

Report for:

Sheldon Road/SR-99 General Plan Amendment Traffic Analysis

Prepared for:
City of Elk Grove, CA

Dowling Associates, Inc.

Transportation Engineering • Planning • Research • Education



May 22, 2008

Submitted by:
180 Grand Avenue, Suite 250
Oakland, CA 94612
Phone: (510) 839-1742; Fax: (510) 839-0871
www.dowlinginc.com

Table of Contents

Executive Summary	5
Introduction.....	7
Setting	8
Study Area Roadways	8
Data Collection	10
Significance Criteria	11
Intersection Level of Service Methods	11
Existing Conditions	13
Traffic Volumes	13
Intersection Levels of Service (LOS).....	15
Roadway Levels of Service.....	16
Baseline Conditions	17
Assumptions.....	17
Traffic Volumes	17
Intersection Levels of Service (LOS).....	19
Roadway Levels of Service.....	20
Baseline + Project Conditions	21
Assumptions.....	21
Traffic Volumes	21
Intersection Levels of Service (LOS).....	23
Roadway Levels of Service.....	25
Cumulative Conditions.....	26
Assumptions.....	26

Intersection Levels of Service (LOS)	29
Roadway Levels of Service	30
Cumulative + Project Conditions	31
Assumptions	31
Intersection Levels of Service (LOS)	33
Roadway Levels of Service	35
Impacts and Mitigation Measures	36

List of Figures

Figure 1: Sheldon Road/SR-99 Study Area	9
Figure 2: Existing Conditions Peak Hour Volumes and Geometries	14
Figure 3: Baseline Conditions Peak Hour Volumes and Geometries.....	18
Figure 4: Baseline + Project Conditions Peak Hour Volumes and Geometries.....	22
Figure 5: Cumulative Conditions Peak Hour Volumes and Geometries.....	28
Figure 6: Cumulative + Project Conditions Peak Hour Volumes and Geometries	32

List of Tables

Table 1: Level of Service Criteria for Signalized Intersections.....	12
Table 2: Level of Service Criteria for Unsignalized Intersections.....	12
Table 3: Peak Hour Level of Service Criteria for City Roadways	13
Table 4: Existing Intersection Levels of Service	15
Table 5: Existing Roadway Segment Peak Hour Levels of Service.....	16
Table 6: Baseline Intersection Levels of Service.....	19
Table 7: Baseline Roadway Segment Peak Hour Levels of Service	20
Table 8: Baseline + Project Intersection Levels of Service.....	23
Table 9: Baseline + Project Roadway Segment Peak Hour Levels of Service	25
Table 10: Cumulative Intersection Levels of Service	29
Table 11: Cumulative Roadway Segment Peak Hour Levels of Service.....	30
Table 12: Cumulative + Project Intersection Levels of Service	33
Table 13: Cumulative + Project Roadway Segment Peak Hour Levels of Service....	35

Executive Summary

This report documents the findings of the traffic analysis completed for the Sheldon Road/SR-99 General Plan Amendment and Rezone project in the City of Elk Grove.

This study evaluated the performance of the key intersections and roadway segments under Existing, Baseline, and Cumulative Conditions. Intersections were evaluated using the SYNCHRO 7 software package and the Highway Capacity Manual (HCM) 2000 methodology. Intersection and roadway segment operations were evaluated based on level of service thresholds required by the City of Elk Grove Traffic Impact Analysis Guidelines.

The results of the analysis indicate that the following study facilities under existing conditions (2007) operate at unacceptable levels of service:

- Sheldon Road & East Stockton Boulevard during the PM peak hour
- SR-99 Southbound Off-Ramp & West Stockton Boulevard during the PM peak hour
- Sheldon Road between Bruceville Road and West Stockton Boulevard

The other study intersections and roadway segments operate at acceptable levels of service.

Under Baseline Conditions, which includes approved projects and roadway improvements along Sheldon Road and the SR-99 interchange, the Sheldon Road/SR-99 General Plan Amendment and Rezone project would cause significant impacts at following study intersections:

- Sheldon Road & Bruceville Road
- Sheldon Road & Lewis Stein Road
- Sheldon Road & East Stockton Boulevard
- Sheldon Road & Elk Grove-Florin Road

Under Cumulative Conditions, the Sheldon Road/SR-99 General Plan Amendment and Rezone project would cause significant impacts at following study intersections and roadway segments:

- Sheldon Road & Bruceville Road
- Sheldon Road & Lewis Stein Road
- Sheldon Road & West Stockton Boulevard
- Sheldon Road & East Stockton Boulevard
- Sheldon Road & Power Inn Road

- Sheldon Road & Vytina Drive
- Sheldon Road & Freesia Drive
- Sheldon Road & Elk Grove-Florin Road
- Sheldon Road & SR-99 Northbound Ramps
- Sheldon Road between West Stockton Boulevard and East Stockton Boulevard
- Sheldon Road between East Stockton Boulevard and Elk Grove-Florin Road

Each of the above intersections/segments have an identified impact because they either operate acceptably under the no project scenario and the project causes them to operate unacceptably, or the intersection/segment operates unacceptably and the plus project scenario causes the intersection's delay to increase by more than 5 seconds or the segment's v/c to increase by 0.05 or more.

With the completion of the Sheldon / SR 99 interchange the signalized intersections along Sheldon Road, from Bruceville Road to Elk Grove-Florin, will be interconnected and controlled by the City of Elk Grove's Traffic Operation Center (TOC). The Traffic Operation's Center will allow the signals to communicate with one another, and will automatically adjust the signal's timing to the demands of traffic.

The signal timing of each of the intersections can be modified to reduce their impact to within 5 seconds of the no project delay. However, the isolated fixed intersection signal timing does not allow the flexibility for the signal to adjust to the demands of traffic as will be possible with the fully interconnected system dynamically controlled through the City's TOC. Since there are no methods to model the effects of this interconnected system on levels of service and since the City will not put in a fixed timing for each intersection, the impacts identified in this study will remain significant.

Introduction

The Sheldon Road/SR-99 General Plan Amendment and Rezone project consists of changing the General Plan land use designations and zoning designations on 18 separate parcels.

Properties examined for inclusion in the General Plan Amendment and Rezone are located mainly within the northeast quadrant of the Sheldon Road/SR-99 interchange. The intent of the General Plan Amendment and Rezone is to allow for the development of land uses that are compatible with the interchange alignment. For example, based on the realigned East Stockton Boulevard, multiple parcels on the north side of Sheldon Road have increased commercial potential as a result of improved access and visibility. These parcels are therefore proposed for the Commercial land use designation by this project. The project includes amending the land use designation of parcels to create a cohesive area available for future retail development and to provide a buffer between future commercial and existing single family residential developments.

The purpose of this traffic analysis is to estimate traffic demand at the study intersections and roadway segments to identify the improvements necessary in conjunction with the Sheldon Road/SR-99 General Plan Amendment and Rezone.

Setting

Study Area Roadways

The following roads are in the project vicinity as shown in Figure 1.

Sheldon Road

Sheldon Road is generally a four-lane arterial running east-west from Grant Line Boulevard in the east to Bruceville Road in the west. At Bruceville Road, Sheldon Road becomes Center Parkway and turns north.

State Route 99

SR-99 is a grade-separated, 4 to 6-lane freeway facility as it runs north-south through the City of Elk Grove. It is one of the main north-south central valley freeways in California, running from Kern County in the south, north to its terminus in the City of Sacramento. As such, it is the main route for commuters between Elk Grove and Sacramento.

Elk Grove-Florin Road

Elk Grove-Florin Road is a 4-lane arterial in the vicinity of the study area. It begins as a two-lane arterial in the south at its intersection with East Stockton Boulevard and travels north to its terminus at Florin Road in the City of Sacramento. Elk Grove-Florin Road widens from a 2-lane arterial to a 4-lane arterial at its intersection with Elk Grove Boulevard.

Calvine Road

Calvine Road runs east-west directly north of, and parallel, to Sheldon Road. It starts at Grant Line Road in the east as a two-lane arterial. West of Waterman Road, it becomes a four to six-lanes arterial. West of SR-99, Calvine Road becomes Cosumnes River Boulevard.

Laguna Boulevard

Laguna Boulevard runs east-west directly south of, and parallel, to Sheldon Road. It starts at Interstate 5 in the west as a six-lane arterial. From Big Horn Blvd to the SR 99 southbound off ramp, it is an 8-lane facility. From the SR 99 southbound off ramp to northbound ramp, it becomes a 7-lane road, with four lanes running west and three running west. West of SR-99, Laguna Boulevard becomes Bond Road and is a 6-lane facility.



Not to Scale

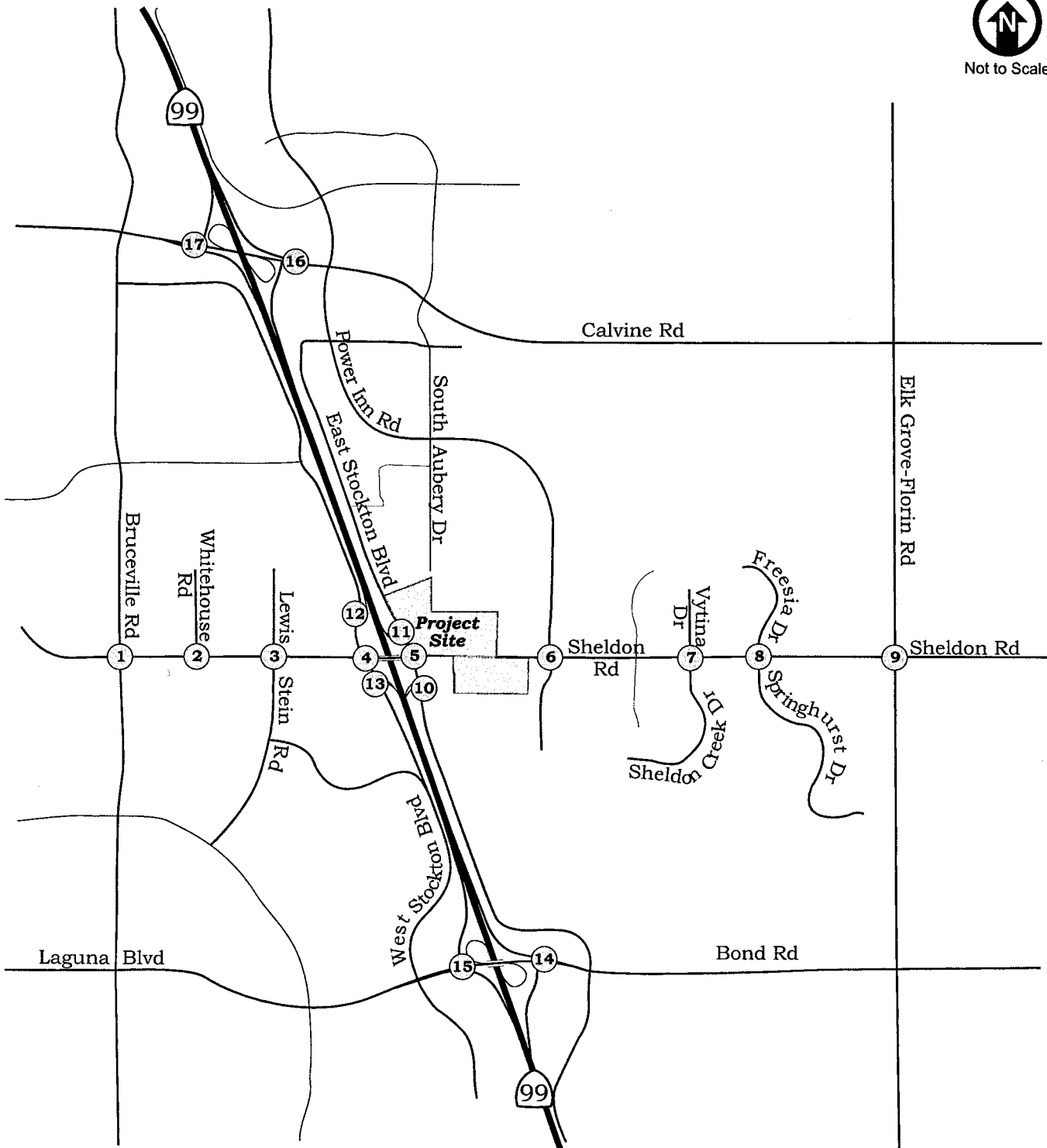


Figure 1
Study Area

Data Collection

Traffic count data was collected for the following 17 study intersections and 11 study roadway segments as part of this study:

1. Sheldon Road & Bruceville Road
 2. Sheldon Road & Whitehouse Road
 3. Sheldon Road & Lewis Stein Road
 4. Sheldon Road & West Stockton Blvd.
 5. Sheldon Road & East Stockton Blvd.
 6. Sheldon Road & Power Inn Road
 7. Sheldon Road & Vytina Drive/Sheldon Creek Drive
 8. Sheldon Road & Freesia Drive/Springhurst Drive
 9. Sheldon Road & Elk Grove-Florin Road
 10. East Stockton Blvd. & SR-99 NB Off-Ramp
 11. East Stockton Blvd. & SR-99 NB On-Ramp
 12. West Stockton Blvd. & SR-99 SB Off-Ramp
 13. West Stockton Blvd. & SR-99 SB On-Ramp
 14. Laguna Blvd. & SR-99 NB Ramps
 15. Laguna Blvd. & SR-99 SB Ramps
 16. Calvine Road & SR-99 NB Ramps
 17. Calvine Road & SR-99 SB Ramps
-
- a. Sheldon Road between Bruceville Road and West Stockton Boulevard
 - b. Sheldon Road between West Stockton Boulevard and East Stockton Boulevard
 - c. Sheldon Road between East Stockton Boulevard and Elk Grove-Florin Road
 - d. Sheldon Road between Elk Grove-Florin Road and Bradshaw Road
 - e. Bruceville Road between Sheldon Road and Jacinto Road
 - f. Bruceville Road between Sheldon Road and Laguna Boulevard
 - g. Elk Grove-Florin Road between Bond Road and Calvine Road
 - h. SR-99 between Laguna Boulevard and Sheldon Road
 - i. SR-99 between Sheldon Road and Calvine Road
 - j. SR-99 between Calvine Road and Stockton Boulevard
 - k. SR-99 between Elk Grove Boulevard and Laguna Boulevard

The intersection turning movement counts were conducted on Wednesday, December 5, 2007 during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods. The counts at the SR-99 ramp intersections were collected from 6:00 to 10:00 AM and 3:00 to 7:00 PM.

Bi-directional 24-hour machine counts on the City roadway segments (Sheldon Road, Bruceville Road, and Elk Grove-Florin Road) were collected on December 5-6, 2007. Existing traffic volumes on SR-99 were obtained from Caltrans.

Significance Criteria

The significance criteria for project impacts are established in the City of Elk Grove's Traffic Impact Guidelines.

For intersections and roadway segments, an impact is considered significant when the project causes the facility to change from LOS A, B, C or D to LOS E or F. For facilities that are or will be operating at unacceptable levels of service without the project, an impact is considered significant if the project:

- 1) increases the average delay at intersections by more than five seconds, or
- 2) increases the volume-to-capacity (v/c) ratio on a roadway ratio by 0.05 or more.

Intersection Level of Service Methods

The methodology used herein to analyze intersection level of service is outlined in the Transportation Research Board's Highway Capacity Manual, 2000. Level of service is a concept used by traffic engineers to describe the peak hour traffic conditions at a given intersection or segment. There are six levels of service, Level A through Level F, with A being the least congested and F being the most congested.

At unsignalized intersections, the level of service is determined by the weighted average delay for all vehicles entering the intersection. The methodologies for these types of intersections calculate a single weighted average delay and LOS for the intersection as a whole. The average delay criteria used to determine the level of service at signalized intersections are presented in Table 1. Table 2 presents the average delay criteria used to determine the level of service at unsignalized intersections.

Table 1: Level of Service Criteria for Signalized Intersections

Level of Service	Average Delay ¹ (secs/veh)	Description
A	≤ 10.0	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	10.1-20.0	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	20.1-35.0	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (<i>to service all waiting vehicles</i>) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	35.1-55.0	Approaching Unstable/Tolerable Delays: 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	55.1-80.0	Unstable Operation/Significant Delays: This is considered by many agencies the upper limit of acceptable delays. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80.0	Excessive Delays: Describes operations with average delay in excess of 60 seconds per vehicle. This level, considered to be unacceptable to most drivers, often occurs with over saturation (i.e., when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

¹ Weighted average of delay on all approaches. This is the measure used by the Highway Capacity Manual to determine level of service.

Source: Highway Capacity Manual 2000, Transportation Research Board, Washington DC

Table 2: Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay ¹ (Seconds/Veh)
A	0.0 - 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	> 50.0

¹ Weighted average of delay

Source: Highway Capacity Manual 2000, Transportation Research Board, Washington DC

Peak hour levels of service for City roadway and freeway segments were determined by comparing volume-to-capacity ratios against threshold based on City of Elk Grove's standards. Table 3 shows the peak hour level of service thresholds for study roadway segments.

Table 3: Peak Hour Level of Service Criteria for City Roadways

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

Existing Conditions

Traffic Volumes

Traffic turning movement counts for the study intersection were conducted in December 2007 during the AM and PM peak periods. The traffic counts were conducted early in December while school was in session. The results of the counts are shown in Figure 2.

