalized intersections. The LOS ranges from "A" (the best) through "F" (system breakdown). The LOS for the intersection represents the LOS for the critical movement. This is typically the stop controlled left turn from the minor street.

**TABLE 1**  
**INTERSECTION CAPACITY ANALYSIS – EXISTING CONDITIONS**  
 Traffic Study

| Intersection                                   | A.M. Peak |         | P.M. Peak |         |
|--|-----------|---------|-----------|---------|
|  | ICU(1)    | LOS (2) | ICU(1)    | LOS (2) |
| Highway 38 and State Lane (3)                  | 13.6      | B       | 15.4      | C       |
| State Lane and First Lane/Project Driveway (3) | 10.0      | A       | 9.7       | A       |

(1) Intersection Capacity Utilization

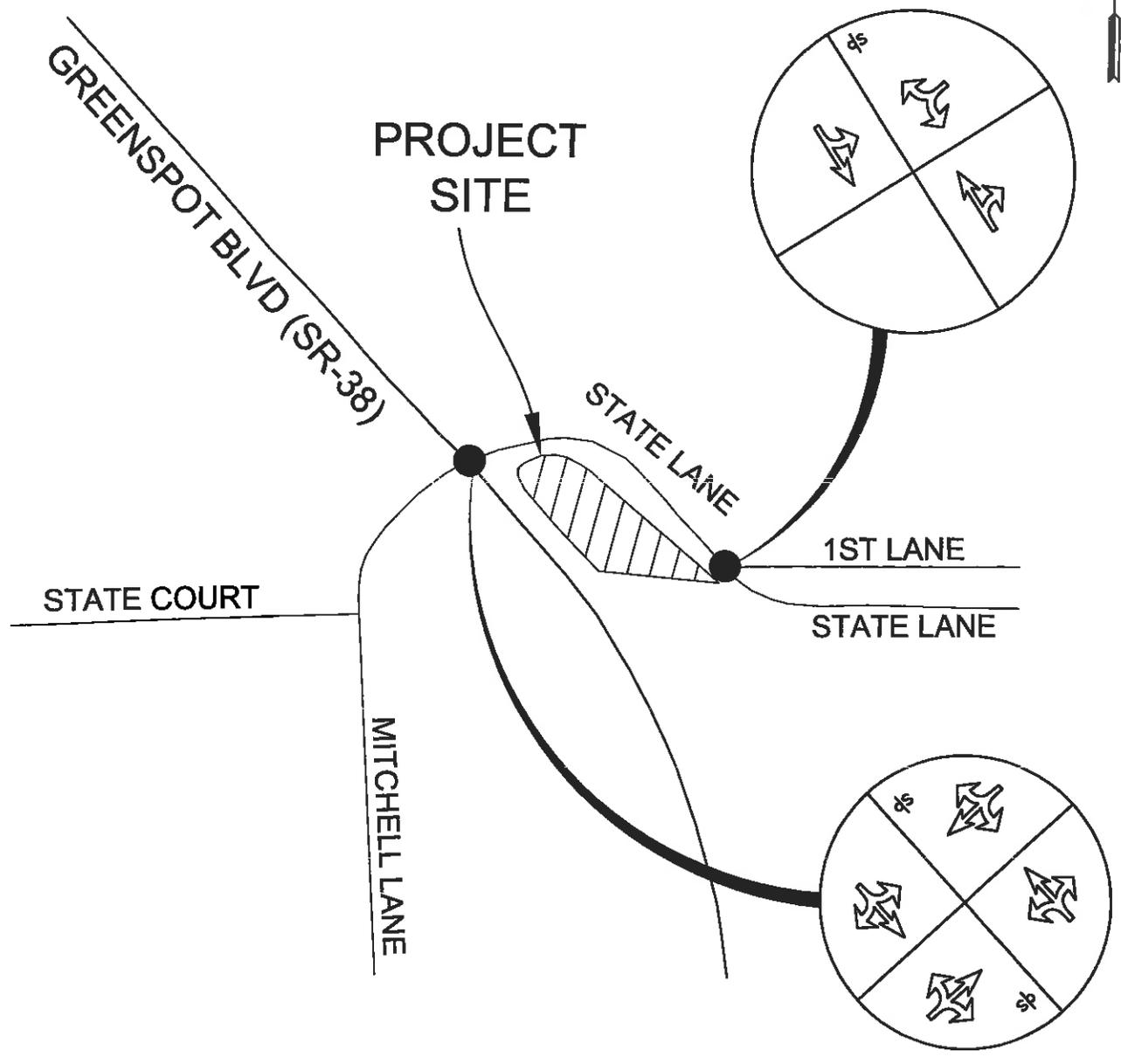
(2) LOS – Level of Service

(3) Un-Signalized Intersection

Source: Hall & Foreman Inc.

As provided in *Table 1* under existing traffic conditions, the un-signalized intersections of Highway 38 and State Lane, and State Lane and First Lane/Project Driveway are operating at LOS "C" or better during both the AM and PM peak hour.

A traffic signal warrant analysis was conducted at the intersection of Highway 38 and State Lane to determine if the installation of a traffic control signal would improve the overall safety and/or operation of the intersection. Traffic Signal Warrant worksheets are provided in the appendix. Consideration is given to the geometrics of each approach and the number of lanes used for the analysis. It was determined that a traffic signal was not warranted based on eight hour volumes, four hour volumes, peak hour volumes, or delay. The level of safety of the intersection was also considered by reviewing accident history for the intersection. The Transportation Injury Mapping System (TIMS) was referenced. TIMS report for Highway 38 and State Lane showed that a single accident occurred within the five year data period. The accident occurrence threshold was not met to require a Traffic Signal installed with concern for safety.



**LEGEND**

- - STUDY INTERSECTIONS
- ➔ - EXISTING GEOMETRIC
- Ⓢ - TRAFFIC SIGNAL
- Ⓢ - UNSIGNALIZED

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**EXISTING INTERSECTION  
 GEOMETRICS**  
 EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

**FIGURE  
 4**

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### 3. BACKGROUND TRAFFIC

#### Area Growth

To analyze the project impacts, the inclusion of traffic generated by other projects within the study area is necessary. Other area projects at the intersections were taken into consideration. The County of San Bernardino has identified one project which would impact the study intersection as presented in Exhibit A in the Appendix of this report. This growth with other area project traffic volumes is known as background traffic.

Typically, regional and local growth is expected over the years at rates ranging from 1% to 2% compounded annually. Based on the existing traffic volumes, a straight line growth at a 2% increase compounded annually was utilized. This growth is known as background traffic. The analysis of background traffic allows a comparison of traffic impacts with and without the project applying the growth to the existing turn movement volumes. *Figure 5* illustrates year 2014 background traffic volumes.

#### Background Traffic Analysis

To determine the impacts of the project to the study intersection, existing plus the anticipated background traffic project peak hour volumes were calculated. The analysis was conducted with the existing intersection geometrics.

**TABLE 2**  
**INTERSECTION CAPACITY ANALYSIS – EXISTING PLUS BACKGROUND CONDITIONS**  
**Traffic Study**

| Intersection                                   | A.M. Peak |         | P.M. Peak |         |
|--|-----------|---------|-----------|---------|
|  | ICU(1)    | LOS (2) | ICU(1)    | LOS (2) |
| Highway 38 and State Lane (3)                  | 14.4      | B       | 16.3      | C       |
| State Lane and First Lane/Project Driveway (3) | 10.1      | B       | 9.8       | A       |

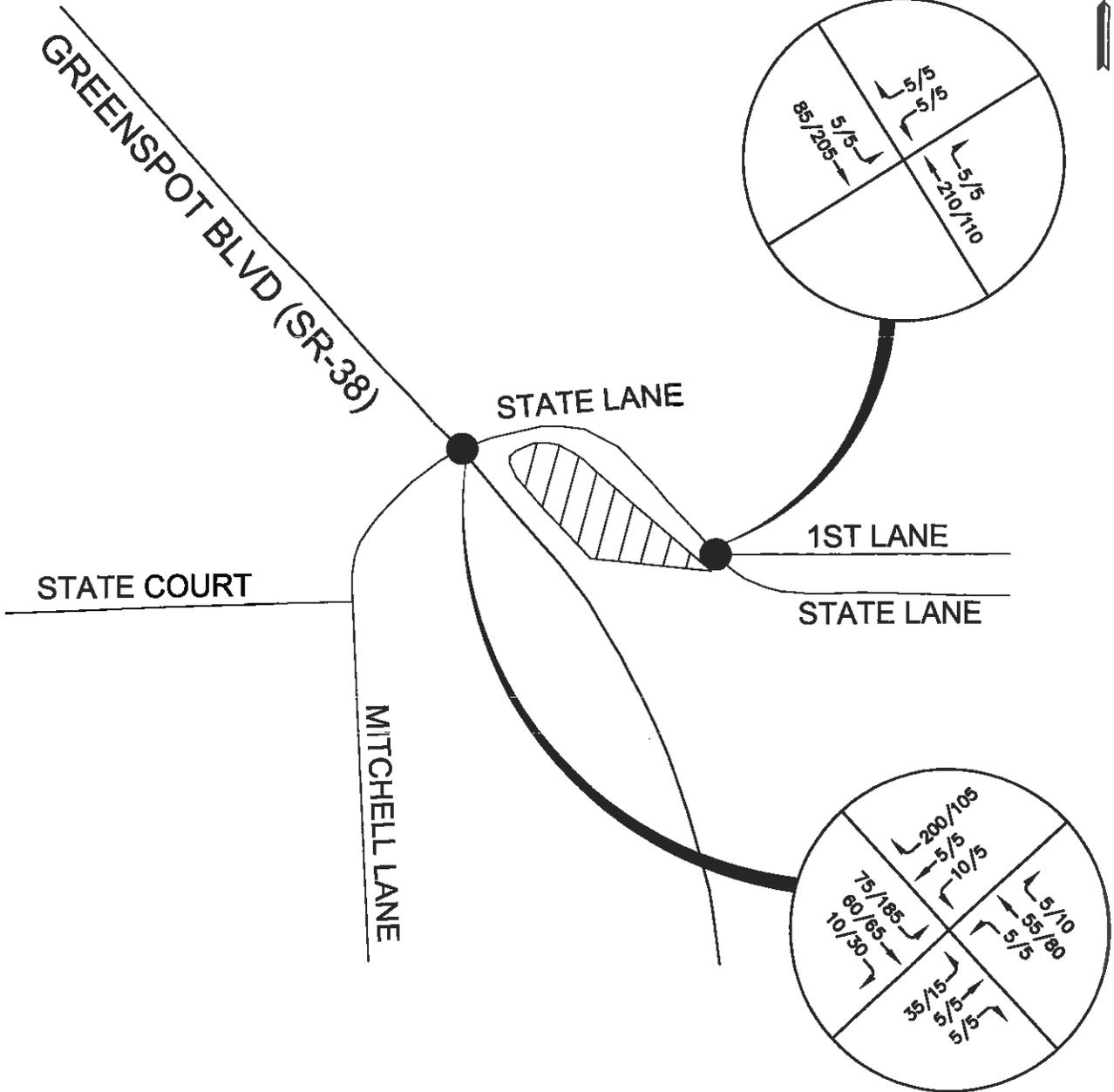
(1) Intersection Capacity Utilization

(2) LOS – Level of Service

(3) Un-Signalized Intersection

Source: Hall & Foreman Inc.

As provided in *Table 2* under existing plus background traffic conditions, the un-signalized intersections of Highway 38 and State Lane, and State Lane and First Lane/Project Driveway are anticipated to continue to operate at LOS "C" or better during both the AM and PM peak hour.



**LEGEND**

- - STUDY INTERSECTION
- XX/XX - AM/PM PEAK HOUR VOLUMES

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**YEAR 2013 BACKGROUND  
 TRAFFIC VOLUMES**  
 EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

**FIGURE  
 5**

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#### 4. PROJECT CONDITIONS

##### Project Trip Generation

The project was analyzed to determine the amount of traffic that would be generated from the proposed development. To identify potential traffic impacts from the project, trip generation factors were applied to the type of use to generate project traffic estimates. The trip generation rates were obtained from the 9th edition of the Institute of Transportation Engineers trip generation report as presented in *Table 3*. The project site consists of a convenience market and a Residence for the caretaker. The trip generation accounts for the trips generated by the Caretaker's residence, since the trips produced are negligible and can be assumed in the rounding of distributed project trips.

**TABLE 3**  
**PROJECT TRIP GENERATION**  
 Traffic Impact Analysis

|          | Use   | Daily        | A.M. Peak Hour |           |            | P.M. Peak Hour |           |            |
|----------|---|--------------|----------------|-----------|------------|----------------|-----------|------------|
|          |   |              | In             | Out       | Total      | In             | Out       | Total      |
| <b>1</b> | <b>Convenience Market with Gasoline Pumps</b> |              |                |           |            |                |           |            |
|          | (ITE 853) Per Fueling Positions               | 542.60       | 8.29           | 8.29      | 16.57      | 9.54           | 9.54      | 19.07      |
|          | 8 Fueling Positions                           | 4,341        | 66             | 66        | 133        | 76             | 76        | 153        |
|          | Pass by Reduction (15%)                       | 651          | 10             | 10        | 20         | 11             | 11        | 23         |
|          | <b>Primary Trips</b>                          | <b>3,690</b> | <b>56</b>      | <b>56</b> | <b>113</b> | <b>65</b>      | <b>65</b> | <b>130</b> |

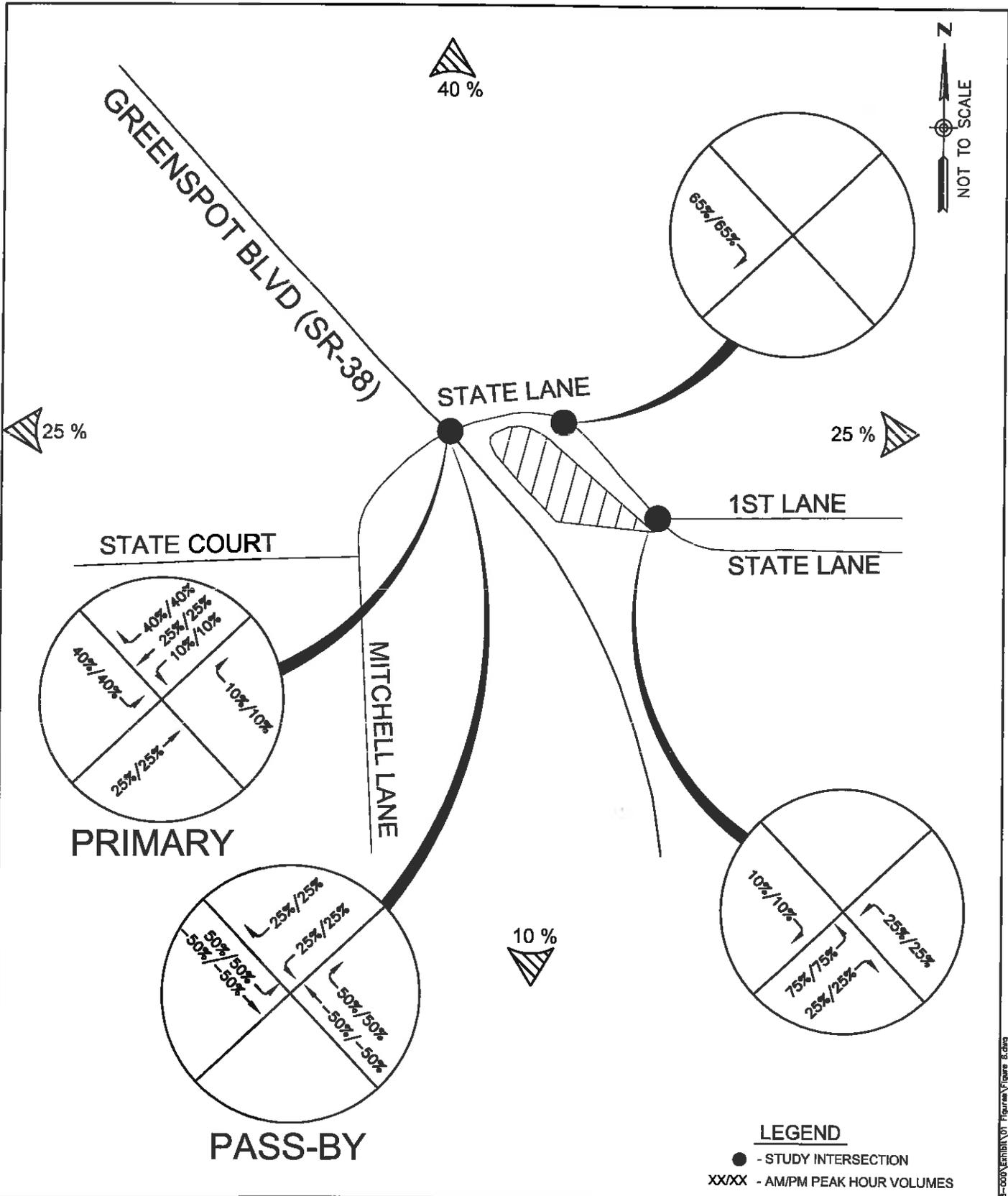
Source: Institute of Transportation Engineers' Trip Generation Report, 9<sup>th</sup> Edition

As presented, it is estimated that the project will generate 3,690 primary daily trips, and 113 primary trips during the AM Peak Hour, and 130 primary trips during the PM Peak Hour.

##### Project Trip Distribution

To address the impacts of the estimated project traffic, the trips were distributed and assigned to the surrounding streets and study intersection. The project traffic was distributed based on the anticipated project utilization. Once the distribution pattern was established, project trips were assigned to the area streets that serve the project.

*Figure 6* illustrates the general and specific estimated distribution pattern for the primary and pass-by project trips. *Figure 7* illustrates the estimated AM and PM peak hours for the project traffic volumes. The project traffic was added to the existing traffic volume to assess the impacts generated.



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**PROJECT TRIP DISTRIBUTION**

**EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA**

**FIGURE**

**6**



GREENSPOT BLVD (SR-38)

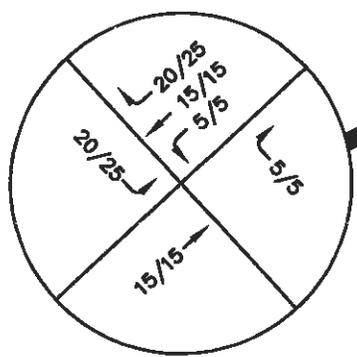
STATE LANE

STATE COURT

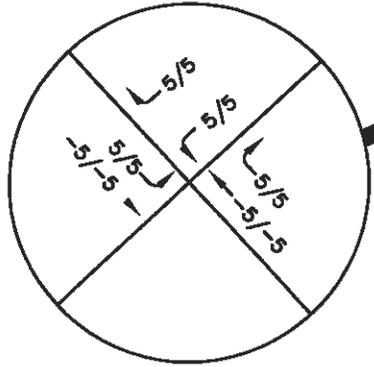
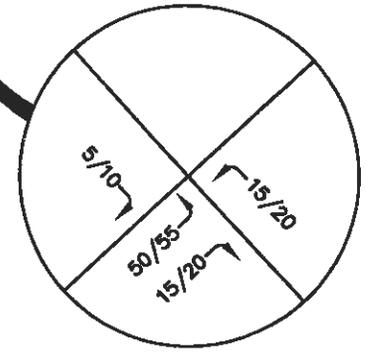
1ST LANE

STATE LANE

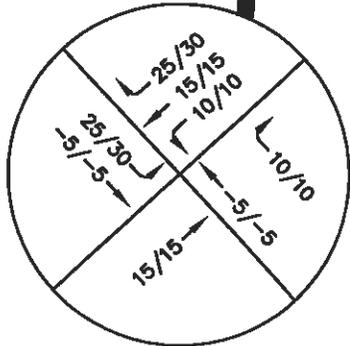
MITCHELL LANE



PRIMARY



PASS-BY



TOTAL

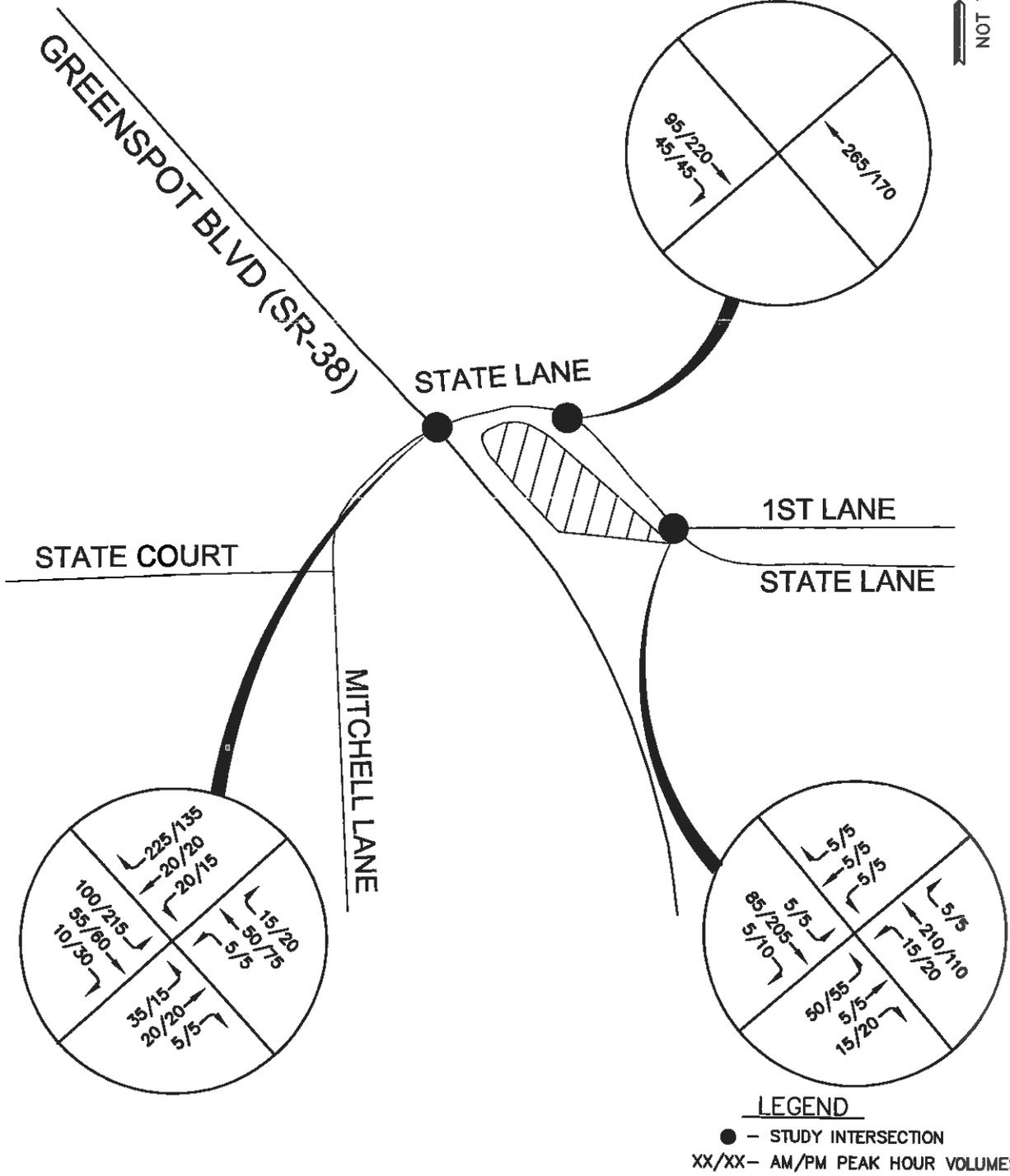
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 ● - STUDY INTERSECTION  
 XX/XX - AM/PM PEAK HOUR VOLUMES

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**PROJECT TRIPS**  
 EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

**FIGURE**  
 7

Project Name: Eagle Ridge Market, Victorville, CA  
 Date: 12/13/12  
 Prepared by: T. Moore



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**PROJECT TRAFFIC VOLUMES**

EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

**FIGURE**

**8**

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## Project Traffic Analysis

Based on the proposed traffic distribution, assignment patterns and project trip generation, intersection capacity analyses were conducted to assess the estimated project impacts. To determine the project impacts at the study intersection and driveways, the Background Year 2014 volumes and project trips, known as Project Conditions illustrated in *Figure 8*, were calculated.

Intersection capacity analysis for the existing signalized intersection was performed using the same methodology as presented in Chapter 1.

**TABLE 4**  
**INTERSECTION CAPACITY ANALYSIS – PROJECT CONDITIONS**  
**Traffic Study**

| Intersection                                   | A.M. Peak |         | P.M. Peak |         |
|--|-----------|---------|-----------|---------|
|  | ICU(1)    | LOS (2) | ICU(1)    | LOS (2) |
| Highway 38 and State Lane (3)                  | 15.7      | C       | 19.4      | C       |
| State Lane and First Lane/Project Driveway (3) | 11.6      | B       | 12.3      | B       |

(1) Intersection Capacity Utilization

(2) LOS – Level of Service

(3) Un-Signalized Intersection

Source: Hall & Foreman Inc.

As presented in *Table 4* under project traffic conditions, the un-signalized intersections of Highway 38 and State Lane, and State Lane and First Lane/Project Driveway are anticipated to continue to operate at LOS “C” or better during both the AM and PM peak hour, utilizing the existing intersection geometrics.

The project proposes to align the full access second driveway with the existing adjacent road First Lane. The proposed intersection will be an un-signalized two-way stop controlled intersection, providing free movement along State Lane. Potential sight distance constraints were evaluated prior to selection of the location of the second driveway due to the alignment of State Lane. The “Corner Sight Distance Triangle” utilized the current advisory speed of 20 mph. The north-west bound traffic currently has an advisory speed posted upon the approach of the westbound reverse curve on State Lane. The south-east bound traffic currently has an advisory speed posted upon the eastbound approach of the reverse curve on State Lane. The Caltrans Highway Design Manual presents a corner sight distance requirement of 7.5 second travel time for a vehicle to cross from a minor road. Based on the current advisory speed of 20 mph and the 7.5 second travel time the sight distance requirement would be 220 feet.

## 5. FUTURE CONDITIONS

### Area Growth

This report is primarily concerned with traffic impacts created by the proposed project. However, growth within the study area due to development will occur. To analyze the future conditions a 2% growth per year of the existing peak hour volumes was considered. The results of the year 2035 with and without project forecasted calculations are illustrated respectively in *Figure 9* and *Figure 10*, and presented in the Turn Movement summary worksheets in the report appendix.

### Future Traffic Analysis

The intersection of Highway 38 and State Lane was analyzed using the capacity analysis methodology described in Chapter 1. The analysis was conducted with the anticipated project and Future Year 2035 traffic volumes and the existing intersection geometrics. The results of the analysis are shown in *Table 5* and *Table 6*.

**TABLE 5**

**INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – W/O PROJECT**

#### **Traffic Impact Analysis**

| Intersection                                   | A.M. Peak |         | P.M. Peak |         |
|--|-----------|---------|-----------|---------|
|  | ICU(1)    | LOS (2) | ICU(1)    | LOS (2) |
| Highway 38 and State Lane (3)                  | 19.0      | C       | 23.6      | C       |
| State Lane and First Lane/Project Driveway (3) | 10.7      | B       | 10.4      | B       |

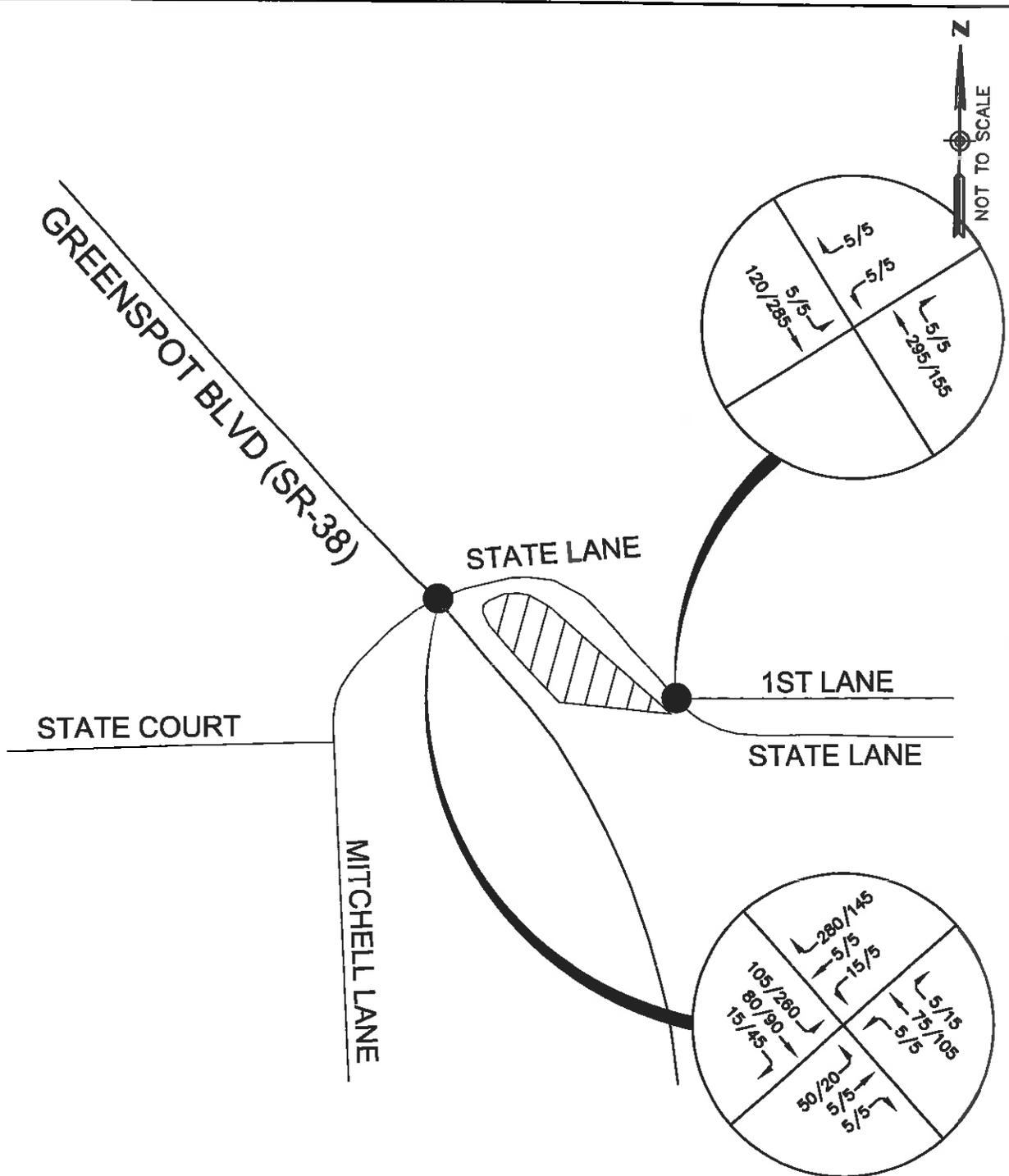
(1) Delay – In Seconds

(2) LOS – Level of Service

(3) Un-Signalized Intersection

Source: Hall & Foreman Inc.

As presented in *Table 5* under Year 2035 traffic conditions, the un-signalized intersections of Highway 38 and State Lane, and State Lane and First Lane/Project Driveway are anticipated to continue to operate at LOS "C" or better during both the AM and PM peak hour, utilizing the existing intersection geometrics.



**LEGEND**

- - STUDY INTERSECTION
- XX/XX - AM/PM PEAK HOUR VOLUMES

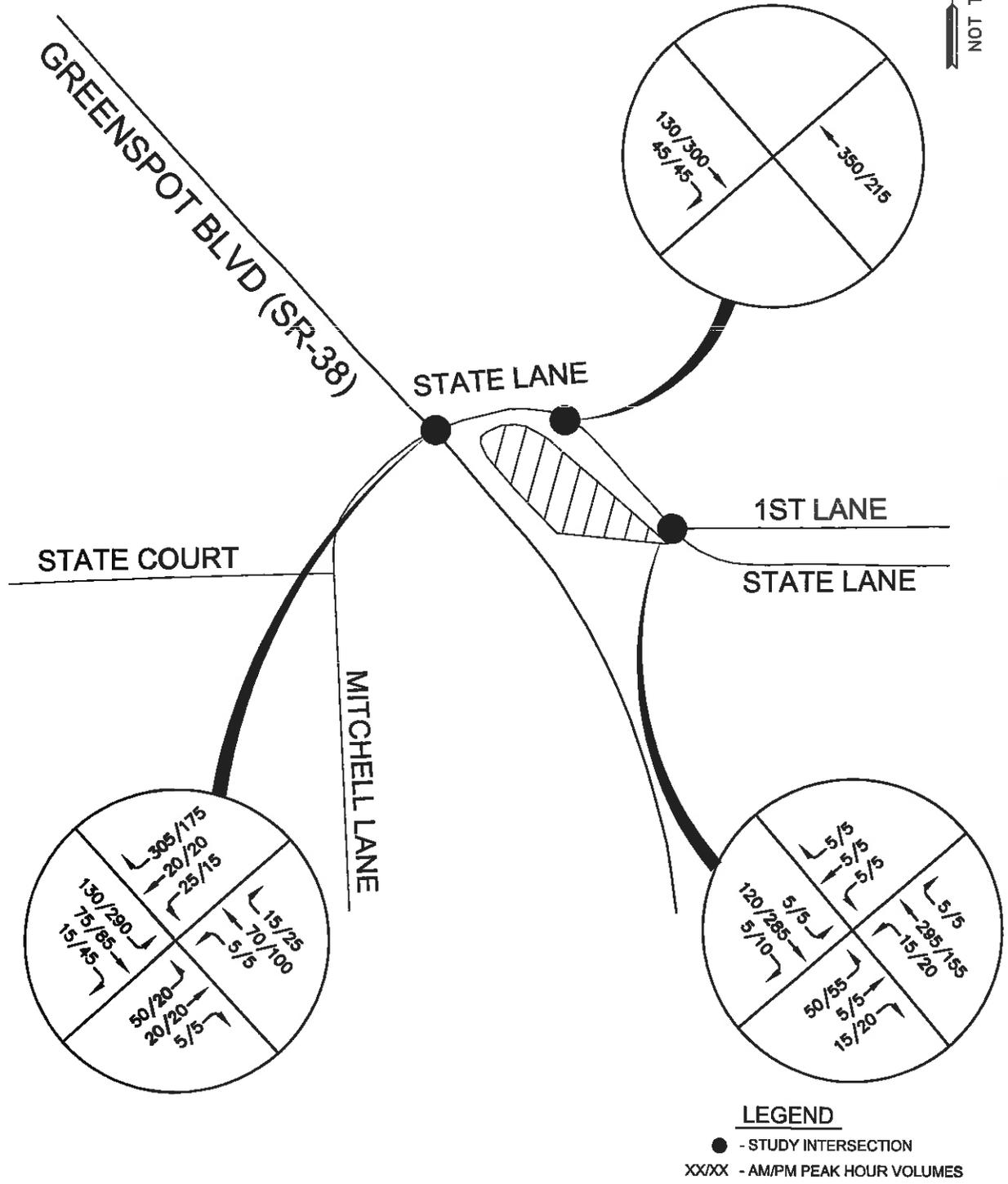
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**YEAR 2035 WITHOUT PROJECT  
 TRAFFIC VOLUMES**

**EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA**

**FIGURE  
 9**

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**YEAR 2035 WITH  
 PROJECT TRAFFIC VOLUMES**

**EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA**

**FIGURE  
 10**

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 Last Updated: Jun 12, 2013 - 7:51pm by: TImenez

**TABLE 6**  
**INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – WITH PROJECT**  
**Traffic Impact Analysis**

| Intersection                                   | A.M. Peak |         | P.M. Peak |         |
|--|-----------|---------|-----------|---------|
|  | ICU(1)    | LOS (2) | ICU(1)    | LOS (2) |
| Highway 38 and State Lane (3)                  | 21.9      | C       | 29.6      | D       |
| State Lane and First Lane/Project Driveway (3) | 12.8      | B       | 13.6      | B       |

(1) Delay – In Seconds

(2) LOS – Level of Service

(3) Un-Signalized Intersection

Source: Hall & Foreman Inc.

As presented in *Table 6* under Year 2035 traffic conditions with project, the un-signalized intersections of Highway 38 and State Lane, and State Lane and First Lane/Project Driveway are anticipated to continue to operate at an acceptable LOS during the AM and PM peak hours, with the existing intersection geometrics.

## 6. PROJECT MITIGATION AND SUMMARY

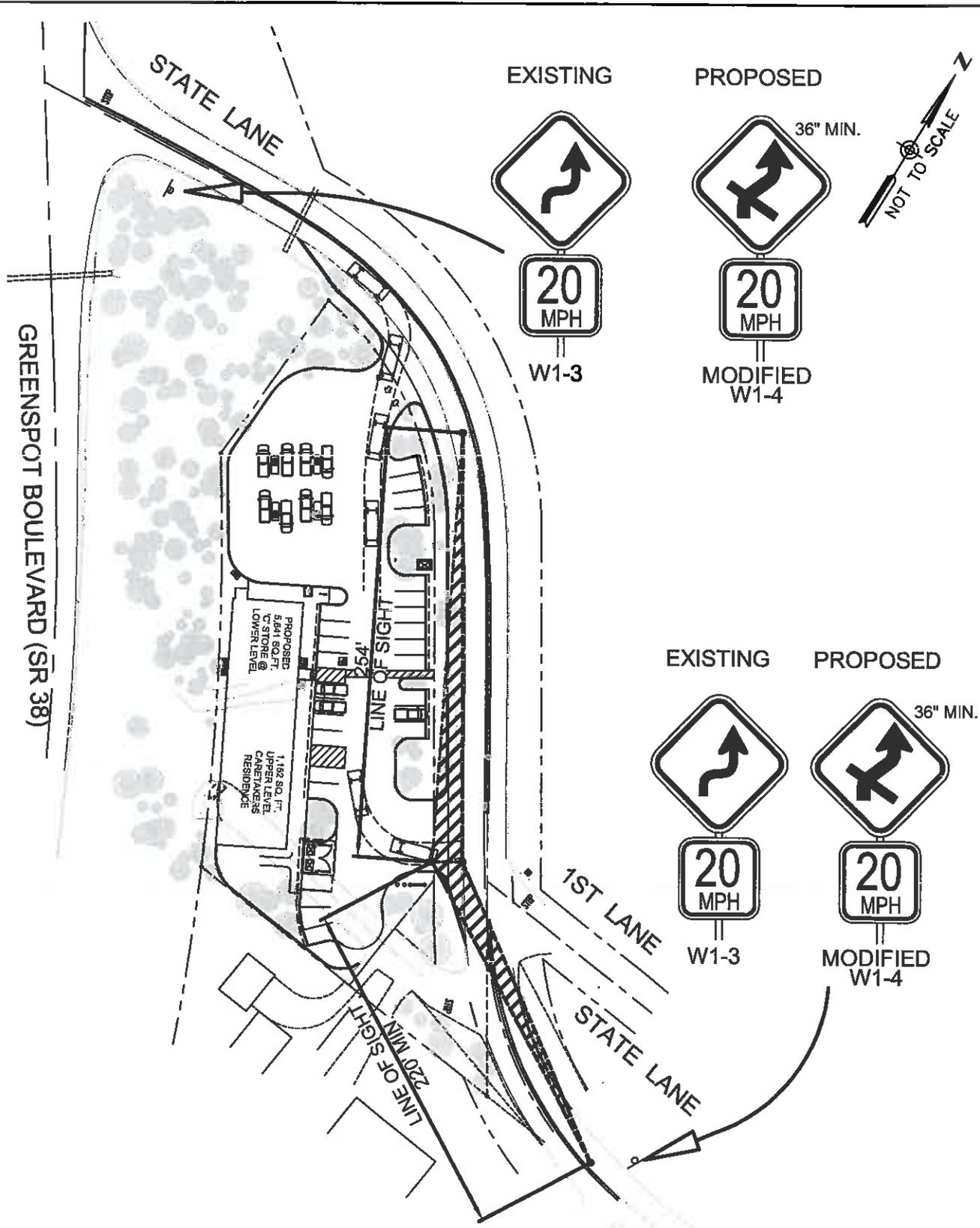
In summary, the project as presented will not cause any significant negative impacts to the surrounding street system. The street system will be adequate to handle estimated project and future traffic with the existing intersection geometrics.

### **Project Condition - Year 2014 Mitigations**

Presented, the project proposes to construct a right turn in only driveway (Driveway #1) and a full access driveway (Driveway #2) on State Lane. Driveway access is not proposed on Greenspot Boulevard (SR-38). Curb and gutter along State Lane project will be constructed.

Driveway #2, which is opposite of First Lane, will be a two-way stop controlled intersection at the driveway and First Lane approaches. Potential sight distance constraints were evaluated for Driveway #2 due to the alignment of State Lane. A "Corner Sight Distance Triangle" was evaluated for both westbound and eastbound traffic. The Caltrans Highway Design Manual presents a corner sight distance requirement of 7.5 second travel time for a vehicle to cross from a minor road. Based on the current advisory speed of 20 mph and the 7.5 second travel time the sight distance minimum requirement would be 220 feet.

Project mitigations and Sight Distance Triangles are illustrated in *Figure 11*. The figure illustrates the placement of the second driveway accommodating the minimum corner sight distance of 220 feet for the westbound traffic traveling at the advisory speed of 20 mph. The eastbound traffic traveling at the advisory speed of 20 mph are also provided with adequate corner sight distance, providing 254 foot line of sight.



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**PROPOSED PROJECT  
 MITIGATIONS**  
 EAGLE RIDGE MARKET  
 ERWIN LAKE, CALIFORNIA

**FIGURE  
 11**

Drawing Name: V:\30048\Eng\30048-000\Kestibot\01 Figures\Figure 11.dwg  
 Last Updated: Jun 14, 2013 - 3:13pm by: Talmaz

## **APPENDIX**

1. Other Area Projects
2. Intersection Capacity Analysis Calculations
3. Traffic Signal Warrant Worksheets – Highway 38 and State Lane

