LEMOORE PLANNING COMMISSION
Regular Meeting
AGENDA
Lemoore Council Chambers
429 'C' Street

February 8, 2016
7:00 p.m.

1. Pledge of Allegiance and Roll Call
2. Public Comments and Inquiries

If you wish to comment on an item, which is not on the agenda, you may do so under "Public Comment." In order to allow time for all public comments, each individual's comments are limited to five minutes. When addressing the Commission, you are requested to come forward to the speaker's microphone, state your name and address, and then proceed with your presentation.

3. Approval – Minutes – Regular Meeting, January 11, 2016
4. Presentation and Request for Comment – State Route 198 Corridor Preservation and Improvement Strategic Plan – Draft Report
5. Planning Director's Report – Judy Holwell, Interim Planning Director
6. Commission's Report and Request for Information

Adjournment

Tentative Future Items

March 14, 2016
City Ordinance – Temporary Use Permit Zoning Changes
City Ordinance – Zone Changes for More Allowable Uses in Certain Zones

Notice of ADA Compliance: If you or anyone in your party needs reasonable accommodation to attend, or participate in, any Planning Commission Meeting, please make arrangements by contacting City Hall at least 24 hours prior to the meeting. They can be reached by calling 924-6700, or by mail at 119 Fox Street, Lemoore, CA 93245.

Any writings or documents provided to a majority of the Planning Commission regarding any item on this agenda will be made available for public inspection at the City Clerk's Counter at City Hall located at 119 Fox Street, Lemoore, CA during normal business hours. In addition, most documents will be posted on the City's website at www.lemoore.com.

CERTIFICATION OF POSTING

I, Kristie Baley, Planning Commission Secretary, do hereby declare that the foregoing Agenda for the Lemoore Planning Commission Regular Meeting of Monday, February 8, 2016 at 7:00 p.m. was posted on the outside bulletin board located at City Hall, 119 Fox Street in accordance with applicable legal requirements. Dated this 2nd day of February 2016.

//s//
Kristie Baley, Commission Secretary

WELCOME TO YOUR LEMOORE PLANNING COMMISSION MEETING

Whether you are attending this meeting because of general interest, or because a particular item of special interest is to be reviewed, your presence is an important means of helping to insure an informed public and responsible City Government.

PLANNING COMMISSION

The Planning Commission has been established to advise the City Council in planning and zoning matters.

REGULAR PLANNING COMMISSION MEETINGS

Meetings are held at 7:00 p.m. on the Second Monday of each month. Business requiring Commission action is listed on the Planning Commission Meeting Agenda. An agenda is prepared for each Planning Commission Meeting. In compliance with the State open meeting laws (Brown Act), only those items on the agenda may be acted upon by the Planning Commission.

CONDUCT AT PUBLIC MEETINGS

Your courtesy is requested to help our meeting run smoothly. If you'll be kind enough to follow these simple rules, we can make the best possible use of time. Please silence all electronic devices. Please refrain from public displays or outbursts such as unsolicited applause, comments, cheering, foul language, or obscenities. Any disruptive activities that substantially interfere with the ability of the City to carry out its meeting or prevents/disrupts others from fully participating in the meeting will not be permitted and offenders will be requested to leave the meeting pursuant to Government Code § 54957.9.

PUBLIC COMMENTS

At a Planning Commission meeting, those who wish to be heard on matters on the agenda should indicate their desire to speak when the item is ready for discussion. If you wish to comment on an item which is not on the agenda, you may do so under "Public Comments". In order to allow time for all public comments, each individual's comments are limited to five minutes. Time shall not be shared/loaned from speaker to speaker. If you wish to request time on an upcoming Planning Commission Agenda to present a particular item or matter to the Planning Commission, you may contact the Planning Commission Secretary at any time before 12:00 noon on the Tuesday immediately preceding the Planning Commission meeting to so request. If the matter is within the Planning Commissions jurisdiction, and the Planning Commission has not taken action or considered the item at a recent meeting, the Planning Director may place the item on the Agenda. When addressing the Planning Commission, you are requested to come forward to the speaker's microphone, state your name and address, and then proceed with your presentation.

PLANNING COMMISSION ACTION

Resolution

A Resolution is a formal written expression of a policy, opinion or desire of the Planning Commission. It requires only one reading and becomes effective on adoption.

Minute Order

Actions of the Planning Commission recorded only in the Minutes taken in all cases where a formal Resolution is not needed or required.

SUGGESTIONS, INQUIRIES OR COMPLAINTS

While any citizen may speak directly to the Planning Commission concerning suggestions, inquiries or complaints, the Planning Director or Department Head responsible for the service or work concerned, can usually provide pertinent information or handle the matter without delay if a request is made directly to him or her. If you are not sure which department to call, or whenever you feel the matter has not been properly handled, please contact the office of the Planning Director at 711 W. Cinnamon Drive, telephone 924-6740.

Item 3

Minutes of the
LEMOORE PLANNING COMMISSION
January 11, 2016

MEETING CALLED TO ORDER:

At 7:00 p.m. the meeting was called to order.

ATTENDANCE:

Chair Garcia, Vice-Chair Clement, Commissioners Badasci, Marvin, Meade, Monreal; City Manager Welsh, City Clerk Venegas, Public Works Director Olson, Interim Planning Director Holwell, City Planner Brandt, Commission Secretary Baley

ABSENT:

Commissioner Dow

PUBLIC COMMENT:

There was no comment.

ADMINISTRATION OF OATH OF OFFICE:

City Clerk Venegas administered the oath of office to Ron Meade.

REORGANIZATION OF COMMISSIONERS – ELECTION OF OFFICERS – CHAIR and VICE-CHAIR:

Commission Secretary Baley opened nominations for Chair.

Commissioner Marvin nominated Commissioner Garcia.

Commissioner Garcia declined and announced that he would be moving out of the City limits within the next few months.

Commissioner Monreal nominated Commissioner Meade.

Commissioner Clement seconded the nomination.

There were no other nominations.

By unanimous vote, Commissioner Meade was elected Chair.

Commission Secretary Baley opened nominations for Vice-Chair.

Commissioner Monreal nominated Commissioner Clement.

Commissioner Clement declined and nominated Commissioner Marvin.

Commissioner Meade seconded the nomination.

There were no other nominations.
By unanimous vote, Commissioner Marvin was elected Vice-Chair.

MINUTES – REGULAR MEETING DECEMBER 14, 2015:

It was moved by Commissioner Marvin and seconded by Commissioner Clement to approve the Minutes of the Planning Commission Regular Meeting of December 14, 2015.

Ayes: Marvin, Badasci, Clement, Garcia, Monreal
Abstain: Meade
Absent: Dow

REPORT AND RECOMMENDATION – LEMOORE COMMUNITY INVESTMENT PROGRAM (CIP) – RESOLUTION 2016-01 – FINDING DRAFT CIP TO BE IN CONFORMITY WITH THE LEMOORE GENERAL PLAN:

City Manager Welsh presented the Community Investment Program; explaining the purpose and benefits of a five year plan. Welsh provided and overview of the approval process and requested questions and comments from Commissioners.

City Planner Brandt explained his review of the CIP and answered questions.

Brandt stated he found the CIP to be in conformance with the General Plan and recommended Commissioners approve the resolution.

It was moved by Commissioner Marvin and seconded by Commissioner Garcia to approve Resolution No. 2016-01 – Finding the CIP to be in conformity with the Lemoore General Plan.

Ayes: Marvin, Garcia, Badasci, Clement, Monreal, Meade
Absent: Dow

PLANNING DIRECTOR'S REPORT:

Interim Planning Director provided an update for the following projects:

Diverging Diamond to be located at W. Bush Street and 19 ½ Avenue

Subdivision Applications in Process – Aniston Place, Wathen Castanos and Daphne Lane, Great Valley Land Company

Revised Marijuana Ordinance approved by City Council

Holwell invited Commissioners to attend the Planning Commissioner Academy in San Ramon March 2-4, 2016.

COMMISSIONER REPORTS AND REQUESTS FOR INFORMATION:

Staff was asked to provide information regarding funding of the BMX track to be operated by Framework Racing during the next regular meeting of the Planning Commission.

ADJOURNMENT:

At 7:37 p.m. the meeting adjourned.
Approved the 8th day of February, 2016.

Full digital audio recording is available.

Dr. Ronald Meade, Chair

Attest:

Kristie Baley, Secretary

City of
LEMOORE
CALIFORNIA

Public Works
Planning Service
Department

119 Fox Street
Lemoore, CA 93245
Phone (559) 924-6740
Fax (559) 924-6708

Staff Report

ITEM NO. 4

To: **Lemoore Planning Commission**

From: **Steve Brandt, City Planner and**
Judy Holwell, Interim Planning Director

Date: **February 2, 2016** **Meeting Date:** **February 8, 2016**

Subject: **State Route 198 Corridor Preservation and Improvement Strategic Plan Draft Report**

Proposed Motion:
No action needed. This is an informational item upon which the Commission may choose to direct the Interim Planning Director to comment on the Commission's behalf.

Subject/Discussion:
Three Councils of Governments – Tulare County Association of Governments (TCAG), Fresno Council of Governments (Fresno COG) and Kings County Association of Governments (KCAG), as well as Caltrans, jointly prepared a State Route (SR) 198 Corridor Preservation and Improvement Strategic Plan Draft Report (Draft Report) which studied an area along SR 198 from Interstate 5 (I-5) in Fresno County to SR 99 in Tulare County. The study primarily analyzed the need for future improvements to SR 198 from the main gate of Naval Air Station Lemoore (NASL) west to I-5 (the area east of NASL is already improved to four lanes.) The identified future improvements to the roughly 19-mile long segment west of NASL are located in both Fresno and Kings Counties.

The primary purpose of the Draft Report is to forecast future traffic demands, compare those demands with current vehicle capacity and then assess any shortfalls in the operational capability of the route now and through the year 2040. VRPA Technologies, a Fresno-based traffic consulting firm, assisted in preparing the report by providing analysis of future traffic demands. A number of enhancement projects are recommended over a short-, medium-, and long-term time period, and an evaluation of these recommendations were carried out to test their viability and justification.

Based on the amount of traffic projected by 2040, the Draft Report recommends that the following enhancements be made, both before and beyond 2040:

Short Term (before 2040):

1. Construct a new intersection facility at the current four-way stop intersection of SR 269 with SR 198. Either a roundabout or a signalized intersection could be appropriate. A detailed study is needed to determine which is more appropriate.
2. Add raised and reflective pavement markings to the roadway.

Medium Term (before 2040):

1. Construct a new intersection facility at the crossing of Commercial Driveway and SR 198 (this is the driveway to the businesses located just west of the I-5 interchange). Either a roundabout or a signalized intersection could be appropriate. A detailed study is needed to determine which is more appropriate.
2. Construct passing lanes on SR 198 between I-5 and NASL in both directions. This is recommended as an interim improvement before widening to four lanes, mainly because the highway is often used by slower moving agricultural vehicles. Passing lane locations and lengths were not identified as part of the Draft Report. An additional study will be required for such passing lanes.

Long Term (beyond 2040):

1. Upgrade SR 198 between NASL and I-5 to a full four-lane conventional highway, making it a continuous four-lane highway between I-5 and SR 99. Four lanes would reduce travel time and improve safety.

It is important to note that the analysis studied the road operations and conditions along SR 198. However, it did not take into consideration additional interchanges that may be necessary for growth in the area, such as the potential development in Lemoore west of SR 41 near West Hills College. An interchange may be needed along SR 198 at 21st Avenue (Marsh Drive) at buildout of Lemoore's Westside, or sooner, as indicated in Lemoore's 2030 General Plan and identified on the General Plan Map and Zoning Map.

Lemoore is equidistant between Los Angeles and the Bay Area making it a prime location for distribution centers and industrial development. The analysis looked at economic development and assumed a rate of growth equal to our historic growth pattern over the last several years. However, it may not have taken into account the potential development activity that could occur if SR 198 was widened to four lanes from NASL to I-5.

It appears that a limited analysis of NASL was performed (as can be found on page 103 of the Draft Report.) Additionally, page 41 indicates that no growth was assumed for NASL or local roadways. Due to the home basing of the F35-C Joint Strike Fighter at NASL, it stands to reason that a significant increase in travel on SR 198 would be anticipated.

It is also important to note that the majority of the 19-mile segment from NASL to I-5 is in Fresno County and therefore would require a joint effort among Kings and Fresno

Counties. Funding from Fresno County that may be available for highway improvements for that portion of SR 198 will require approval from its Board of Supervisors.

Study Area

Possible Action

The City Council was presented this information on February 2, 2016, and given the option to submit comments on the Draft Report. At time of this writing, it is not known what their comments were, if any. If the Commission would like to submit their own comments, these should be discussed now so that a letter from the Interim Planning Director can be sent on the Commission's behalf.

STATE ROUTE 198

Corridor Preservation and Improvement Strategic Plan

Draft Report | January 2016

Funded by the Caltrans
Transportation Planning Grant Program

Report Preparation

This report was prepared by the State Route 198 Corridor Preservation and Improvement Strategic Plan Project Team

Project Team:

Kings County Association of Governments

Terri King
Chris Lehn
Unchong Parry
Bruce Abanathie

Fresno Council of Governments

Melissa Gaza
Lindsay Monge
Peggy Arnest

Tulare County Association of Governments

Cynthia Echavarria
Roberto Brady
Mark Hayes

Caltrans

Steve MacDonald
Omar Mostafa
Kevin Lum
Paul Marquez
Albert Lee
Beverly Boucher
Sandra Scherr

Hatch Mott MacDonald, LLC

Shruti Malik

Jason McCoy
Richard Davies
Celina Lee

VRPA Technologies, Inc.

Georgiena Vivienne
Richard Lee
Erik Reuhr

Provost & Pritchard Consulting Group

Dawn Marple

Fehr & Peers

Fred Choa

Economic & Planning Systems, Inc.

Jason Moody
Walker Toma

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1 Executive Summary

1. Executive Summary

Introduction

State Route-198 (SR 198) is a vitally important highway to Kings and Tulare Counties and the southern part of Fresno County, forming a major east-west link for this region of the San Joaquin Valley in California as shown in **Figure 1.1** below. It has been subject to a number of individual route and regional area studies. The study area extends from Interstate 5 (I-5) in Fresno County to SR-99 in Tulare County. SR 198 was widened to a four-lane expressway along a 10-mile section between SR-43 and SR-99. Construction began in November 2009 and was completed in December 2012. Given these recent improvements to the eastern section of the corridor, the western segment extending from I-5 to the Lemoore Naval Air Station (LNAS) was the main focus of the corridor enhancements recommended in this corridor preservation and improvement strategic plan.

In February 2012, the State Route 198 Corridor System Management Plan (CSMP) was issued by the Caltrans Office of System Planning, District 6. The CSMP was prepared and approved by the Fresno Council of Governments (FCOG), the Kings County Association of Governments (KCAG), the Tulare County Association of Governments (TCAG) and Caltrans District 6.

In the CSMP, SR 198 was recognized as a

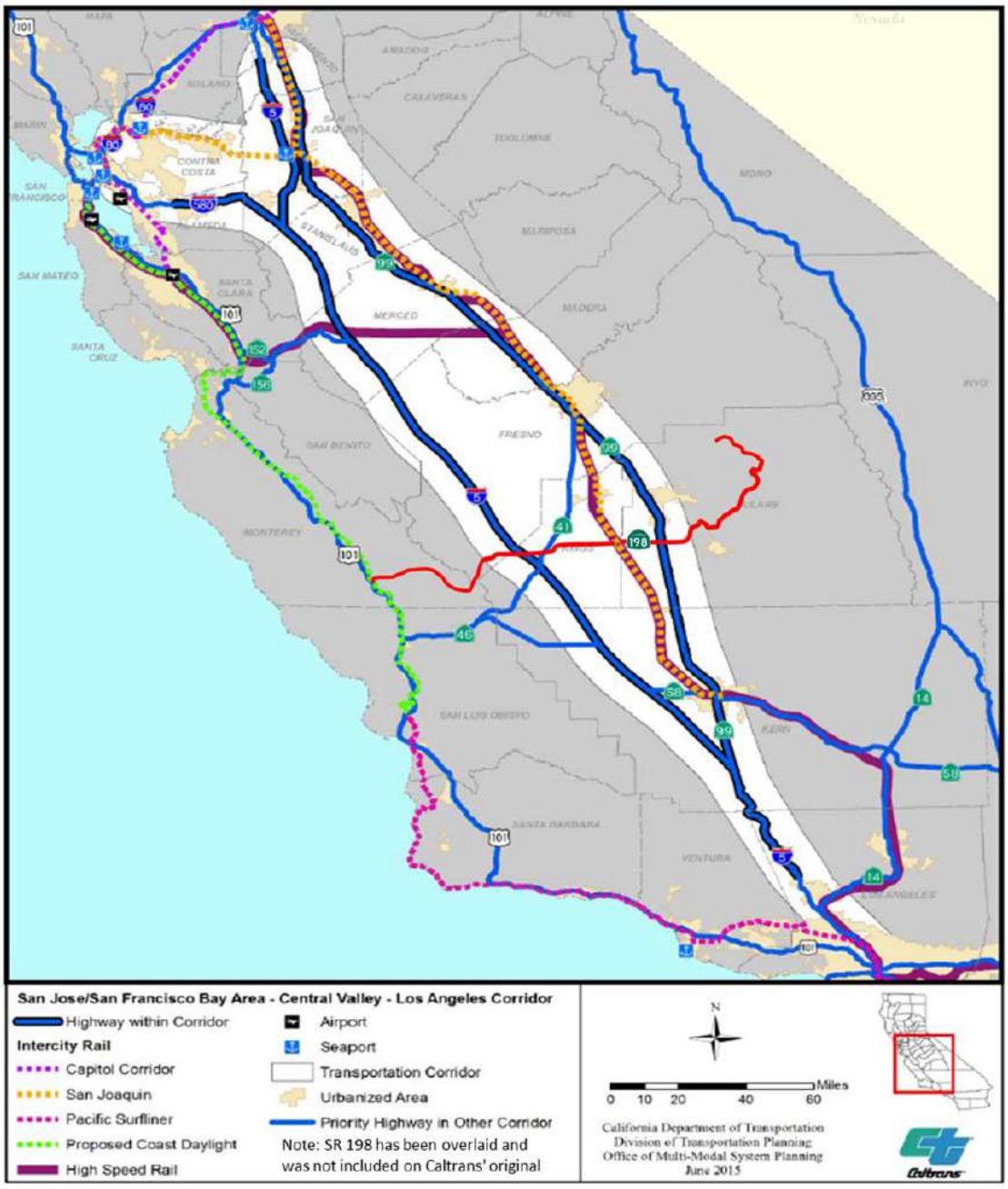
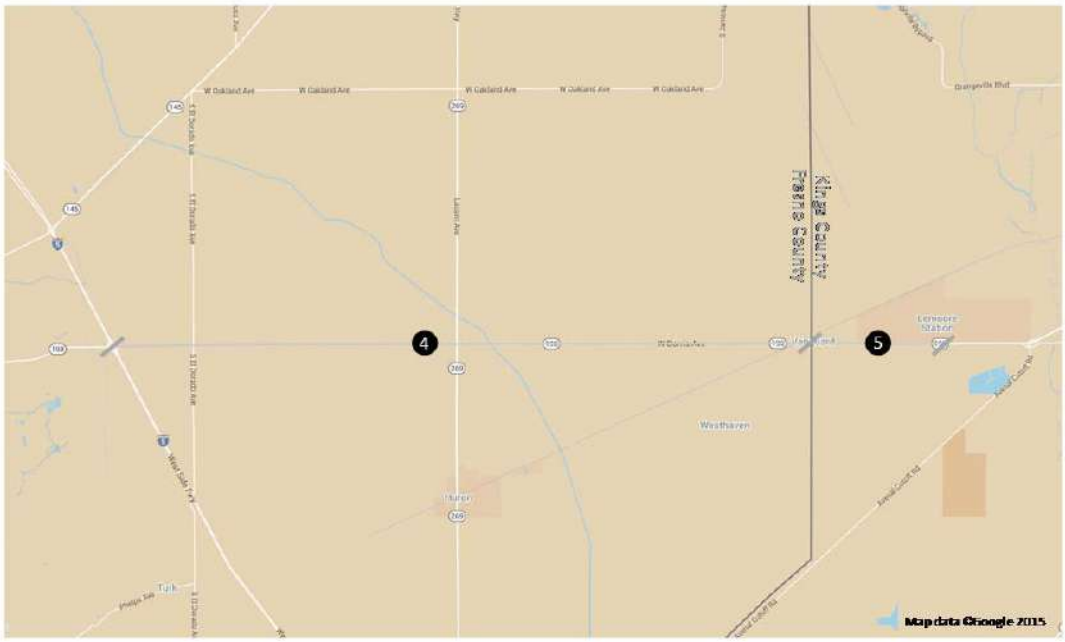


Figure 1.1- San Jose/San Francisco Bay Area – Central Valley – Los Angeles Corridor

"key east-west corridor" of regional significance. This plan also identified the need to consider enhancements to Segments 4 and 5 of the CSMP (the two lane stretch west of the LNAS) to accommodate future traffic demand after a period of 20 years. As a consequence of this, a study was commissioned to develop a Corridor Preservation and Improvement Strategic Plan for these sections of SR 198. This report documents the outcomes of that study and sets out the Plan.

This study was funded by the Caltrans Transportation Planning Grant Program and focused on segments of SR 198 within Fresno, Kings and Tulare counties. The funding had been brought about by the successful collaboration of the agencies mentioned above along with Caltrans District 6.

Figure 1.2 - Segments 4 and 5 per the Caltrans Corridor System Management Plan



Legend:

4 Fresno County
Segment 4: SR 198 PM 26.8 / 42.7
SR 198 / I-5 Separation / Kings County Line

5 Kings County
Segment 5: SR 198 PM 0.0 / 3.0
Fresno County Line / Lemoore Naval Air Station

Purpose of the Study

The primary purpose of the study was to build on the information for SR 198 from the CSMP. This has involved forecasting future traffic demands, comparing those demands with current infrastructure capacity and from that, assessing any shortfalls in the operational capability of the route. A number of enhancements have been recommended over a short, medium, and longer term time period and an evaluation of these recommendations was carried out to test their viability and justification.

Setting the Scene for the Study

From a state level context, SR 198 is within one of the eleven strategic interregional corridors identified by the 2015 Interregional Transportation Strategic Plan,[1] the Central Coast and San Joaquin Valley East-West Connections. SR-41 is identified as a significant highway within this corridor and SR 198 feeds traffic demand from the economically active area of Kings County onto SR-41. Functionally it also contributes significant traffic demand at a second interregional corridor – the San Francisco - San Joaquin Valley – Los Angeles Corridor. Approximately 50% of traffic on SR 198 turns onto the I-5, contributing to the north/south movement within this corridor.

At a regional level the I-5 corridor and SR-99 are the primary north-south links through the San Joaquin Valley. Additional key routes included are highways SR 198 and SR-41. Both of these, linking the I-5 and SR-99, are among the 93 routes under the heading of the Interregional Road System that are deemed important to the economy of the state.[2]

In terms of freight access and mobility, the I-5 and SR-99 are considered as part of the primary highway freight network with SR 198, SR-41 and SR-152 as part of the "other" state highway freight network.[3] In this locale, trucks average between 22% and 30% of all traffic on I-5. On the SR-99 in Tulare County, the equivalent figure is around 20 to 21%.[4]

The cross-linking routes SR 198 and SR-41 act as the feeder system both to the SR-99 and I-5 and also to each other. They can also serve as major diversion routes if either of the north-south routes is blocked.

Acknowledging the role that SR 198 plays in the transportation system in this area, a methodology to carry out an exhaustive examination of the current and future performance of SR 198 and its relationship to the economic well-being of the area as a whole was developed for the study.

Methodology

The study team reviewed all previous relevant studies[5] and existing data and developed a study methodology. Resulting from this, a program of new data collection was carried out and this data was used to both assess current operating conditions of the SR 198 between I-5 and SR-99 and as input to a forecasting process to examine the most likely conditions for the year 2040.

County travel demand models were used to establish robust and realistic forecasts of travel demand for the year 2040. Using the Counties' demand models ensures compatibility with the relevant general plans and other transportation project appraisals.

From the current (2014) and future (2040) forecast traffic demand, capacity analyses were carried out to estimate the capability of the current infrastructure to support that future travel demand. This was carried out for an average day morning and evening peak hour and was done for both the main

[1] 2015 Interregional Transportation Strategic Plan: Caltrans Division of Transportation Planning: June 30, 2015.
[2] 2015 Interregional Transportation Strategic Plan: Caltrans Division of Transportation Planning: June 30, 2015.
[3] California Freight Mobility Plan, California State Transportation Agency; and Caltrans, Division of Transportation Planning (DOTP).
[4] 2015 Interregional Transportation Strategy Plan: Caltrans Division of Transportation Planning: June 30, 2015.
[5] Source: California Freight Mobility Plan; California State Transportation Agency and Caltrans, Division of Transportation Planning (DOTP). Interregional Transportation Strategic Plan; Caltrans; Division of Transportation Planning: June 30, 2015. Caltrans; State Route 198 Corridor System Management Plan; Office of System Planning District 6, February 2012.

intersections and the road links along the SR 198 from the I-5 to the SR-99. However, the concentration was on the section of SR 198 between I-5 and the LNAS.

The main metric used to assess both the road and intersection conditions under these travel demands was **Level of Service (LOS).** In traffic engineering methodology, roadway operations are rated in terms of levels of service, ranging from level of service A (light traffic, minimal delays) to level of service F (substantial traffic congestion and delay). Within Caltrans District 6, level of service D is a typical design threshold for urban areas within City limits and level of service C is a typical design threshold used outside of City limits. These design thresholds were used for the SR 198 corridor analysis. A list of intersections analyzed is further detailed in Section 5 – Corridor Studies.

Findings

Traffic Operations Analysis

From the LOS analysis, current and future operational deficiencies were identified. For 2014, the average condition for SR 198 road segment is LOS C. For 2040, with forecast traffic growth, 50% of these deteriorate to LOS D.

For intersections along SR 198, the operational conditions for 2014 varied between LOS A-C. For 2040, this deteriorated significantly in some cases. From 2014 to 2040, the percentage of intersections at LOS A dropped from 17% to 11%; those at LOS B from 66% to 17%; those at LOS C increased from 17% to 36%, and those at LOS D in 2040 increased from 0% to 21% and to LOS E/F from 0% to 17%. So whereas in 2014, no intersections were below LOS C, in 2040, 38% operated at LOS D, E or F.

From the capacity analysis, a number of phased enhancements were explored to restore the LOS to level C and better were put forward for examination.

The analysis suggested that raised/reflective pavement marking and improvements at the intersection of SR-269 and SR 198 would provide significant enhancements to this section of SR 198 in the short-term.

The construction of passing lanes between I-5 and LNAS and a new intersection facility at Commercial Driveway on the SR 198 were also examined as potential solutions together with the two-lane section being upgraded to a full four-lane highway.

Additional strategies included ITS variable message signing and traffic operations monitoring to be used along the SR 198 corridor to help counter the climatic hazards of fog and dust. This will also help to manage potential traffic diversion from the SR-99 to the I-5 under conditions where one of the north-south routes becomes blocked and it becomes necessary to switch traffic to the other routes.

Pavement Condition Analysis

As part of the study, a pavement condition analysis was carried out based on a 2011 Caltrans survey. In general, apart from the one section just to the east of the I-5, the higher priority sections in need of improvement are between LNAS and SR-99. It is understood that these measures are all within Caltrans' current highway maintenance program.

Economic Development Analysis

The suggested improvements were subjected to performance tests, and in particular the key area of economic evaluation. For purely travel-related benefits, all of the enhancements put forward had a

positive net present value and thus their value for money was established. This took no account of beneficial economic impacts on businesses and industry or socio-economic benefits for the population.

Another important characteristic of the SR 198 corridor is the existence of parallel rail service. The San Joaquin Valley Railroad operates a branch freight rail service from Exeter through Goshen to Huron (58.8 miles) with long haul rail connections available at Goshen Junction. Burlington Northern Santa Fe (BNSF) and Union Pacific Rail Road (UPRR) are both active in this area. Long-haul rail connections to UPRR are available at Goshen Junction and through BNSF at Hanford. The fact that there is rail service means that economic activities that import or export goods over long distance have access to this mode as well as trucking over much of the corridor. The 2013 California State Rail Plan includes the San Joaquin Valley Railroad as a significant local and regional rail service provider. This rail line may be subject to grade separation from SR 198 in the future.

The appraisal showed that traffic flow, capacity and safety enhancements in the SR 198 corridor, particularly along the western segment of SR 198 (i.e., the two-lane segment from I-5 to LNAS) would create road user benefits, including benefits for goods movement operations. These benefits could include savings in travel time, greater travel time reliability and predictability, lower accident costs, and lower vehicle operating costs. Existing SR 198 corridor businesses would consequently have lower operating costs. New businesses would have incentives to locate in the corridor with improvements to SR 198, thus providing additional job opportunities to local residents. Moreover, better access to I-5 via an improved SR 198 will confer a measure of benefits to SR-99 and SR-41, by creating an alternative goods movement route for some users of these facilities.

Goods Movement Analysis

The movement of goods (and to a lesser extent services) throughout Kings County and parts of Fresno and Tulare Counties plays a critical role in the functioning of the overall economy. The study analysis and statistical sources of data suggest that goods movement supports 33% of Regional Gross Domestic Product (RGDP) and 34% of jobs in Kings County. By directly enabling a more efficient distribution of goods to, from, and within the County, enhancements on SR 198 will have a beneficial impact on both warehouse and distribution providers and the sectors that rely on these services.

Public Outreach

During the study, four separate public outreach meetings, three stakeholder working group meetings and two presentations to Council of Governments public board meetings were held to present findings from the study and gather public input by local users of SR 198. The public meetings were held in all three counties of the project area at strategically located population centers.

These meetings proved to be of significant value in that a number of important concerns arose that may have remained unidentified with only a purely technical examination.

The first concern raised in the public meetings was limited visibility due to climatic conditions of the local region. The region experiences very dry weather with precipitation occurring mostly in the winter months. During the long hot summer months, the predominantly rural agricultural region produces significant dust clouds at various times of day. Conversely, during the winter months considerable amounts of fog can severely limit visibility. Early morning commute peak traffic will often encounter these climatic conditions which may seriously affect driving visibility.

The second concern discussed in the public meetings is the many different vehicular users on SR 198, specifically between I-5 and SR-41. This segment of SR 198 is a high-speed route for trucks and autos

(between 53 and 58 mph average was recorded in 2007 on SR 198 at the LNAS gate).[6] It is also used both along and for crossing movements by agricultural vehicles in an informal and unregulated manner. Two problems emerge from this.

First, the speed differentials between the through traffic and the agricultural traffic are considerable and passing is often difficult. Secondly, as agricultural vehicles merge onto SR 198, dirt and mud is deposited on the pavement shoulder and striping, building up substantially during peak agricultural season. This obscures the road striping and can cause issues in identifying the edge and center line of the road pavement.

Conclusions & Recommendations

The critical location of SR 198 as a primary east/west facility and its proximity to existing urban centers, major employers, and goods movement service providers determines that it plays a critical role in sustaining the local economic activity.

The three-county study area experienced significant growth from 1970, far out-pacing the state as a whole. It was also disproportionately damaged by the so-called "Great Recession" commencing in 2008, reflecting a high degree of dependence on external economic trends. In Kings County, both Lemoore and Hanford dominate from a population and employment aspect. Both of these cities sit along SR 198 as does the LNAS.

As home to a large number of in-commuters and out-commuters, Kings County serves as both a bedroom community and a job destination within the study area, with SR 198 serving as a critical link for access and mobility. While agriculture and food processing/packing industries will continue to play a significant role in the economy of the study area, the educational, health care and retail sectors have had significant growth, in particular in Kings County and along SR 198 .

The continued vertical integration within the agricultural sections of the study area will likely concentrate jobs and activity in and around existing urban centers. This will likely increase land use intensity and potentially create greater demand for east-west passengers and freight movements along the SR 198 corridor. This emphasizes the importance that SR 198 will serve in enabling efficient movement to satisfy these demands.

The technical analysis that went into this plan leads to a series of recommended improvements, phased over the next 25 years, up to and beyond 2040. The following enhancements are recommended to be phased in, up to and beyond 2040:

Short Term: First, a new intersection facility at the current four-way stop intersection of SR-269 with SR 198 is recommended. Due to the nature of the traffic, it would seem that a roundabout could be an ideal solution but this needs to be subject to a more detailed study. Second, that raised and reflective pavement markings are used for the sections studied on SR 198.

Medium Term: A new intersection facility at the crossing of Commercial Driveway and SR 198 is constructed and passing lanes on SR 198 between I-5 and LNAS in both directions are constructed.

Long Term (beyond 2040): That SR 198 between LNAS and I-5 is upgraded to a full four-lane conventional highway, making it continuous between I-5 and SR-99.

[6] Caltrans; State Route-198 Corridor System Management Plan; Office of System Planning; District 6, February 2012.

It is also recommended that ITS variable message signing and traffic operations monitoring be used along the SR 198 corridor. This could be introduced as funds become available.

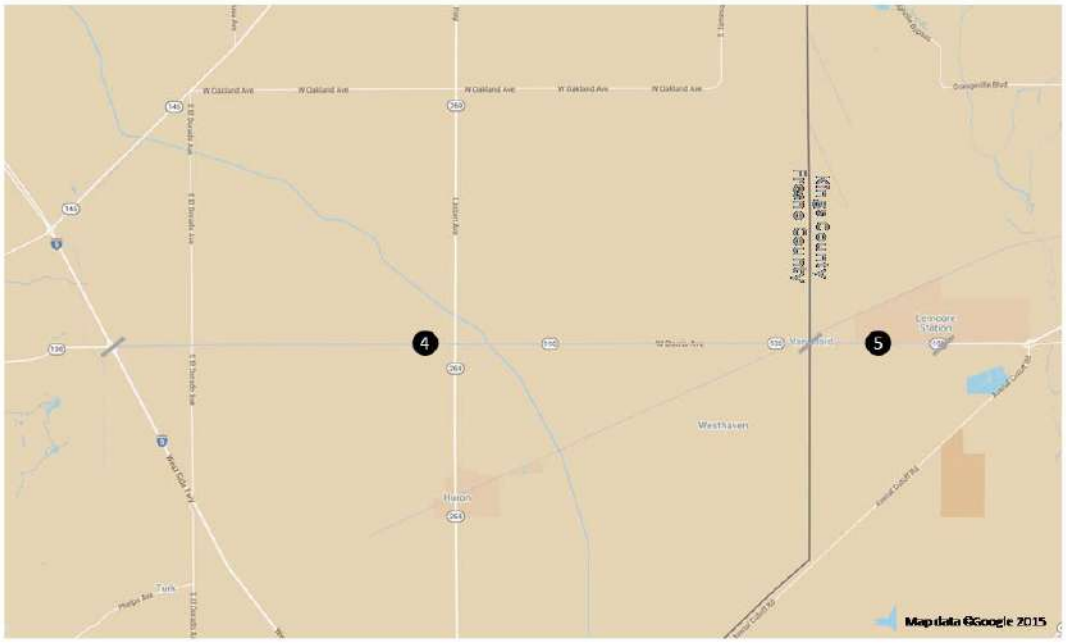
Due to the strategic importance of SR 198 to freight and commercial traffic, the need to stimulate economic activity in the corridor and study area and the potentially hazardous operational conditions caused by multiple vehicular uses and weather, it is recommended that serious consideration be given to accelerating the timing of the implementation of the SR 198 Corridor Preservation and Improvement Strategic Plan Report recommendations.

2 Introduction

2. Introduction

The State Route 198 Corridor Preservation and Improvement Strategic Plan (SR 198 PLAN) is a long-range planning document that establishes performance-based improvement and implementation strategies using a collaborative, public-private approach for this vital Californian route. The study that produced the plan was funded by the Caltrans Transportation Planning Grant Program after a successful application from the Council of Governments from Fresno, Kings and Tulare counties. The project study area focuses on Segments 4 and 5 of the SR 198 Corridor Systems Management Plan (CSMP) as shown in **Figure 2.1** below, but also includes the segments within the three counties. This plan provides analysis to establish capacity, safety, and operational enhancements to the study corridor based on performance, cost-benefit considerations of current land uses, and the potential for economic development along the corridor.

Figure 2.1 - Segments 4 and 5 per the Caltrans Corridor System Management Plan



Legend:

4 Fresno County
Segment 4: SR 198 PM 26.8 / 42.7
SR 198 / I-5 Separation / Kings County Line

5 Kings County
Segment 5: SR 198 PM 0.0 / 3.0
Fresno County Line / Lemoore Naval Air Station

Background and Regional Setting of SR 198

The Interregional Transportation Strategic Plan (ITSP)[7] is the key Californian document that sets out the 11 strategic interregional corridors that describe the major travel patterns for the state. These corridors contain both high volumes of freight movement and significant recreational tourism. There are two that are relevant to the section of SR 198 under review: The Central Coast and San Joaquin Valley East-West Connections and the San Jose/San Francisco Bay Area-San Joaquin Valley-Los Angeles Corridor.[8]

[7] Draft for Public Comment: 5/1/2015
[8] 2015 Interregional Transportation Strategic Plan: Caltrans Division of Transportation Planning: June 30, 2015.

Interregional Transportation Strategic Plan
Strategic Interregional Corridors

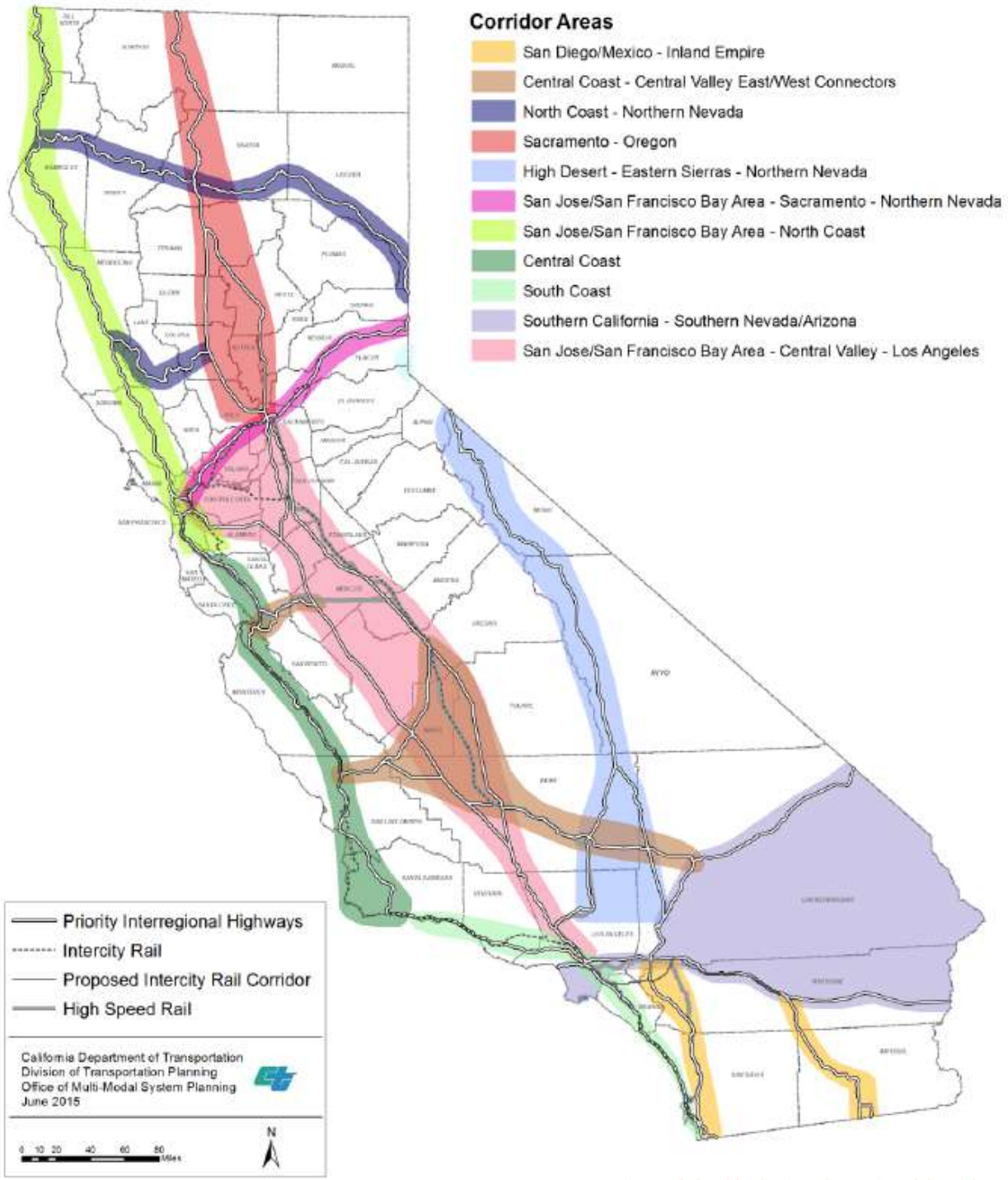
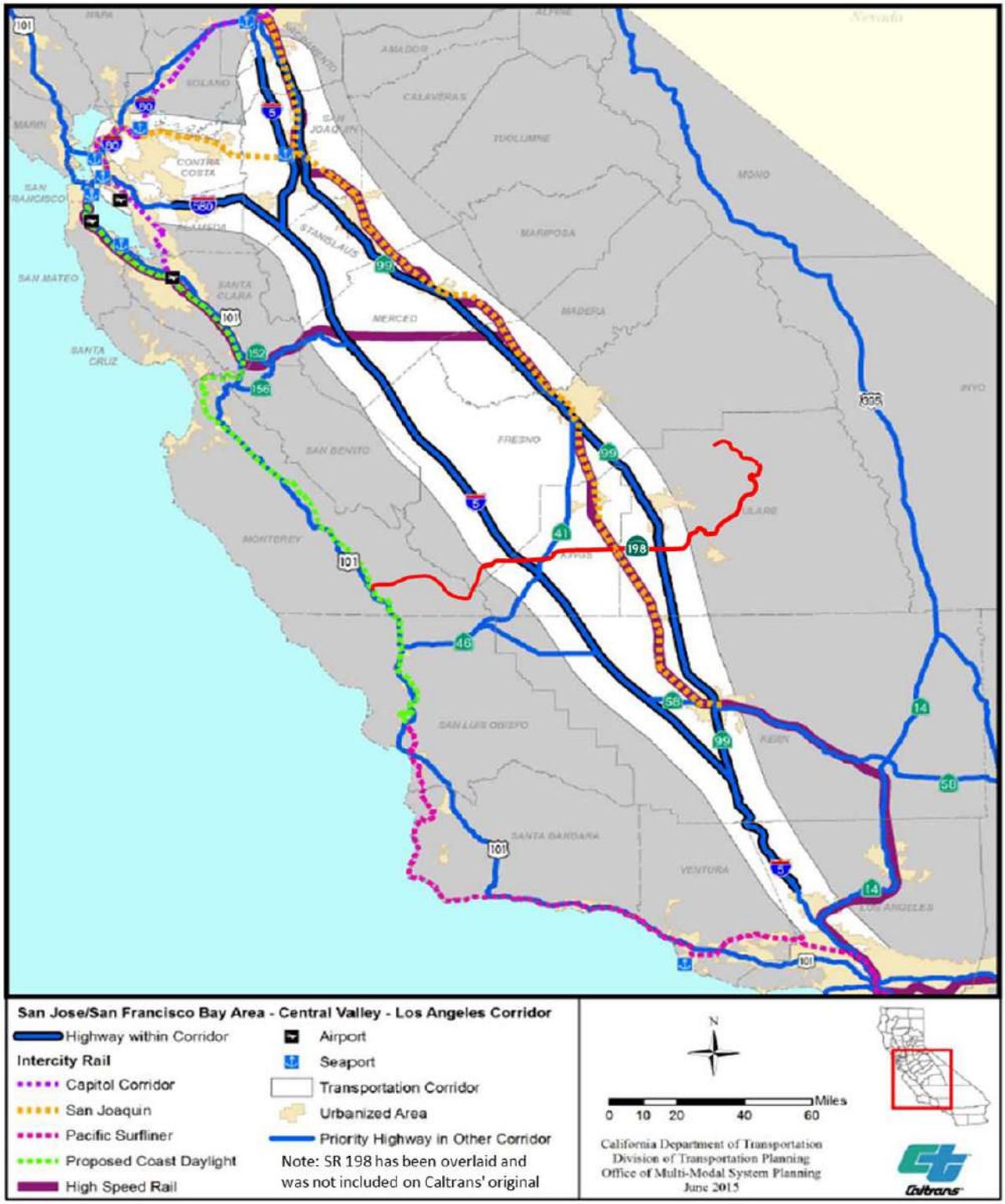


Figure 2.2 - Strategic Interregional Corridors

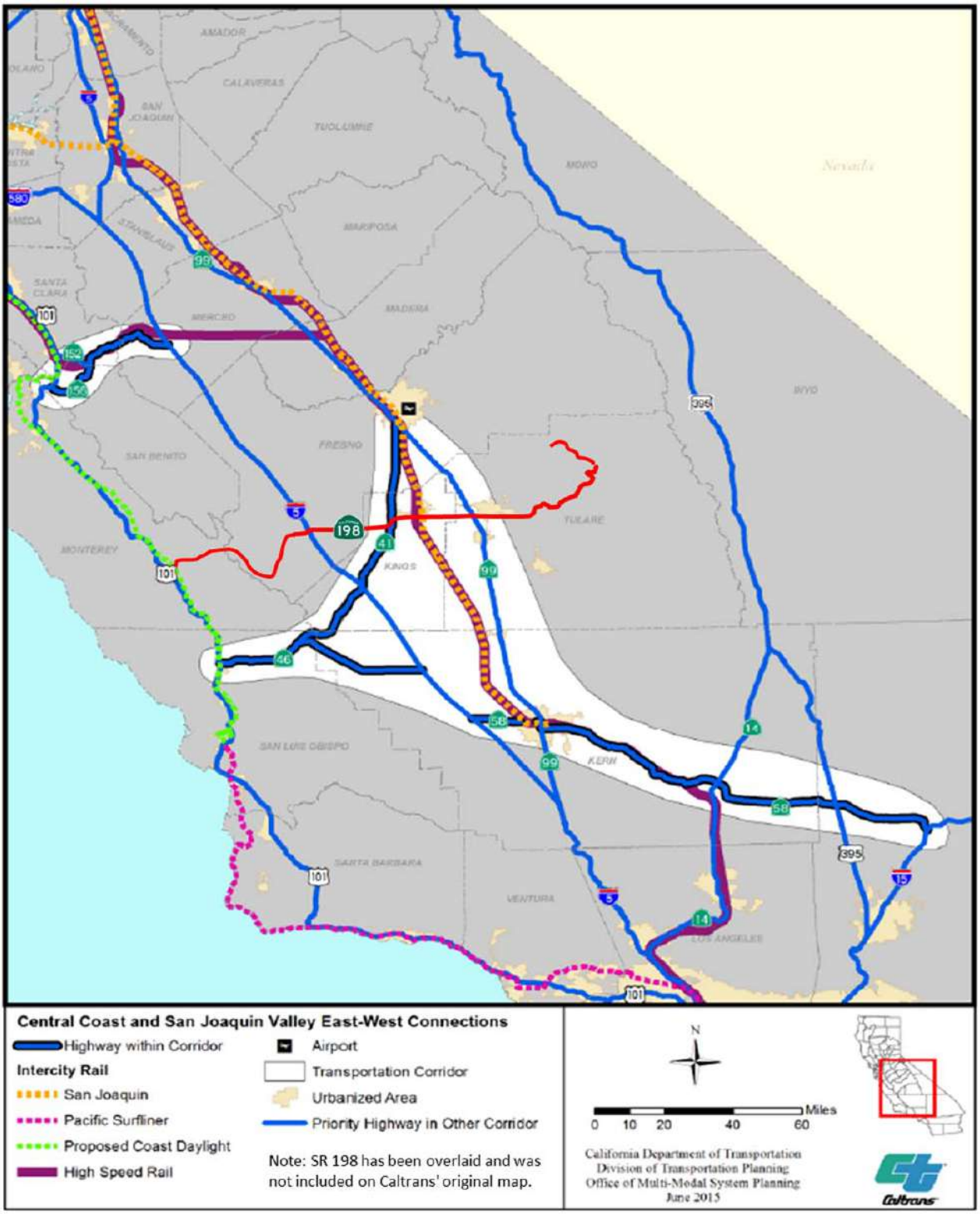
These corridors supply the life blood of a state that has the eighth largest economy in the world. California's unique climate and growing conditions provides the most productive agricultural regions in the world. It exports high value crops to every state in the USA and most other countries.

Figure 2.3 - San Jose/San Francisco Bay Area - Central Valley - Los Angeles Corridor



Within these corridors, a priority of improvement projects has been set to support interregional travel, servicing the needs of agriculture and industry.

Figure 2.4 - Central Coast – San Joaquin Valley East-West Connections



The purpose of these projects includes ensuring a highway capacity consistency; improving the efficiency of freight movement; improving safety; improving journey times and their reliability; providing more facilities for active transportation and mobility for passenger travel.

Figure 2.5 - Highway Freight Network

It is clear that outside urban areas, many of the travel facilities have remained in the conditions of 40 to 50 years ago, while travel demand through population and employment growth has been magnified several times.

In the San Joaquin Valley in Kings, Fresno and Tulare Counties, SR-99, SR-41 and I-5 are identified as strategic interregional corridors. The state has recognized 93 routes as being interregional important highways. This was named the Interregional Road System (IRRS) and was first identified in 1989. It was conceived partly to address the critical transportation system funding and development needs of the state. SB 45 requires that specific allocations of funds are programmed on IRRS routes in non-urbanized areas. IRRS routes include I-5, SR-99, SR-41 and SR 198 in Kings, Fresno and Tulare Counties.

The central core of the California economy is the freight transportation system; supporting not only industry and commercial activities but also over 1.3 million freight-specific jobs. To continue to be successful and have a global market, the state needs to strengthen its position through strategic investment into a sustainable freight system. The California Freight Mobility Plan (CFMP) has identified a tiered category of state highways within its Highway Freight Network.

In the San Joaquin Valley, I-5 and SR-99 are designated as part of the Primary Freight Network and SR 198, SR-41 and SR-152 as "other state Highway Freight Network" as illustrated in **Figure 2.6** below. These "other state highway freight networks' link I-5 and SR-99 and together provide the access and mobility needed for freight in the San Joaquin Valley region. The section of I-5 between route I-580 and route Highway 46 is recorded to have between around 22% to 30% truck traffic. The section of SR-99 between Fresno (at SR-41) and Tulare is recorded to have between 15% (at Fresno) and 20-21% (at Tulare) truck traffic.

Figure 2.6 – Freight Network in the San Joaquin Valley

Figure 2.7 - CFMP Draft Highway Freight Network

The ITSP analysis carried out by Caltrans "shows value in improvements on SR-99 and I-5." These improvements include upgrading all four lane sections -- both the SR-99 between Stockton and Kern County and I-5 between I-580 and SR-99 in Kern County to six lanes. Both SR 198 and SR-41 are critical to the freight highway system in providing linkage between I-5 and SR-99 and providing access for agriculture and industry both to and from I-5 and SR-99.

State Route 198 (SR 198), which is the subject of this report, is a critical interregional east-west highway corridor spanning Fresno, Kings, and Tulare Counties, connecting SR-99 to I-5. It is a vital transportation and trade route linking the coast range and Monterey County, the San Joaquin Valley, and the Sierra Nevada Mountains. The highway also serves as the primary resupply corridor supporting the LNAS.

The regional significance of this highway is well-recognized. Caltrans has identified the facility as a "key east-west corridor" in the SR 198 Corridor System Management Plan (CSMP); however, the investigatory work for this report looked at whether the limited capacity along the two-lane stretch of SR 198 west of the LNAS at 25th Avenue may, in the future, inhibit its performance and consequently, the region's ability to nurture existing businesses or attract new industry.

SR 198 alternates between a minor arterial and a principal arterial from the Monterey County line to Tulare County. West of I-5, SR 198 joins SR-33 and continues west to Monterey County, linking to SR-101.

The SR 198 corridor is identified as a route of regional significance; designated as a Strategic Highway Corridor Network route from I-5 to LNAS, and part of the National Highway System from 25th Avenue east to the end of the route. Additionally, it is designated as part of the National Truck Network for semi-trailer and truck movement between I-5 and SR-99, and the State of California designated this section as a High Emphasis Focus Route of the Interregional Roadway System in the 2012 ITSP.

In February 2012 Caltrans, in partnership with the local public agencies and stakeholders, produced the "State Route 198: Corridor Systems Management Plan (CSMP)".[9] This document addresses the issues on SR 198 from the Monterey County line to the boundary with the Sequoia National Park, traversing the Counties of Fresno; Kings and Tulare. The analysis carried out and described in the document reviewed the operating conditions on the roadway and proposed improvements for further study.

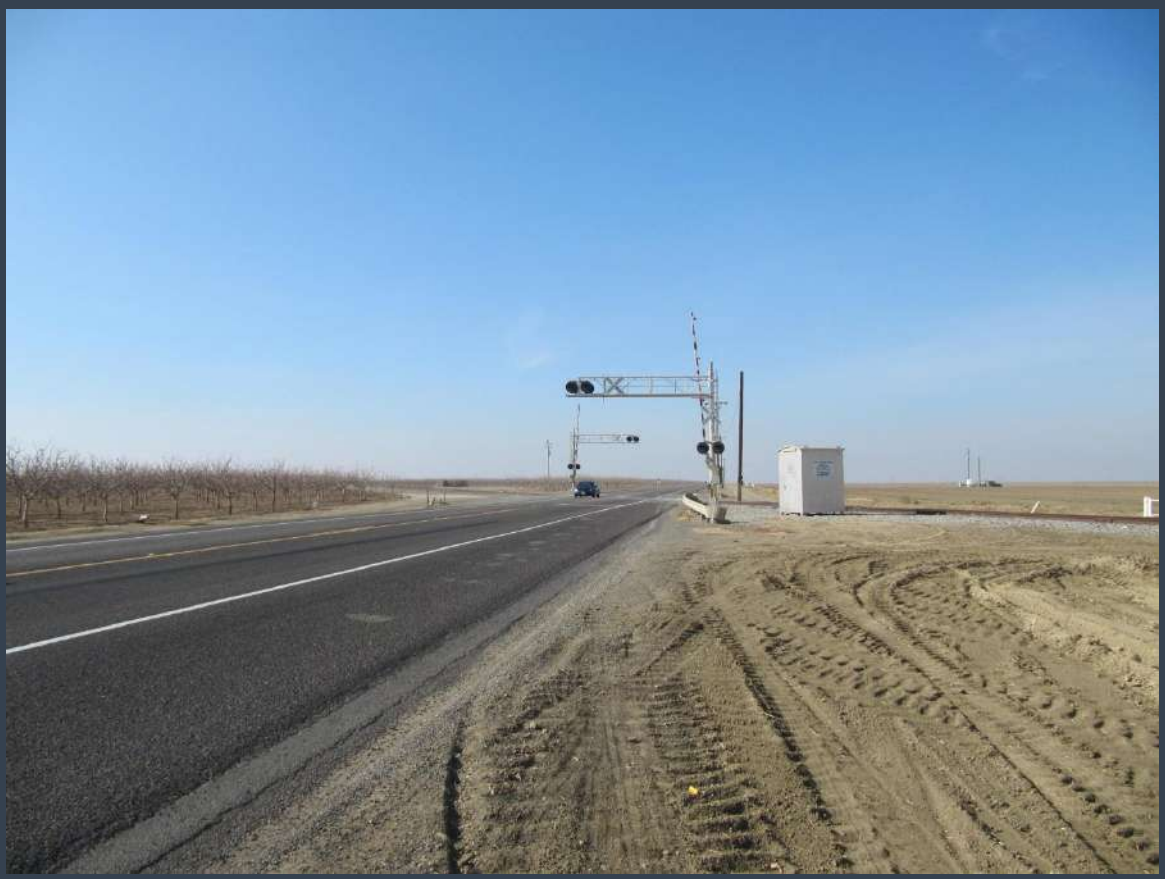
The document described the need for "Ongoing management of the corridor using CSMP, continuous corridor performance assessment and implementing CSMP for highest performance outcomes throughout the corridor"– to be carried out post-January 2013. The document reviewed: existing and proposed ITS elements, recorded accidents, roadway pavement condition and recommended improvements for a 10, 20 and 20+ year implementation plan.

The draft plan that is the subject of this report takes the intention to implement a series of improvements over time to SR 198, for the section between the LNAS and the I-5 forward to the next stage. The analysis carried out includes forecasting future auto and freight demand, comparing that demand to available operational capacity, identifying deficiencies and recommending improvement measures. Capacity improvements are one consideration but road accident reduction and operational mitigations are also part of the objectives.

The improvements themselves are then tested with performance measures to not only establish whether they are worth doing but also to enable prioritization over a 25 year time period to 2040. The stimulus of both economic well-being and quality of life is also a major consideration that relates to improved access and mobility of these sections of SR 198 .

[9] State Route 198 Corridor System Management Plan: Caltrans: Office of Systems Panning: District 6, February 2012.

3 Project Description



3. Project Description

The SR 198 Corridor Preservation and Improvement Strategic Plan (SR 198 PLAN) will furnish the necessary data, analysis, and stakeholder perspectives required to establish performance-based improvement and implementation strategies using a collaborative, public-private approach. **Figure 3.1** below provides an overview of the study area.

Purpose and Need

In its current configuration, SR 198 is not operationally sufficient or suitable for carrying the substantial increase in truck and traffic volumes projected to accommodate regional growth projections. Improving corridor performance, including efficiency and safety of SR 198, starts with focused attention toward near long-term strategies to improve mobility and foster regional economic development.

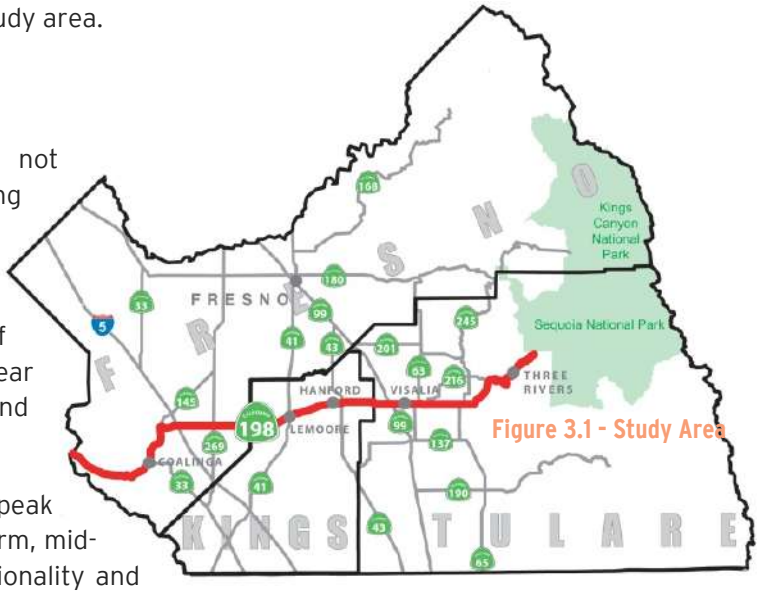


Figure 3.1 - Study Area

Annual Average Daily Traffic (AADT) and peak hourly volumes emphasize the need for near-term, mid-term and long-term solutions to address functionality and traffic operations. Data collected in 2011/2012 shows a peak hour volume of 460-500 vehicles at the I-5 junction with SR 198, and a peak AADT of 5,900-6,000. In segments 4 and 5 of the SR 198 CSMP, the peak hour volume varies between 610–1,350 with the peak AADT increasing from 5,300 at the Fresno/Kings County line to 12,600 at the LNAS. The peak hour volume for SR 198 in Visalia is as high as 6,000, with peak AADT jumping to approximately 74,000 (12 times increase from the volumes and AADT observed at the I-5 junction).

In short, SR 198 traffic fluctuates substantially by region, in traffic demand, operational capacity and its status as a highway. In terms of its function, SR 198 accommodates commercial traffic, commuter traffic, seasonal traffic and agricultural vehicle usage. The corridor is not only diverse in terms of its existing functions, but its geographical extents and regional significance indicate a broad, engaged stakeholder base that has influenced every stage of this study. The grant partners, including Fresno Council of Governments (Fresno COG), Kings County Association of Governments (KCAG), Tulare County Association of Governments (TCAG), and Caltrans District 6, as well as Tribal governments, namely, the traditional indigenous territories of the Southern Valley (Yokuts, Foothill Yokuts, Monache and Salinan), and other stakeholders constituted the Project Development Team in the CSMP. These key participants helped drive discussions and were actively engaged with the HMM Team from project inception through to developing the final plan.

Project Objectives

Highway Corridor Use

Predominantly rural, the corridor serves agricultural operations, including dairy farms and businesses that rely on SR 198 as a farm-to-market route. SR 198 is also the primary transportation supply route supporting LNAS military operations. Within this stretch are its most critical segments (Segments 4 and 5), the remaining two-lane stretch, where much of the stakeholder coordination, economic, design and performance improvement strategies were focused.

Freight Operations

The SR 198 corridor is not only home to frequent semi-trailer/truck transport, but includes freight rail transport operated by the San Joaquin Valley Railroad regional short-line that connects with Union Pacific Railroad at Goshen, and crosses SR 198 at-grade west of LNAS between Westlawn and Dickenson Avenues. Growing interest in short-haul goods movement and rail intermodal facility development provides a unique opportunity within the SR 198 corridor to capitalize on existing infrastructure and maximize regional goods movement. The SR 198 PLAN has evaluated regional goods movement with an emphasis on evaluating the potential for short-haul truck and intermodal freight transport. The analysis included other regional east-west corridors and a cost and benefit comparison. Opportunities and advantages of the SR 198 corridor that may have been discounted or overlooked in the San Joaquin Valley Interregional Goods Movement Plan are identified. An implicit recommendation is that a grade separation for the existing railroad and SR 198 will be constructed.

Transit Operations

Transit providers are part of the Stakeholder Advisory Group. The transit system west of SR-269 is operated by Fresno County while Kings County operates transit east of the LNAS. This has resulted in a missing transit link along SR 198 between SR-269 and the LNAS. A connection would be beneficial to link the two counties and could be provided by either of the transit agencies. It is recommended that these are the subject of a more detailed review. However, there is no identified current need and Caltrans provides an opportunity for vanpooling options.

Bicycle/Pedestrian Mobility

SR 198 currently serves as a bicycle travel route between U.S. 101 and the LNAS, SR-43 and SR-99, and east of Farmsville Boulevard in Tulare County. Potential solutions will conform to both the Streets and Highway Code and Vehicle Code, and will allow highway improvements, including future widening to proceed on SR 198.

Public Participation

Agency Consultation

Weekly Project Development Team meetings have been held during preparation of this SR 198 PLAN. Project Development Team members include representatives from Caltrans District 6 and members of the consultant team.

Public Coordination

Many opportunities were made available for the public to get involved with the SR 198 corridor Preservation and Improvement Strategies Plan development as detailed further in the community outreach and participation section of this report.

In summary, there were a total of four community workshops where the public was welcome to provide comments early in the project and three stakeholder group meetings which were open to interested members of the public. There was also a public review and comment period on the draft plan sponsored by the RTPA's in Fresno, Kings, and Tulare Counties. Presentations were made to two of the RTPA governing boards at meetings that were open to the public.

Development of the Plan

From the starting point described above, the transportation system was completely reviewed. This consisted of:

1. Fresh traffic data collection in 2014 to establish current travel demand from both autos and trucks;

2. Forecasting future demand at 2040;

3. Analyzing the operational aspects to the travel demand on the existing highway facilities and developing recommendations for improvements;

4. Testing the improvements and developing performance measures for each of the improvements;

5. Reviewing the economic drivers of travel demand from both existing and forecast socio-economic data. This was supplemented with live surveys of freight operators and the freight generation industries;

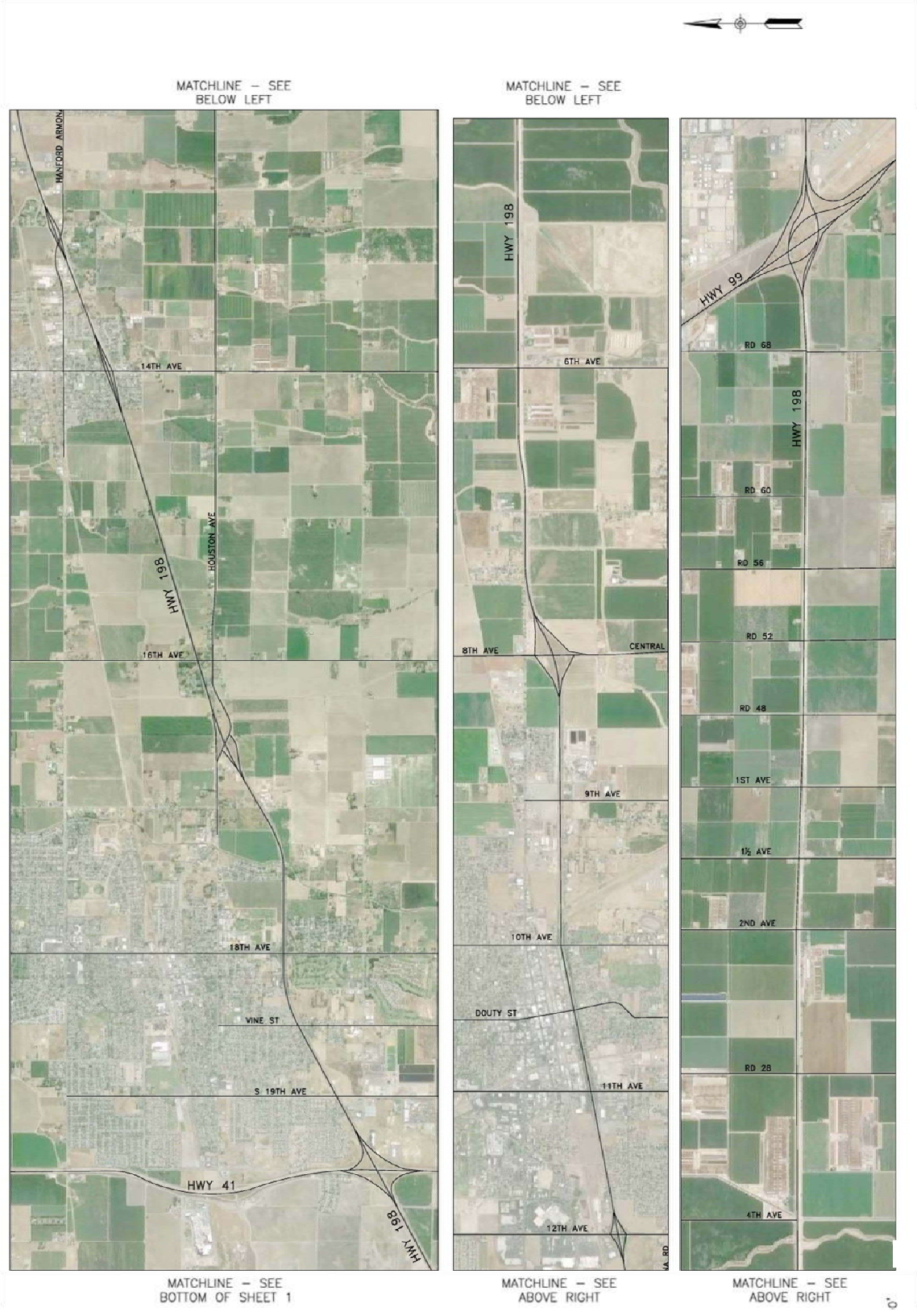
6. Assessing the pavement condition of SR 198 from currently available Caltrans data;

7. Carrying out preliminary cost benefit analysis (CBA) of recommended improvement to firstly establish the "worth" and secondly to allow prioritization; and

8. Draw up a phased program of implementation for the recommended improvements.

Figure 3.2 – SR 198 Study Area Map – Sheet 1

Figure 3.3 – SR 198 Study Area Map – Sheet 2



4 Travel Demand Modeling

4. Travel Demand Modeling

Theoretically, the future year travel demand forecasts could be merely taken directly from an appropriate locally based travel demand model. However, forecast demand volumes from large models, particularly, from links with low flows on them, contain a high degree of statistical uncertainty. In most cases, for the SR 198, the improvements under consideration are also of a minor nature. Given the structure of the highway network in the area, it was considered highly unlikely that the improvement would generate any significant reassignment to traffic. Therefore, the forecast traffic volume estimates were considered to be stable between the "no build' and 'project' scenarios.

It was decided not to use the direct output from the travel models but to use the "Delta" approach. That means estimating the growth described by the modeled flows without using the absolute values of the modeled flows. These growth factors were taken from a combination of model sources (described below) and a consensus on their values by the study partners –i.e., it was agreed with the MPO Group and Caltrans. The model growth factors (2014-2040) were then applied to the 2014 observed traffic flows in order to estimate the 2040 traffic volumes.

This approach acknowledges the forecasts of travel demand from each county model which in combination cover the area of influence of the model. To overcome any potential biases caused by the volatility of demand during the recessional period, a "trend analysis" was also used based on historic growth data.

Review of San Joaquin Valley Model Improvement Plan (MIP) Models for Kings, Fresno and Tulare Counties

The original approach to forecasting the traffic demand for the SR 198 study corridor was to use the MPO regional models for Kings, Fresno and Tulare counties to derive growth factors and scale up the observed 2014 traffic data to 2040. However, each model was developed with a different base year, all of which were during a fairly unstable time period for the economy (2007-2010). The stakeholders noted that some of the models did not match at the gateways and that the historic growth trends should also be taken into account as part of the modeling effort.

To address these concerns, the team picked a number of locations on the roadway network that were relevant to the project objectives as well as locations where there was available modeled data and Caltrans long-term count data, about 24 locations total. Refer to **Figure 4.1** for a map of these locations. From these points, the forecast growth was reviewed from the models to 2040 and their estimated growth rates from their individual base years. The primary objective was to develop a growth rate from 2014 to 2040. This proved to provide a high degree of variation in the values of the estimates, so to provide more confidence, a Trend Analysis approach was also employed.

Trend Analysis

A substantial data set of Average Daily Traffic (ADT) traffic flows were supplied by Caltrans for the key road links in the study area. Most of these stretched back over at least a 30-year time period. This allowed some time-series models to be constructed. This approach essentially projects forward from what has happened in the past. This removes much of the potential instability in traffic demand forecasting from models where base year was in the recessional period.

The first exercise carried out merely extrapolated the observed historic 30-year growth in traffic flows forward from the last year of recorded flow to 2040.

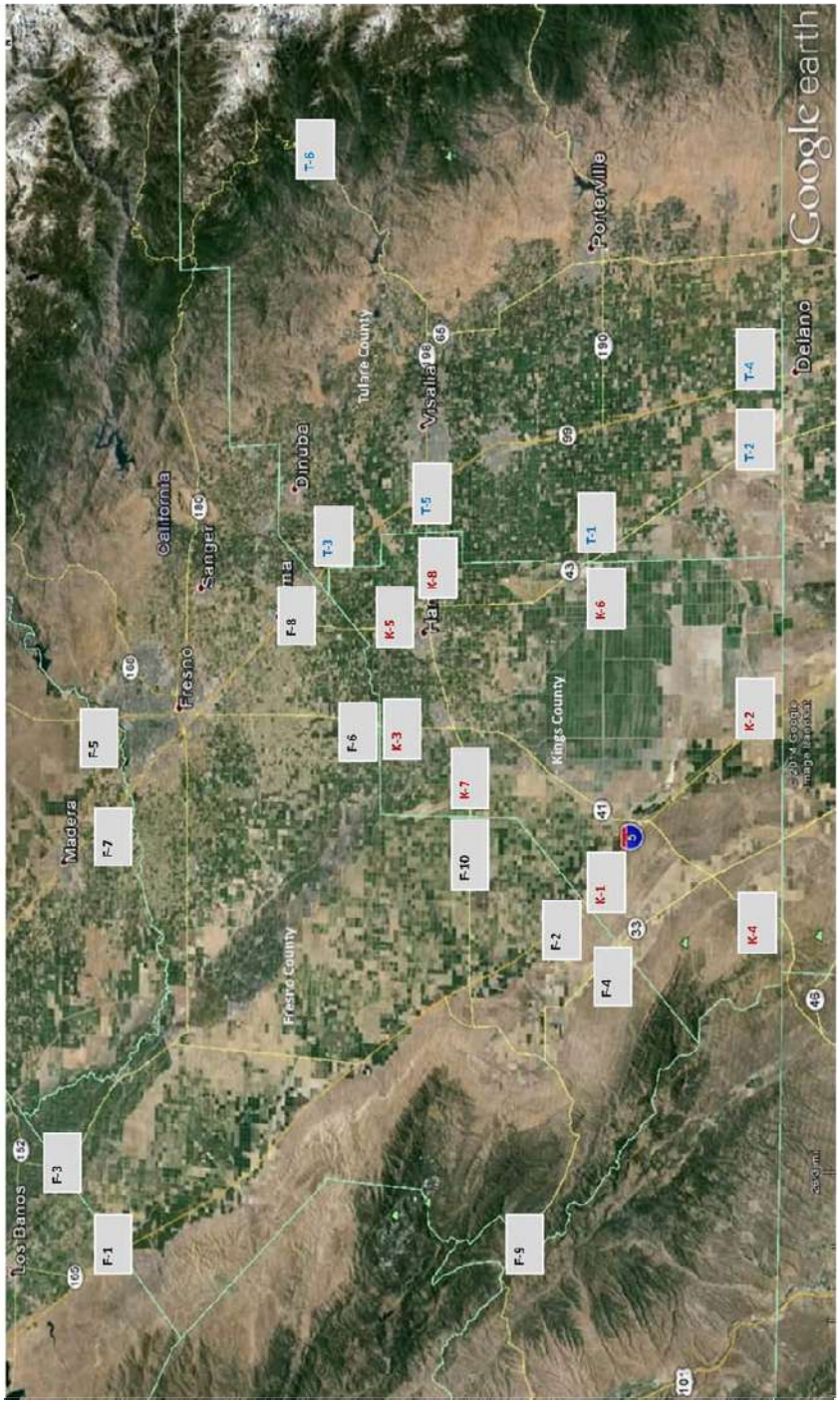
Regression Analyses were used to develop a linear extrapolation. However, this makes the assumption that trends in growth of the major variables (population and employment) for traffic generation remain constant. Over the period of the observed traffic growth, there was substantial growth in population numbers. Travel demand and population are highly correlated variables. The forecast population growth rate is considerably less than the immediate historic one. In response to this, further regression analyses were carried out using traffic volumes and population as controlled variables. The R^2 Measure of fit for the data were satisfactory (most in excess of 0.9). From the mathematical relationships derived, the future year travel demand was estimated from the future year population forecast.

The 2040 traffic volume forecasts were developed based on the comparison between the three methods mentioned above, using the averaged MPO model outputs -- a straight line trend extrapolation of observed traffic flows and a time series model using observed flows and population. From this analysis a set of location-based 2014 to 2040 growth factors were recommended for the road network. Final adjustments were made to the proposed growth rates as a result of a meeting held on October 30, 2014 between the study partners.

Truck Modeling

A truck traffic modeling component is included in each of the models received from Kings, Fresno and Tulare counties noted above. Detailed information with regards to truck analysis is included in the Goods Movement section of this report.

Figure 4.1 – Select Study Locations in Fresno, Kings, and Tulare Counties



5 Roadway Pavement Condition Analysis

5. Roadway Pavement Condition Analysis

Background

The 2011 Caltrans pavement condition survey inventory along State Route 198 (SR 198) was provided for review on March 25, 2014.

The pavement condition review includes the following sections of SR 198:

- Post miles from 26.814 to 42.731 in Fresno County (i.e., the route from the I-5 interchange to the Fresno/Kings County line); and
- Post miles from 0 to 20.975 in Kings County (i.e., the route from the Fresno/Kings County line to the SR-43 junction).

Although SR 198 between SR-43 and SR-99 is in the limits of pavement condition review, this portion of the corridor was recently improved in December 2012 due to the completion of the SR 198 Expressway Project. Because the recently widened pavement data (2012) was not collected as part of the 2011 survey, this portion of corridor (i.e., sections from post miles 20.975 to 28.325 in Kings County and sections from post miles 0 to 3.835 in Tulare County) was excluded in the review.

It should be noted that the pavement condition review presented herein is based on the 2011 pavement condition survey provided by Caltrans. Any pavement deterioration and/or enhancement that occurred after December 2011 is not considered as part of this review.

Assessment Methodology and Relative Ranking

Except bridge sections, all pavement sections in the review limit are asphalt pavements. A thorough examination of the provided pavement inventory data including fatigue cracking, International Roughness Index (IRI) and ride are performed as part of this review. For flexible pavements, one of the key indicators to reflect the structural strength of flexible pavement is fatigue cracking. As shown in **Table 5.1**, eleven sections totaling 6.755 miles exhibit high severity of alligator cracking. These sections should be given the highest priority for maintenance and/or rehabilitation. The section number shown in **Table 5.1** represents the relative ranking of improvement priority. The smaller the section number, the greater the improvement needed. A corrective measure is being planned for nine sections by Caltrans as noted in the table.

Type A	Type B	Type C

Figure 5.1 – Pavement Condition Analysis

Table 5.1 - Pavement Sections with High Severity Alligator Cracking A, B and C

Group	No	Lane	County	Begin Postmile	End Postmile	Length (Mile)	Alligator Cracking A (%)	Alligator Cracking B (%)	Alligator Cracking C (Yes/No)	Ride	IRI	Caltrans Priority	Note/ Defect	Corrective Measure Planned by Caltrans
High Severity Alligator Cracking A, B and C	1	R1	FRE	28.000	29.000	1.000	36	61	Yes	5	76	7	High ABC	No
	2	L2	KIN	6.000	7.000	1.000	38	60	Yes	19	142	7	High ABC	Yes
	3	L2	KIN	7.000	7.167	0.167	36	55	Yes	26	169	7	High ABC	Yes
	4	L2	KIN	7.210	8.000	0.790	36	55	Yes	5	80	7	High ABC	No
	5	L2	KIN	9.967	10.000	0.033	4	47	Yes	--	N/A	7	High ABC	Yes
	6	L2	KIN	10.000	11.000	1.000	4	47	Yes	14	122	7	High ABC	Yes
	7	L2	KIN	12.000	13.000	1.000	22	35	Yes	9	104	7	High ABC	Yes
	8	L2	KIN	11.000	11.176	0.176	42	32	Yes	11	111	7	High ABC	Yes
	9	L2	KIN	11.183	12.000	0.817	42	32	Yes	11	109	7	High ABC	Yes
	10	R2	KIN	5.189	5.709	0.520	22	31	Yes	23	158	7	High ABC	Yes
	11	R2	KIN	5.748	6.000	0.252	22	31	Yes	5	47	7	High ABC	Yes
Subtotal (Mile)						6.755								

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

As shown in **Table 5.2**, nine sections totaling 3.927 miles exhibit moderate severity of alligator cracking. These sections should be given a high priority for maintenance and/or rehabilitation. Corrective measures are being planned by Caltrans for these sections.

Table 5.2 - Pavement Sections with Moderate Severity Alligator Cracking A, B and C

Group	No	Lane	County	Begin Postmile	End Postmile	Length (Mile)	Alligator Cracking A (%)	Alligator Cracking B (%)	Alligator Cracking C (Yes/No)	Ride	IRI	Caltrans Priority	Note/ Defect	Corrective Measure Planned by Caltrans
Moderate Severity Alligator Cracking A, B and C	12	L2	KIN	5.000	5.189	0.189	24	18	Yes	9	102	9		Yes
	13	L2	KIN	5.189	5.709	0.520	24	18	Yes	20	144	9	Mod ABC	Yes
	14	L2	KIN	5.748	6.000	0.252	24	18	Yes	18	136	9	Mod ABC	Yes
	15	L2	KIN	14.000	14.767	0.767	10	13	Yes	11	109	9	Mod ABC	Yes
	16	L2	KIN	14.796	14.965	0.169	10	13	Yes	14	121	9	Mod ABC	Yes
	17	L2	KIN	13.000	14.000	1.000	84	12	Yes	11	112	9	Mod ABC	Yes
	18	L2	KIN	15.962	16.021	0.059	38	--	Yes	--	N/A	9	Mod ABC	Yes
	19	L2	KIN	16.029	16.125	0.096	38	12	Yes	9	101	9	Mod ABC	Yes
	20	L2	KIN	16.125	17.000	0.875	38	12	Yes	12	113	9	Mod ABC	Yes

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.
"Mod": moderate

As shown in **Table 5.3**, 16 sections totaling 8.642 miles exhibit more than 30% alligator cracking A. Some sections also exhibit alligator cracking B and C. These sections should be given the next high priority for maintenance and/or rehabilitation. Again, the section number represents the relative priority for improvement opportunity. A corrective measure is being planned for thirteen sections by Caltrans as indicated in **Table 5.3**.

Table 5.3 - Pavement Sections (Less than 10% Alligator Cracking B and More Than 30% Alligator Cracking A)

Group	No	Lane	County	Begin Postmile	End Postmile	Length (Mile)	Alligator Cracking A (%)	Alligator Cracking B (%)	Alligator Cracking C (Yes/No)	Ride	IRI	Caltrans Priority	Note/ Defect	Corrective Measure Planned by Caltrans
Less than 10% Alligator Cracking B & More Than 30% Alligator Cracking A	21	R2	KIN	17.000	17.912	0.912	43	7	Yes	17	132	31		No
	22	R2	KIN	17.943	18.000	0.057	43	7	yes	10	105	31		Yes
	23	L2	KIN	3.054	4.000	0.946	48	8	--	19	143	31	Open cracks	Yes
	24	L2	KIN	17.000	17.912	0.912	89	4	--	12	114	32		No
	25	L2	KIN	17.943	18.000	0.057	89	4	--	11	112	32		No
	26	L2	KIN	4.000	5.000	1.000	42	2	--	13	118	32		Yes
	27	R2	KIN	15.782	15.962	0.180	70	2	--	13	118	32		Yes
	28	R2	KIN	15.962	16.021	0.059	70	2	--	--	N/A	32		Yes
	29	R2	KIN	16.029	16.125	0.096	70	2	--	20	145	32		Yes
	30	L2	KIN	14.965	15.124	0.159	100	--	--	14	121	32		Yes
	31	L2	KIN	15.124	15.745	0.621	100	--	--	9	101	32		Yes
	32	L2	KIN	15.782	15.962	0.180	100	--	--	7	96	32		Yes
	33	R2	KIN	16.125	17.000	0.875	89	--	--	12	116	32		Yes
	34	R2	KIN	15.124	15.745	0.621	70	--	--	12	115	32		Yes
	35	R1	KIN	1.000	2.000	1.000	35	--	--	17	135	32	Open cracks	Yes
	36	L2	KIN	9.000	9.967	0.967	32	--	--	18	138	32		Yes
Subtotal (mile)						8.642								

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

As shown in **Table 5.4,** 12 sections totaling 9.168 miles exhibit less than 30% alligator cracking A. Open cracks were observed in many sections. It is suggested to seal the open cracks and monitor the sections annually. Since Alligator cracking B and C were not observed, these sections can be given the medium priority for maintenance opportunity. A corrective measure is being planned by Caltrans for nine sections as indicated in **Table 5.4.** Section 48 was recently repaved.

Table 5.4 - Pavement Sections (Less Than 30% Alligator Cracking A)

Group	No	Lane	County	Begin Postmile	End Postmile	Length (Mile)	Alligator Cracking A (%)	Alligator Cracking B (%)	Alligator Cracking C (Yes/No)	Ride	IRI	Caltrans Priority	Note/ Defect	Corrective Measure Planned by Caltrans
Less than 30% Alligator Cracking A	37	L1	KIN	12.000	13.000	1.000	26	--	--	5	74	32		Yes
	38	R2	KIN	9.000	9.967	0.967	25	--	--	7	95	32	Open cracks	Yes
	39	R2	KIN	9.967	10.000	0.033	25	--	--	6	91	32	Open cracks	Yes
	40	R2	KIN	19.000	20.000	1.000	25	--	--	5	79	32	Open cracks	No
	41	L1	KIN	9.967	10.000	0.033	22	--	--	--	N/A	32		Yes
	42	L1	KIN	10.000	11.000	1.000	22	--	--	5	79	32		Yes
	43	L1	KIN	3.054	4.000	0.946	17	--	--	14	121	32	Open cracks	Yes
	44	L1	FRE	28.000	29.000	1.000	17	--	--	5	74	32		No
	45	L1	KIN	13.000	14.000	1.000	16	--	--	5	71	32		Yes
	46	R2	KIN	5.000	5.189	0.189	12	--	--	18	137	32	Open cracks	Yes
	47	R2	KIN	4.000	5.000	1.000	12	--	--	7	96	32	Open cracks	Yes
	48	L1	FRE	40.000	41.000	1.000	11	--	--	5	47	32		Yes (Recently paved)
Subtotal (mile)						9.168								

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

As shown in **Table 5.5,** 14 sections totaling 6.961 miles exhibit less than 10% alligator cracking A. Open cracks were observed in a couple sections. It is suggested to seal the open cracks and monitor the sections annually. These sections can be given the low priority for maintenance opportunity. As shown in **Table 5.5**, a corrective measure is being planned by Caltrans for eight sections. Section 57 was recently repaved.

Table 5.5 - Pavement Sections (Less Than 10% Alligator Cracking A)

Group	No	Lane	County	Begin Postmile	End Postmile	Length (Mile)	Alligator Cracking A (%)	Alligator Cracking B (%)	Alligator Cracking C (Yes/No)	Ride	IRI	Caltrans Priority	Note/ Defect	Corrective Measure Planned by Caltrans
Less than 10% Alligator Cracking A	49	R1	FRE	26.903	28.000	1.097	8	--	--	7	93	32	Open cracks	Yes
	50	R1	KIN	15.124	15.745	0.621	7	--	--	9	104	32		Yes
	51	R1	KIN	15.782	15.962	0.180	7	--	--	9	103	32		Yes
	52	R1	KIN	15.962	16.021	0.059	7	--	--	--	N/A	32		Yes
	53	R1	KIN	16.029	16.125	0.096	7	--	--	10	105	32		Yes
	54	R1	KIN	17.000	17.912	0.912	7	--	--	12	116	32		No
	55	R1	KIN	17.943	18.000	0.057	7	--	--	15	126	32		No
	56	R1	KIN	2.000	3.054	1.054	4	--	--	14	120	32	Open cracks	Yes
	57	R1	FRE	38.000	39.000	1.000	1	--	--	5	69	32		Yes (Recently paved)
	58	L1	KIN	14.000	14.767	0.767	1	--	--	5	81	32		Yes
	59	L1	KIN	14.796	14.965	0.169	1	--	--	5	76	32		Yes
	60	L2	KIN	18.000	18.132	0.132	1	--	--	20	145	32		No
	61	L2	KIN	18.162	18.227	0.065	1	--	--	--	N/A	32		No
	62	L2	KIN	18.248	19.000	0.752	1	--	--	10	105	32		No
Subtotal (mile)						6.961								

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

As shown in **Table 5.6,** 30.563 miles of pavement sections exhibit the distress of miscellaneous unsealed cracks. As shown in **Table 5.7,** no distresses were observed for 27.8 miles of pavement sections. As shown in **Table 5.8,** 14.7 miles of pavement sections show a good condition. Sections listed in **Table 5.6** through **Table 5.8** have no immediate issues.

Table 5.6 - Pavement Sections (Misc. Unsealed Cracks)

Lane	County	Begin Postmile	End Postmile	Length (Mile)	Ride	IRI	Caltrans Priority	Note/ Defect
R1	KIN	0.000	1.000	1.000	15	126	33	Misc. unsealed cracks
L1	KIN	1.000	2.000	1.000	7	93	33	Misc. unsealed cracks
L1	KIN	2.000	3.054	1.054	8	100	33	Misc. unsealed cracks
R1	KIN	3.054	4.000	0.946	15	127	33	Misc. unsealed cracks
R2	KIN	3.054	4.000	0.946	16	129	33	Misc. unsealed cracks
L1	KIN	4.000	5.000	1.000	7	93	33	Misc. unsealed cracks
R1	KIN	4.000	5.000	1.000	14	123	33	Misc. unsealed cracks
L1	KIN	5.000	5.189	0.189	7	93	33	Misc. unsealed cracks
R1	KIN	5.000	5.189	0.189	18	137	33	Misc. unsealed cracks
L1	KIN	5.189	5.709	0.520	13	119	33	Misc. unsealed cracks
R1	KIN	5.189	5.709	0.520	18	136	33	Misc. unsealed cracks
L1	KIN	5.748	6.000	0.252	10	107	33	Misc. unsealed cracks
R1	KIN	5.748	6.000	0.252	5	57	33	Misc. unsealed cracks
L1	KIN	6.000	7.000	1.000	9	102	33	Misc. unsealed cracks
L1	KIN	7.000	7.167	0.167	9	103	33	Misc. unsealed cracks
L1	KIN	7.210	8.000	0.790	6	89	33	Misc. unsealed cracks
L1	KIN	8.000	8.897	0.897	5	82	33	Misc. unsealed cracks
L2	KIN	8.000	8.897	0.897	5	85	33	Misc. unsealed cracks
L1	KIN	8.897	9.000	0.103	23	158	33	Misc. unsealed cracks
L2	KIN	8.897	9.000	0.103	9	103	33	Misc. unsealed cracks
L1	KIN	9.000	9.967	0.967	5	82	33	Misc. unsealed cracks
R1	KIN	9.000	9.967	0.967	5	84	33	Misc. unsealed cracks
R1	KIN	9.967	10.000	0.033	13	117	33	Misc. unsealed cracks
L1	KIN	11.000	11.176	0.176	5	75	33	Misc. unsealed cracks
L1	KIN	11.183	12.000	0.817	5	74	33	Misc. unsealed cracks
L1	KIN	14.965	15.124	0.159	5	80	33	Misc. unsealed cracks
L1	KIN	15.124	15.745	0.621	5	86	33	Misc. unsealed cracks
L1	KIN	15.782	15.962	0.180	5	86	33	Misc. unsealed cracks
L1	KIN	15.962	16.021	0.059	--	N/A	33	Misc. unsealed cracks
L1	KIN	16.029	16.125	0.096	5	84	33	Misc. unsealed cracks
L1	KIN	16.125	17.000	0.875	8	97	33	Misc. unsealed cracks
R1	KIN	16.125	17.000	0.875	11	111	33	Misc. unsealed cracks
L1	KIN	17.000	17.912	0.912	6	92	33	Misc. unsealed cracks
L1	KIN	17.943	18.000	0.057	13	117	33	Misc. unsealed cracks
L1	KIN	18.000	18.132	0.132	15	126	33	Misc. unsealed cracks
R1	KIN	18.000	18.132	0.132	10	108	33	Misc. unsealed cracks
R2	KIN	18.000	18.132	0.132	9	103	33	Misc. unsealed cracks
L1	KIN	18.162	18.227	0.065	--	N/A	33	Misc. unsealed cracks
R1	KIN	18.162	18.227	0.065	--	N/A	33	Misc. unsealed cracks
R2	KIN	18.162	18.227	0.065	--	N/A	33	Misc. unsealed cracks
L1	KIN	18.248	19.000	0.752	9	101	33	Misc. unsealed cracks
R1	KIN	18.248	19.000	0.752	7	93	33	Misc. unsealed cracks
R2	KIN	18.248	19.000	0.752	7	96	33	Misc. unsealed cracks
L1	KIN	19.000	20.000	1.000	8	100	33	Misc. unsealed cracks
L2	KIN	19.000	20.000	1.000	7	96	33	Misc. unsealed cracks
R1	KIN	19.000	20.000	1.000	8	98	33	Misc. unsealed cracks
L1	KIN	20.000	20.795	0.795	9	104	33	Misc. unsealed cracks
L2	KIN	20.000	20.795	0.795	5	85	33	Misc. unsealed cracks
R1	KIN	20.000	20.795	0.795	12	113	33	Misc. unsealed cracks
R2	KIN	20.000	20.795	0.795	5	80	33	Misc. unsealed cracks
L1	KIN	20.795	21.000	0.205	8	99	33	Misc. unsealed cracks
L2	KIN	20.795	21.000	0.205	8	97	33	Misc. unsealed cracks
R1	KIN	20.795	21.000	0.205	10	105	33	Misc. unsealed cracks
R2	KIN	20.795	21.000	0.205	5	79	33	Misc. unsealed cracks
L1	FRE	26.903	28.000	1.097	5	80	33	Misc. unsealed cracks
Subtotal (mile)				30.563				

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory

Table 5.7 - Pavement Sections (No Distress Observed)

Lane	County	Begin Postmile	End Postmile	Length (Mile)	Ride	IRI	Caltrans Priority	Note/ Defect
L1	KIN	0.000	1.000	1.000	13	118	99	No distress observed
R1	KIN	6.000	7.000	1.000	5	56	99	No distress observed
R2	KIN	6.000	7.000	1.000	5	47	99	No distress observed
R1	KIN	7.000	7.167	0.167	7	93	99	No distress observed
R2	KIN	7.000	7.167	0.167	14	121	99	No distress observed
R1	KIN	7.210	8.000	0.790	5	49	99	No distress observed
R2	KIN	7.210	8.000	0.790	5	58	99	No distress observed
R1	KIN	8.000	8.897	0.897	5	68	99	No distress observed
R2	KIN	8.000	8.897	0.897	5	73	99	No distress observed
R1	KIN	8.897	9.000	0.103	6	90	99	No distress observed
R2	KIN	8.897	9.000	0.103	6	90	99	No distress observed
R1	KIN	10.000	11.000	1.000	5	73	99	No distress observed
R2	KIN	10.000	11.000	1.000	5	83	99	No distress observed
R1	KIN	11.000	11.176	0.176	5	76	99	No distress observed
R2	KIN	11.000	11.176	0.176	7	95	99	No distress observed
R1	KIN	11.183	12.000	0.817	5	77	99	No distress observed
R2	KIN	11.183	12.000	0.817	5	83	99	No distress observed
R1	KIN	12.000	13.000	1.000	5	82	99	No distress observed
R2	KIN	12.000	13.000	1.000	6	91	99	No distress observed
R1	KIN	13.000	14.000	1.000	5	73	99	No distress observed
R2	KIN	13.000	14.000	1.000	5	84	99	No distress observed
R1	KIN	14.000	14.767	0.767	7	93	99	No distress observed
R2	KIN	14.000	14.767	0.767	6	91	99	No distress observed
R1	KIN	14.796	14.965	0.169	17	135	99	No distress observed
R1	KIN	14.965	15.124	0.159	9	103	99	No distress observed
R2	KIN	14.965	15.124	0.159	11	109	99	No distress observed
L1	FRE	29.000	30.000	1.000	5	60	99	No distress observed
L1	FRE	30.000	31.000	1.000	5	62	99	No distress observed
L1	FRE	31.000	32.000	1.000	5	62	99	No distress observed
R1	FRE	32.000	33.000	1.000	5	65	99	No distress observed
R1	FRE	34.000	35.000	1.000	11	112	99	No distress observed
R1	FRE	36.000	37.000	1.000	5	62	99	No distress observed
L1	FRE	38.000	39.000	1.000	5	69	99	No distress observed
R1	FRE	39.000	40.000	1.000	5	55	99	No distress observed
L1	FRE	41.000	42.000	1.000	5	49	99	No distress observed
R1	FRE	41.000	42.000	1.000	5	53	99	No distress observed
R1	FRE	42.000	42.731	0.731	5	88	99	No distress observed
Subtotal (mile)				27.800				

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

Table 5.8 - Pavement Sections (Good Conditions)

Lane	County	Begin Postmile	End Postmile	Length (Mile)	Ride	IRI	Caltrans Priority	Note/ Defect
R1	FRE	26.846	26.903	0.057	--	N/A	98	Good Condition
R1	FRE	29.000	30.000	1.000	5	61	98	Good Condition
R1	FRE	30.000	31.000	1.000	5	62	98	Good condition
R1	FRE	31.000	32.000	1.000	5	60	98	Good condition
L1	FRE	32.000	33.000	1.000	5	62	98	Good condition
L1	FRE	33.000	34.000	1.000	5	62	98	Good condition
R1	FRE	33.000	34.000	1.000	5	70	98	Good condition
L1	FRE	34.000	35.000	1.000	8	99	98	Good condition
L1	FRE	35.000	35.396	0.396	5	85	98	Good condition
R1	FRE	35.000	35.396	0.396	8	98	98	Good condition
L1	FRE	35.440	36.000	0.560	5	59	98	Good condition
R1	FRE	35.440	36.000	0.560	5	71	98	Good condition
L1	FRE	36.000	37.000	1.000	5	59	98	Good condition
L1	FRE	37.000	38.000	1.000	5	69	98	Good condition
R1	FRE	37.000	38.000	1.000	5	69	98	Good condition
L1	FRE	39.000	40.000	1.000	5	53	98	Good condition
R1	FRE	40.000	41.000	1.000	5	48	98	Good condition
L1	FRE	42.000	42.731	0.731	5	77	98	Good condition
Subtotal (mile)				14.700				

"--": data not recorded in 2011 Caltrans Pavement Condition Survey inventory.

Other Observations and Discussion

The 2011 pavement condition data show that the inner travel lanes (i.e., lanes L2 and R2) generally exhibit a higher percentage of fatigue cracking in comparison to the outer travel lanes (i.e., lanes L1 and R1). As listed in **Tables 5.1 and 5.2**, 20 pavement sections are either categorized as the highest priority or high priority for improvement. Among these sections, 95% (i.e., 19 sections) are located in the inner travel lanes.

Furthermore, the roughness index is not a good indicator to reflect the structural strength of pavements for the improvement need. As shown in **Table 5.1**, section numbers 10 and 11 exhibit the same amount of fatigue cracking. However, section 11 has a low IRI of 47 while section 10 has a relatively high IRI of 158. A wide range of IRI is also observed for other pavement sections of similar conditions. As shown in **Table 5.6**, the IRI for pavements with miscellaneous unsealed cracks ranges from 57 to 158. Similarly, the IRI for pavements with no observed distresses ranges from 47 to 167 as shown in **Table 5.7**.

Five sections listed in **Table 5.9** have an IRI over the threshold of 170 inches per mile. The ride qualities of these sections are considered poor per the Federal Highway Administration (FHWA) Standard. Except bridge sections that were excluded in the pavement condition review, 0.169 miles of pavements in Kings County and 0.057 miles of pavements (i.e., the section connecting to bridge) in Fresno County are due for a field condition survey. Hence, the causes of excessive pavement roughness can be identified in order to develop suitable solutions.

For sections in the limit of pavement condition review, only one bridge section has the ride score over 40. Since the bridge section is excluded in the condition review, no further discussion is made. All other flexible pavement sections have the ride scores below 40. Thus, the rides are considered acceptable.

Table 5.9 - Pavement Sections (with IRI over 170 Inches per Mile)

Lane	County	Begin Postmile	End Postmile	Length	Ride	IRI	Caltrans Priority	Note/ Defect
R1	FRE	26.814	26.846	0.032	44	225	0	N/A Bridge
L1	FRE	26.814	26.846	0.032	37	205	0	N/A Bridge
L1	FRE	26.846	26.903	0.057	33	196	12	Ride
R2	KIN	14.796	14.965	0.169	29	181	5	Ride
R2	KIN	7.167	7.210	0.043	27	180	0	N/A Bridge

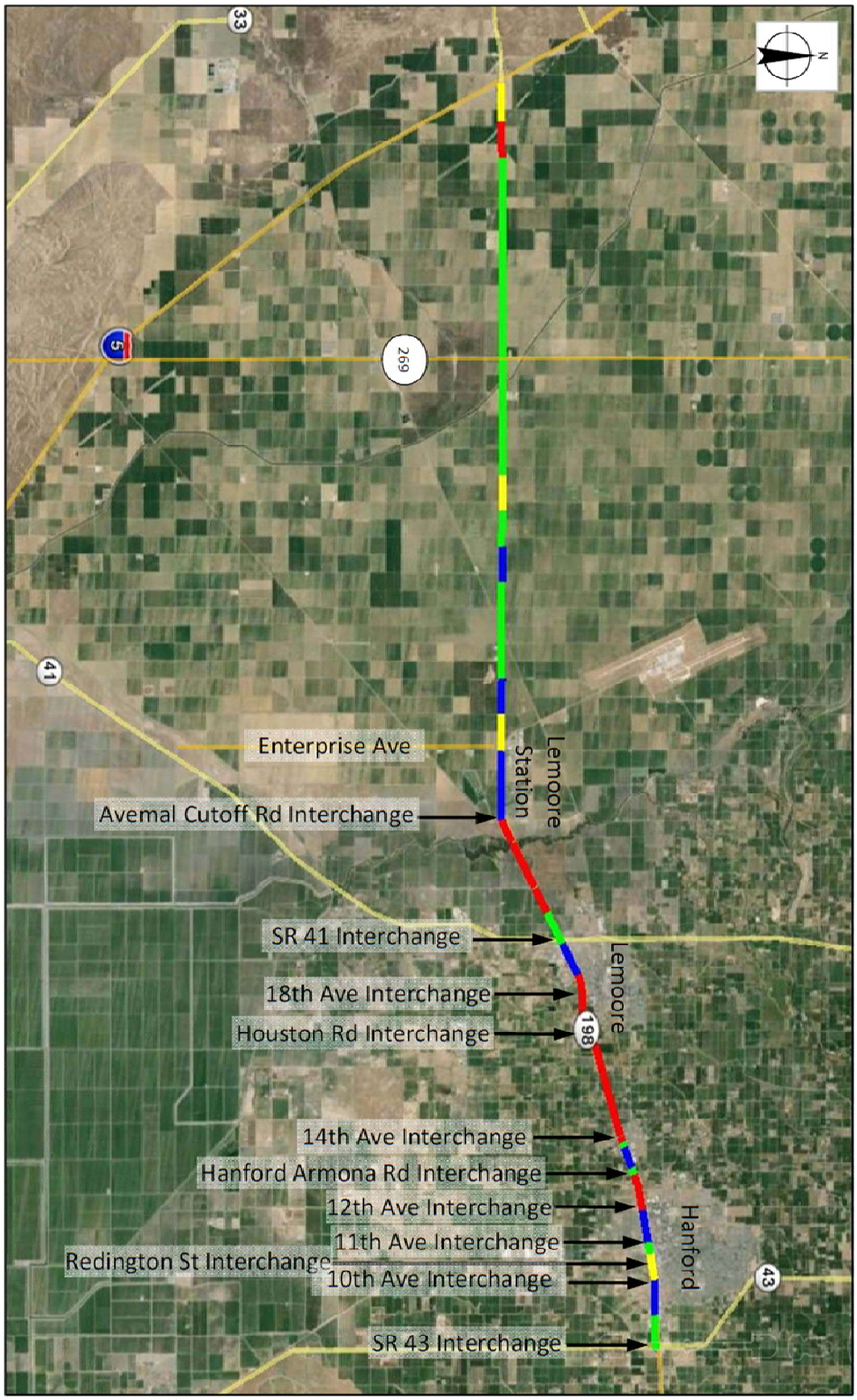
Summary

Pavement conditions of SR 198 (between the I-5 interchange and the SR-43 junction) are reviewed. The pavement condition review is based on the 2011 Caltrans pavement condition survey inventory data. As a result, pavement improvements and/or deteriorations after the last survey (i.e., December 2011) are not considered. As shown in **Tables 5.1 to 5.5,** a relative ranking is developed to further prioritize the improvement demand. The smaller the section number, the greater the improvement need. A corrective measure, if being planned by Caltrans, is noted in **Tables 5.1** to **5.5**.

Alligator cracking data are used to categorize flexible pavements as follows:

- Sections 1 to 11 shown in **Table 5.1:** The highest priority for improvement;
- Sections 12 to 20 shown in **Table 5.2:** A high priority for improvement;
- Sections 21 to 36 shown in **Table 5.3:** The next high priority for improvement;
- Sections 37 to 48 shown in **Table 5.4:** To be monitored annually (medium priority);
- Sections 49 to 62 shown in **Table 5.5:** To be monitored annually (low priority);
- Other sections shown in **Table 5.6** to **Table 5.8:** No immediate issue.

Figure 5.2 – Pavement Ranking Map



Pavement Ranking – Alligator Cracking Data

- Highest and High Priority – 7-9 (95% on inner travel lanes)
- Next High and Medium Priority – 31-32
- Low Priority – 98 (Good Condition)
- No Immediate Issue – 99 (No distress observed)

6 Corridor Studies

6. Corridor Studies

Scope of the Analysis

The purpose of the corridor study analysis conducted for the SR 198 Corridor Preservation and Improvement Strategic Plan was to recommend low-cost, short-term roadway improvements and longer term improvements that will provide for improved traffic operations, traffic safety, and economic development. The scope of this corridor analysis includes a detailed traffic analysis for the two-lane portion of SR 198 between I-5 and the LNAS and for selected intersections and interchanges in the remainder of the study area which is largely in Fresno County. It also includes a more general evaluation of the four-lane segment of SR 198 between the LNAS and SR-99. Crop production estimates were gathered for the study area for the years 2007 through 2013.

Based on a combination of Average Daily Traffic values and crop production values for 2007 through 2013, an estimate was made of the conditions that would have been expected to be observed in 2014 if corresponding 2014 data were available.

Figure 6.1 shows the study area for this analysis, SR 198 from I-5 to SR-99. This study area is centered in Kings County, but includes portions of Fresno County on the west end of the corridor and portions of Tulare County on the east end of the corridor.

The following intersections on SR 198 are examined:

- Commercial Driveway
- I-5
- Harris Ranch Drive
- El Dorado Avenue
- Butte Avenue
- SR-269
- Bishops Avenue
- LNAS Access Road
- 18th Avenue
- 13th Avenue
- 11th Avenue
- 9th Avenue*

*9th Avenue is the only at-grade intersection on the Segment of SR 198 that otherwise acts as a freeway.

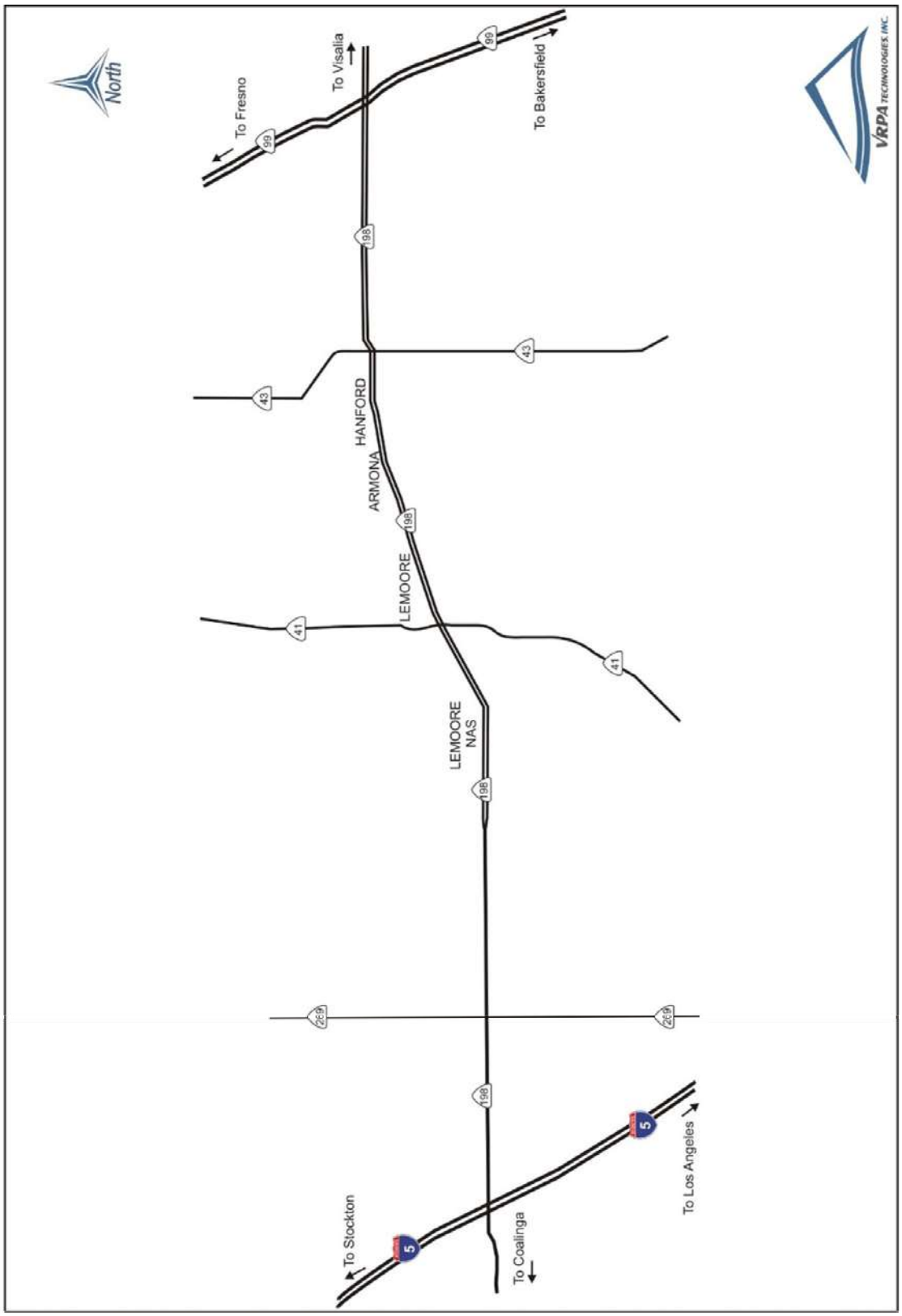
The final traffic forecasts that resulted from the traffic modeling were used to conduct roadway capacity analysis, including the existing and expected future operating condition of roadway facilities within the corridor. In traffic engineering methodology, roadway operations are rated in terms of levels of service, ranging from level of service A (light traffic, minimal delays) to level of service F (substantial traffic congestion and delay). Within Caltrans District 6, level of service D is a typical design threshold for urban areas within City limits and level of service C is a typical design threshold used in outside of City limits. These design thresholds were used for the SR 198 corridor analysis.

Review and Analyze Existing Traffic and Performance Data

This section provides detailed traffic counts/forecasts for base year conditions for the SR 198 Corridor Preservation and Improvement Strategic Plan.

The remainder of this section provides background information, methodology for determination of base year conditions, and results.

Figure 6.1 - Project Location



Methodology – Existing Conditions

The following methodology was used to determine existing traffic conditions:

- Intersection turning movement counts were collected at study area intersections in June 2014. In order to reflect the agricultural area of the study area, as well as atypical traffic generators, such as the LNAS, traffic counts were collected from 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM on typical weekdays. The peak hour counts used were the AM peak hour and PM peak hour at each individual intersection based on these counts.

- Average Daily Traffic (ADT) counts were obtained for 2013 from the Traffic Census on the Caltrans website. The counts from 2013 were considered to represent 2014 conditions for the purposes of this study.

Develop New Data for SR 198 from I-5 and SR-99

Base year conditions were considered to reflect the current traffic counts that would be observed if the study area were not experiencing the effects of drought and the recent recession. Rather than reporting existing 2014 conditions, it was decided to provide an estimate of traffic conditions that would have occurred in a normal year. The year 2040 was selected for future year analysis because it is consistent with the horizon years of the three regional transportation models that cover the study area (KCAG, Fresno COG, and TCAG).

Methodology – Base Year Conditions

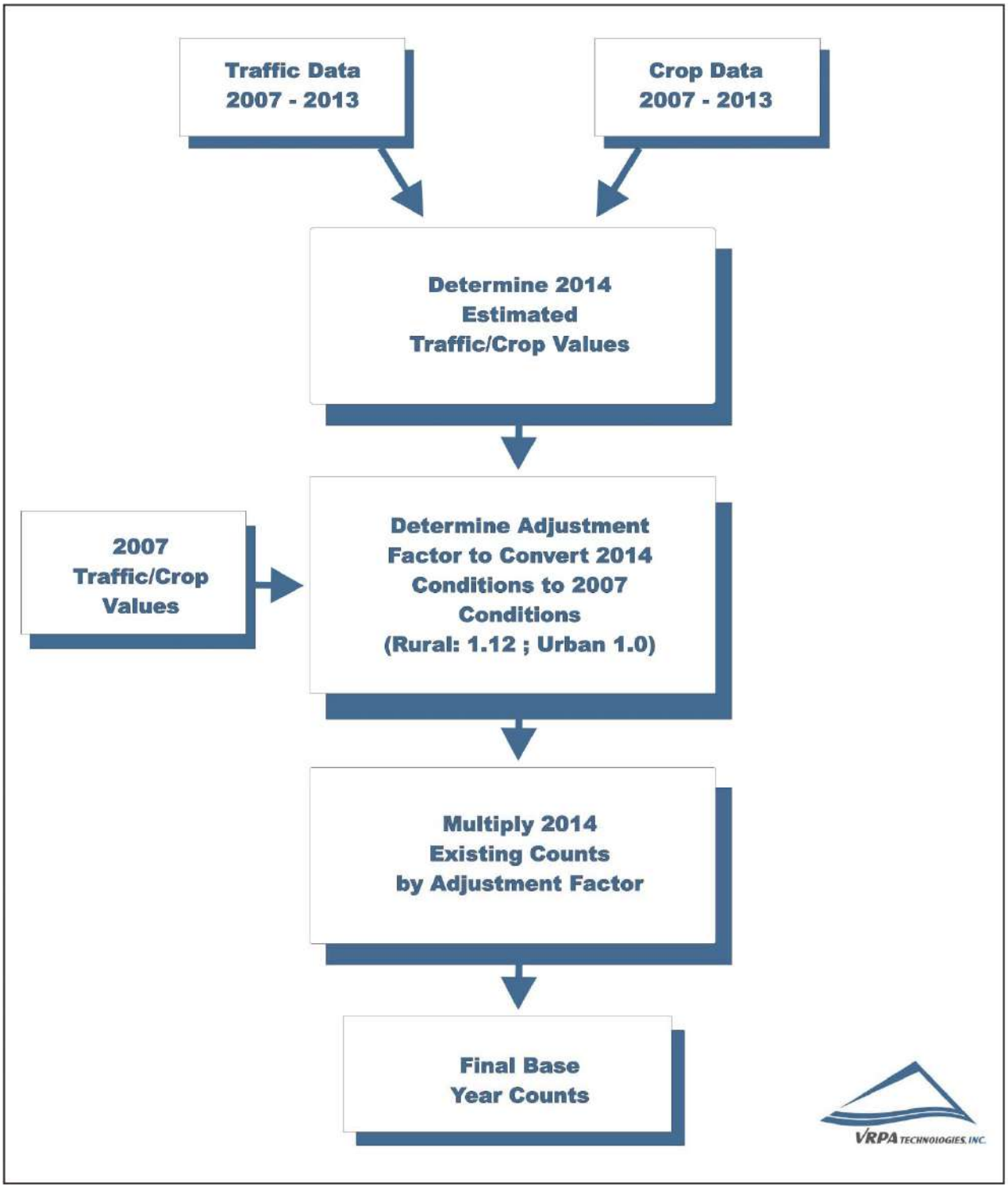
The following methodology was used to estimate base year traffic conditions (see **Figure 6.2**):

- Available Average Daily Traffic counts were gathered from Caltrans files for key locations in the study area for the years 2007 through 2013.

- Crop production estimates were gathered for the study area for the years 2007 through 2013.

- Based on a combination of Average Daily Traffic values and crop production values for 2007 through 2013, an estimate was made of the conditions that would have been expected to be observed in 2014 if corresponding 2014 data were available.

Figure 6.2 – Flow Chart for Calculation of Adjustment Factor for Base Year Counts



- The estimated 2014 prevailing traffic conditions and crop production estimates were compared to 2007 conditions (considered to be the most recent "typical" year not subject to recession or drought). This led to an increase or adjustment factor of 1.12 to increase existing counts to base year conditions for the portion of the study area from I-5 to the LNAS (see **Figure 6.3**). Within the portion of the study area between the LNAS and SR-99, no adjustment factor was considered to be needed. It should be noted that **Figure 6.3** includes data based on both traffic counts and agricultural crops. The crop data can be subject to wider variations than traffic due to weather and various other factors.

- A specific year has not been assigned to base year traffic conditions, but they could be considered to correspond to 2007 pre-drought, pre-recession conditions. Alternatively, the base year condition could be considered to be representative of the conditions that would have occurred in 2014 if there had been no recession or drought, but also no growth between 2007 and 2014.

An adjustment was also made to account for the seasonality of traffic counts. The following methodology was used (see **Figure 6.4**):

- Since the process above was considered to produce base year traffic counts that represent average conditions throughout the year, 2007 peak month ADT was compared to 2007 average conditions to determine a seasonal adjustment (see **Figure 6.4**). This led to an increase or adjustment factor of 1.05 for the entire study area.

- The seasonal adjustment was applied only to peak hour intersection turning movements, not to ADT values. Therefore, the ADT values reported in this report are considered to represent the average daily traffic that would be expected to occur throughout the year, while the intersection turning movements are considered to represent the turning movements that would occur in the peak month of the year.

Exhibit C
Calculation of Adjustment Factor for Base Year Counts

TYPE OF DATA	LOCATION	URBAN/ RURAL	SOURCE OF DATA	2007	2008	2009	2010	2011	2012	2013	2014 (EST.) (1)	BASE YEAR COUNT/ 2014 COUNT ESTIMATE
Traffic Counts (ADT)	Tulare County SR 198 Gateway E	Rural	Caltrans	1,500	1,650	1,650	1,650	1,700			1,650	0.81
Traffic Counts (ADT)	Tulare County SR 198 Gateway W	Rural	Caltrans	19,800	19,000	19,000	19,000	19,000			19,000	1.04
Traffic Counts (ADT)	Kings County SR 198 Gateway E	Rural	Caltrans	18,900	18,000	18,000	18,000	19,000			19,100	0.99
Traffic Counts (ADT)	Kings County SR 198 Gateway W	Rural	Caltrans	7,700	7,000	7,000	7,000	4,500			7,000	1.10
Traffic Counts (ADT)	Fresno County SR 198 Gateway E	Rural	Caltrans	6,800	6,700	6,700	6,700	4,500			4,500	1.51
Traffic Counts (ADT)	Fresno County SR 198 Gateway W	Rural	Caltrans	1,200	1,200	1,200	1,200	850			850	1.41
Traffic Counts (Historical Directional 3-Day ADT)	EB SR 198 West of SR 269	Rural	Caltrans	3,415				2,761			2,761	1.24
Traffic Counts (Historical Directional 3-Day ADT)	WB SR 198 West of SR 269	Rural	Caltrans	3,173				2,727			2,727	1.16
Traffic Counts (Historical Directional 3-Day ADT)	EB SR 198 East of SR 269	Rural	Caltrans	3,447				2,872			2,872	1.20
Traffic Counts (Historical Directional 3-Day ADT)	WB SR 198 East of SR 269	Rural	Caltrans	3,512				2,845			2,845	1.23
Traffic Counts (Historical Directional 3-Day ADT)	WB SR 198 West of LNAS Main Gate	Rural	Caltrans	1,808				2,222			2,222	0.81
Traffic Counts (Historical Directional 7-Day ADT)	EB SR 198 West of SR 269	Rural	Caltrans	3,246				2,609			2,609	1.24
Traffic Counts (Historical Directional 7-Day ADT)	WB SR 198 West of SR 269	Rural	Caltrans	3,050				2,498			2,498	1.22
Traffic Counts (Historical Directional 7-Day ADT)	EB SR 198 East of SR 269	Rural	Caltrans	3,307				2,516			2,516	1.31
Traffic Counts (Historical Directional 7-Day ADT)	WB SR 198 East of SR 269	Rural	Caltrans	3,406				2,511			2,511	1.36
Traffic Counts (Historical Directional 7-Day ADT)	WB SR 198 West of LNAS Main Gate	Rural	Caltrans	1,685				2,280			2,280	0.74
Tomato (includes 18 other vegetable crops)	Tulare County	Rural	TCAG	3,010	3,330	5,975	5,450	3,470	2,880	3,310	3,310	0.91
Tomato	Kings County	Rural	KCAG	26,041	30,425	26,658	38,357	31,155	36,008	33,447	33,447	0.78
Tomato	Fresno County	Rural	Fresno COG	135,100	117,900	125,400	116,280	104,460	106,030	111,600	111,500	1.21
Traffic Counts (ADT)	EB SR 198 West of Hanford/Armona Rd	Urban	Caltrans	15,793	15,442	15,999	15,837	15,761	15,958	16,036	16,076	0.98
Traffic Counts (ADT)	WB SR 198 West of Hanford/Armona Rd	Urban	Caltrans	16,325	16,568	16,017	16,277	16,416	16,560	16,647	16,700	0.98
Traffic Counts (ADT)	EB SR 198 West of SR 99	Urban (2)	Caltrans	9,310		9,025	8,886			11,067	11,578	0.81
Traffic Counts (ADT)	WB SR 198 West of SR 99	Urban (2)	Caltrans	11,563		10,470	9,963			11,537	11,804	0.98

1. Estimated actual 2014 value that would have been reported if data were available.
2. Assumed to correspond to urban conditions because of its location between Hanford and Visalia.

	Rural	
	Average	1.12
	Minimum	0.74
	Maximum	1.51
	Urban	
	Average	0.94
	Minimum	0.81
	Maximum	0.98
Recommended Adjustment Factor	**Rural**	1.12
	Urban	1.0

Figure 6.3 – Calculation of Adjustment Factor for Base Year Counts

Figure 6.4 – Flow Chart for Calculation of Seasonal Adjustment to Peak Hour Traffic Counts

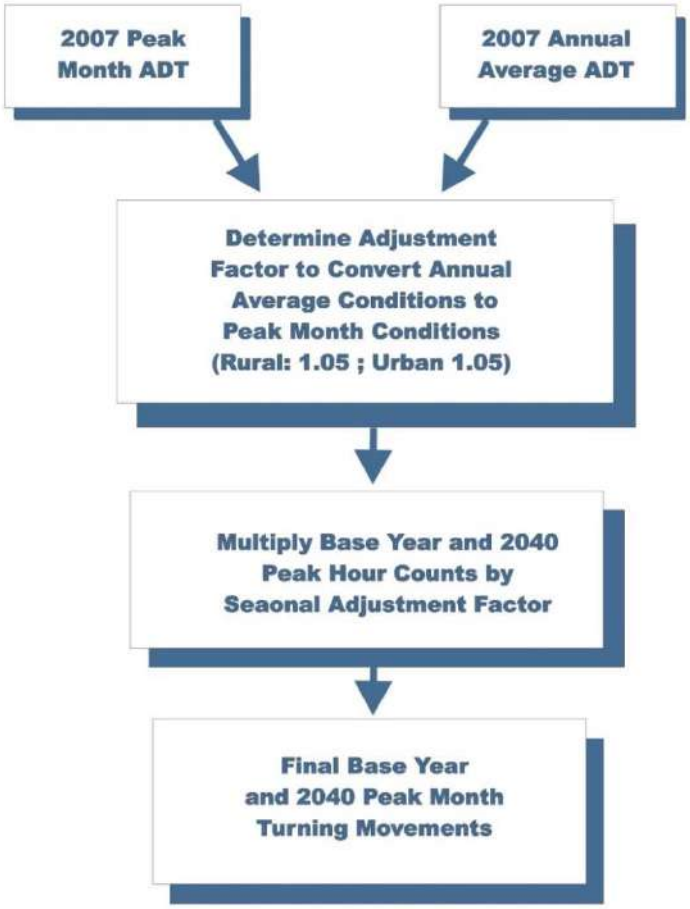


Exhibit E
SR 198 Seasonal Adjustment
(Calculation Based on 2007 Traffic Data)

LOCATION	Peak Month ADT [1]	Annual Average ADT [2]	Adjustment Factor
Houston Ave to 14th Ave	31,500	29,000	1.09
Hanford Armona to 12th Ave	33,000	32,000	1.03
10th Ave to SR 43	20,700	19,500	1.06

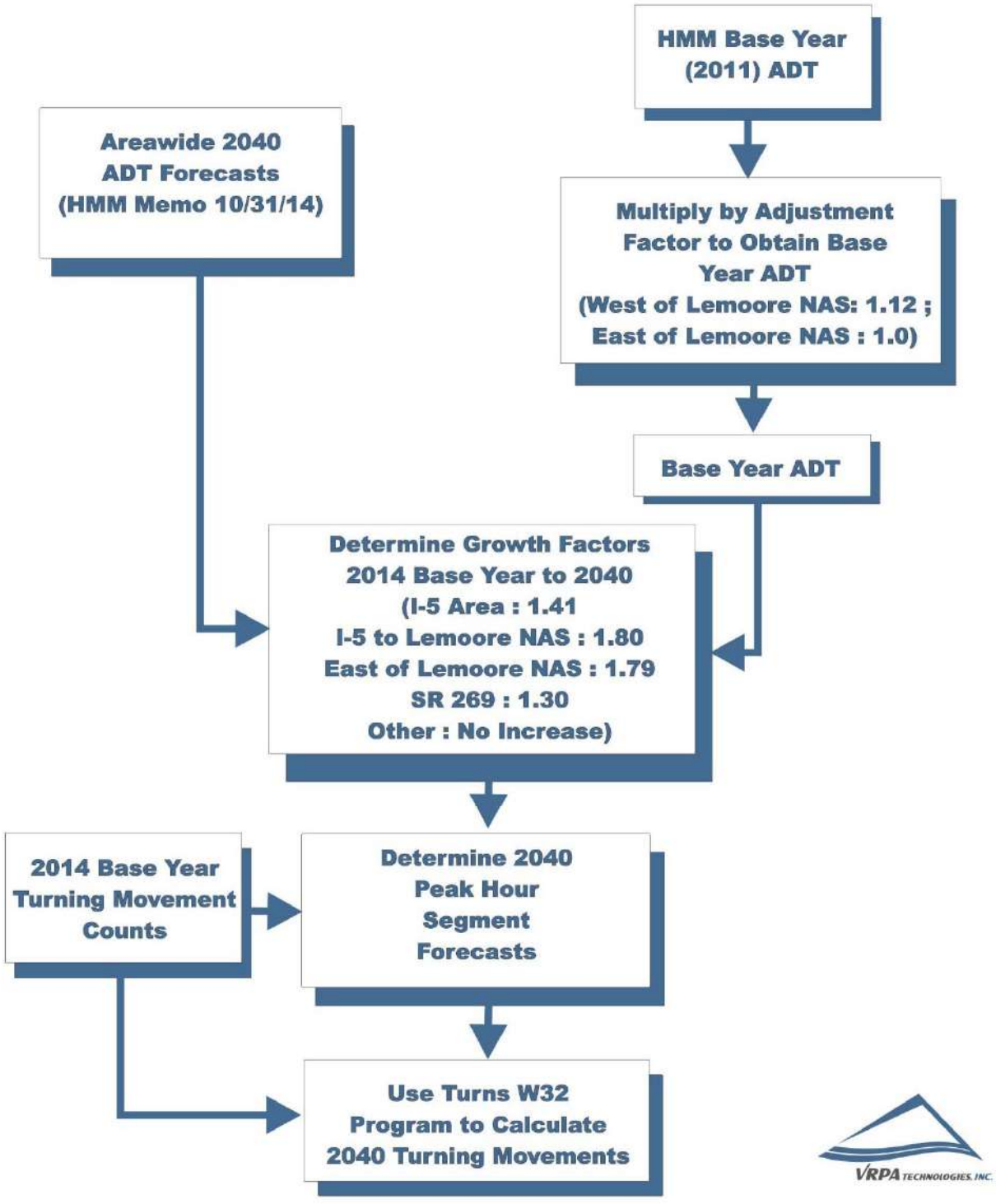
1. 2007 Peak Month ADT from Caltrans Traffic Census website.
2. 2007 annual average ADT from Caltrans Traffic Census website.

Methodology – 2040 Conditions

Traffic forecasts for 2040 conditions were determined as follows (see **Figure 6.5**):

- Overall traffic forecasts for 2040 ADT conditions in the study area were prepared based on the regional transportation models that cover the study area (KCAG, Fresno COG, and TCAG) and an analysis of historic trends.
- Since the ADT traffic forecast used a base year of 2011, the 2011 ADT was multiplied by an adjustment factor to determine 2014 base year conditions for the ADT values. As described above in the calculation of base year conditions, an adjustment factor of 1.12 was used west of the LNAS and no adjustment factor was considered to be needed east of the LNAS.
- In the I-5/SR 198 Interchange Area, the representative forecast from the HMM memo was considered to be the location on I-5 north of SR 198 and resulting in a growth factor of 1.41 from 2014 base year conditions to 2040 conditions.
- In the area between Harris Ranch and the LNAS, the representative forecast was considered to be the location at the Fresno County/Kings County line, resulting in a growth factor of 1.80 from 2014 base year conditions to 2040 conditions.
- In the area between the LNAS and SR-99, the representative forecast was considered to be the location on SR 198 at the Kings County/Tulare County line, resulting in a growth factor of 1.79 from 2014 base year conditions to 2040 conditions.
- For all locations, the Turns W32 program was used to calculate future 2040 intersection turning movements. Base year counts and 2040 peak hour segment directional traffic forecasts based on the growth factors were used as inputs to the program.
- For SR-269, the assumed growth factor was 1.30 (or 1.0% per year) from 2014 to 2040. This growth factor was considered to reflect moderate growth in through trips along SR-269 and local developments.
- No growth was assumed for LNAS or local roadways. While traffic increases may occur the assumption was that general traffic increases are reflected in the overall forecasts and that localized traffic increases would be mitigated by specific development projects.

Figure 6.5 – Flow Chart for Calculation of 2040 Traffic Forecasts



In the following pages, traffic flow information and level-of-service data is provided for the roadway and at the intersections for the sections of SR 198 under review (between I-5 and SR-99). Three time periods are provided for the roadway sections: the whole (average) day and both the morning and

evening peak hour for an average day. For the intersections, both the morning and evening peak hours traffic flows are shown.

It is normal industry practice to use peak hour flows at intersections to judge their operational performance and daily flows for road sections.

Two years are shown, 2014 and 2040. The 2014 are observed flows adjusted for neutral conditions. The 2040 flows are forecast estimates.

The Level of Service (LOS) measure assesses the traffic flows against the available capacity and so demonstrates an operational index. LOS A is free flow condition and LOS F is where traffic demand equals or exceeds capacity.

Results

The resulting base year traffic conditions are shown in **Figures 6.6 through 6.23**.

Figure 6.6 – Existing Average Daily Traffic I-5 to LNAS

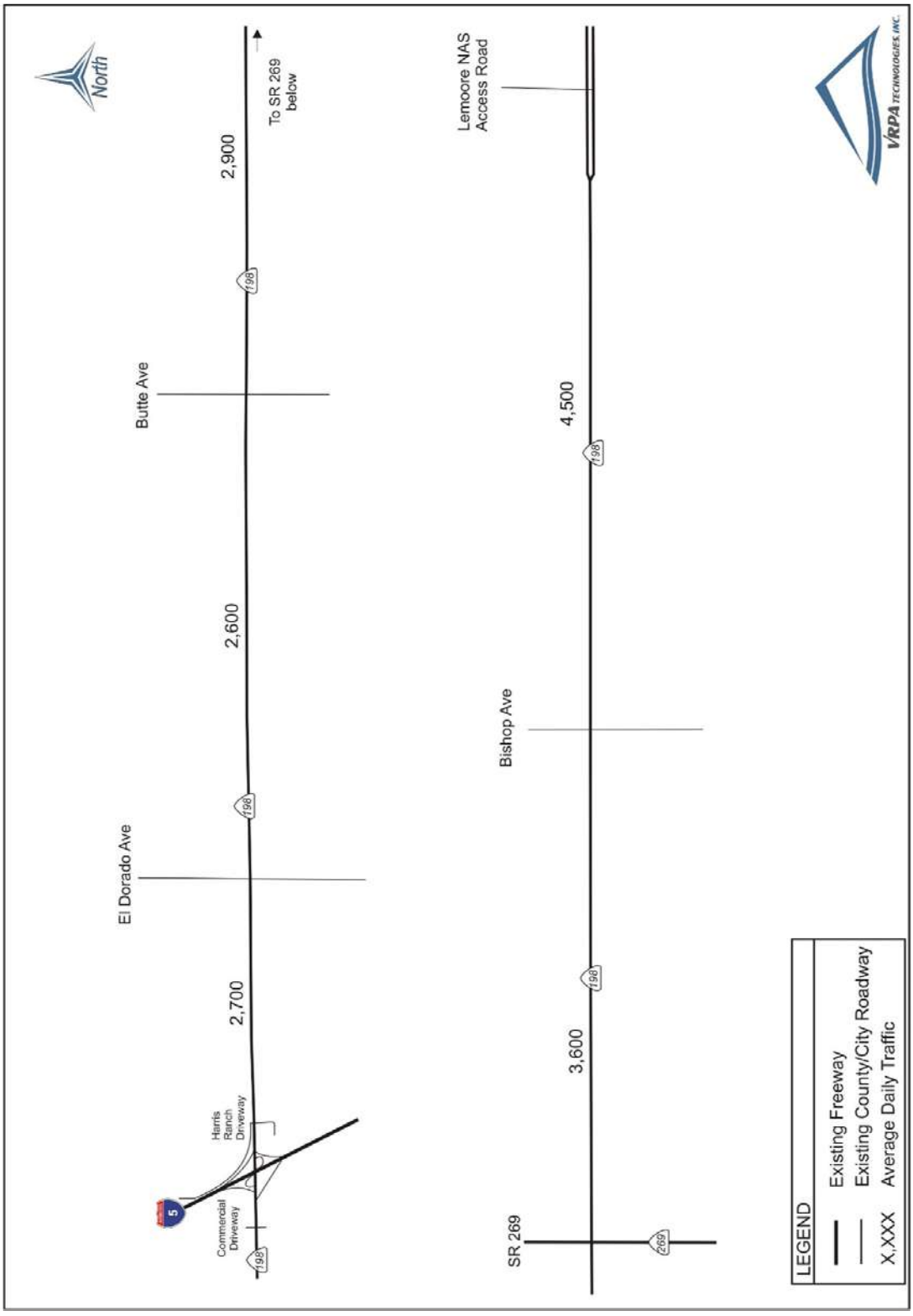


Figure 6.7 - Existing Average Daily Traffic LNAS to State Route 99

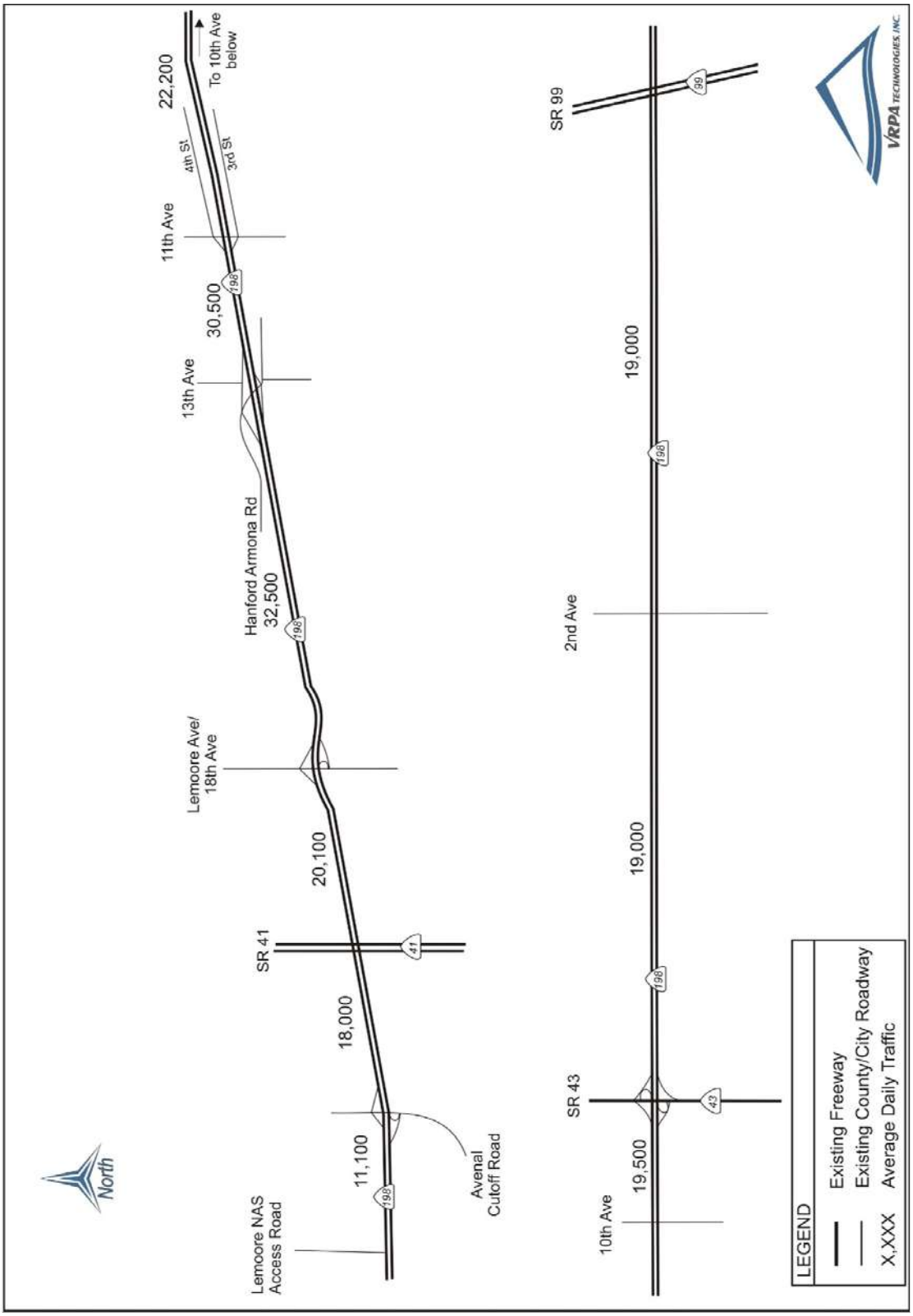


Figure 6.8 – Existing AM Peak Hour Traffic I-5 to LNAS

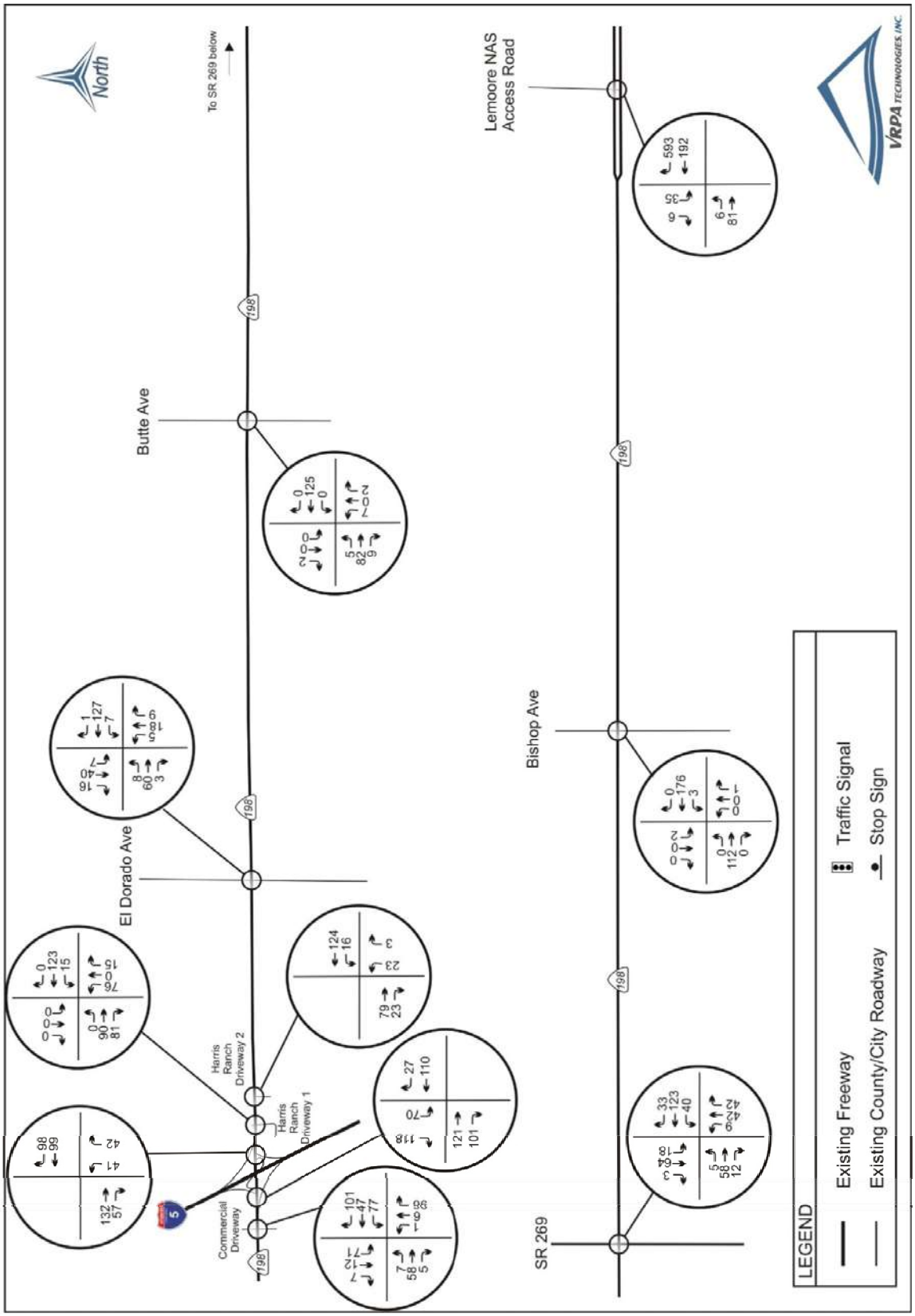


Figure 6.9 – Existing AM Peak Hour Traffic LNAS to State Route 99

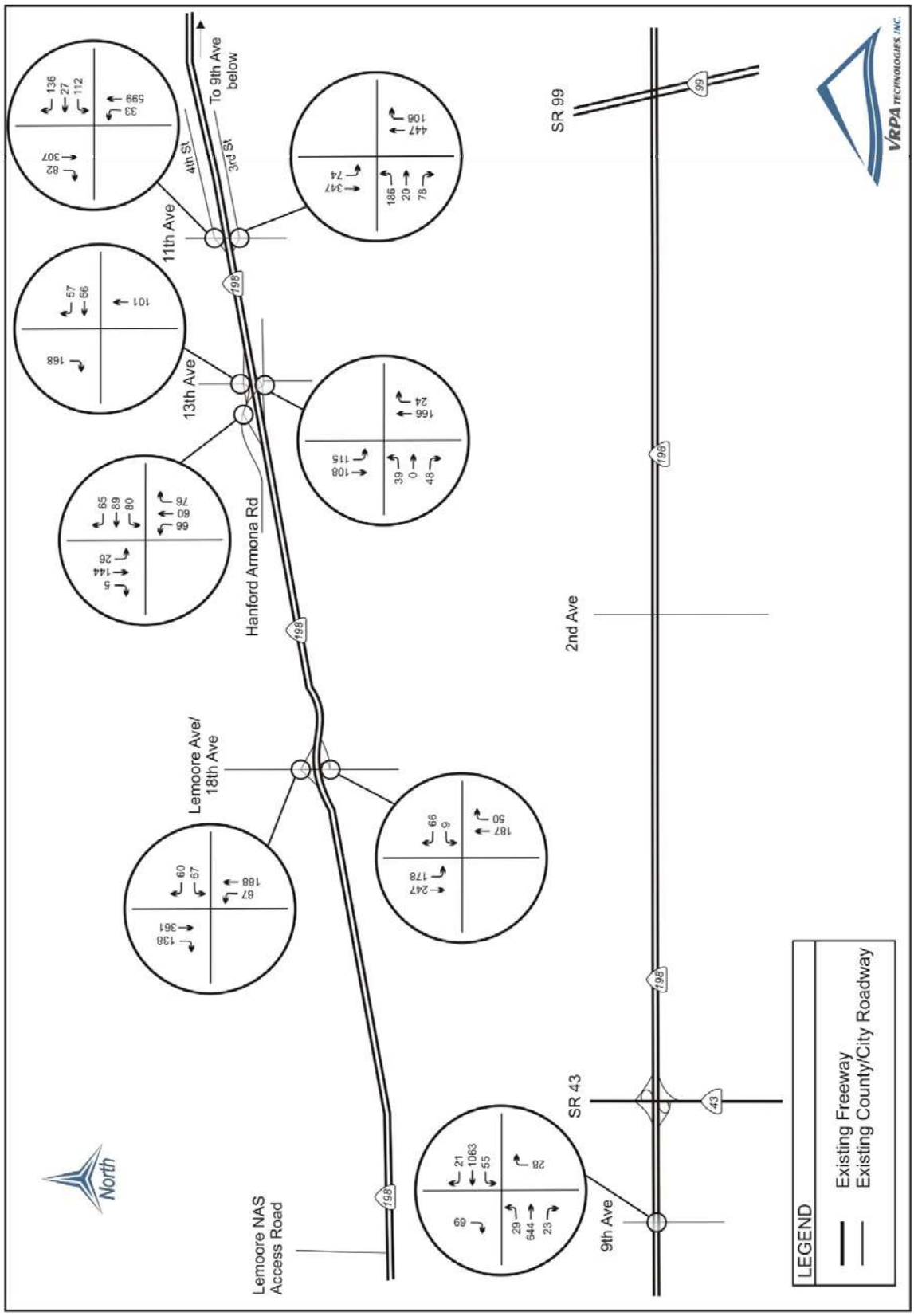


Figure 6.10 – Existing PM Peak Hour Traffic I-5 to LNAS

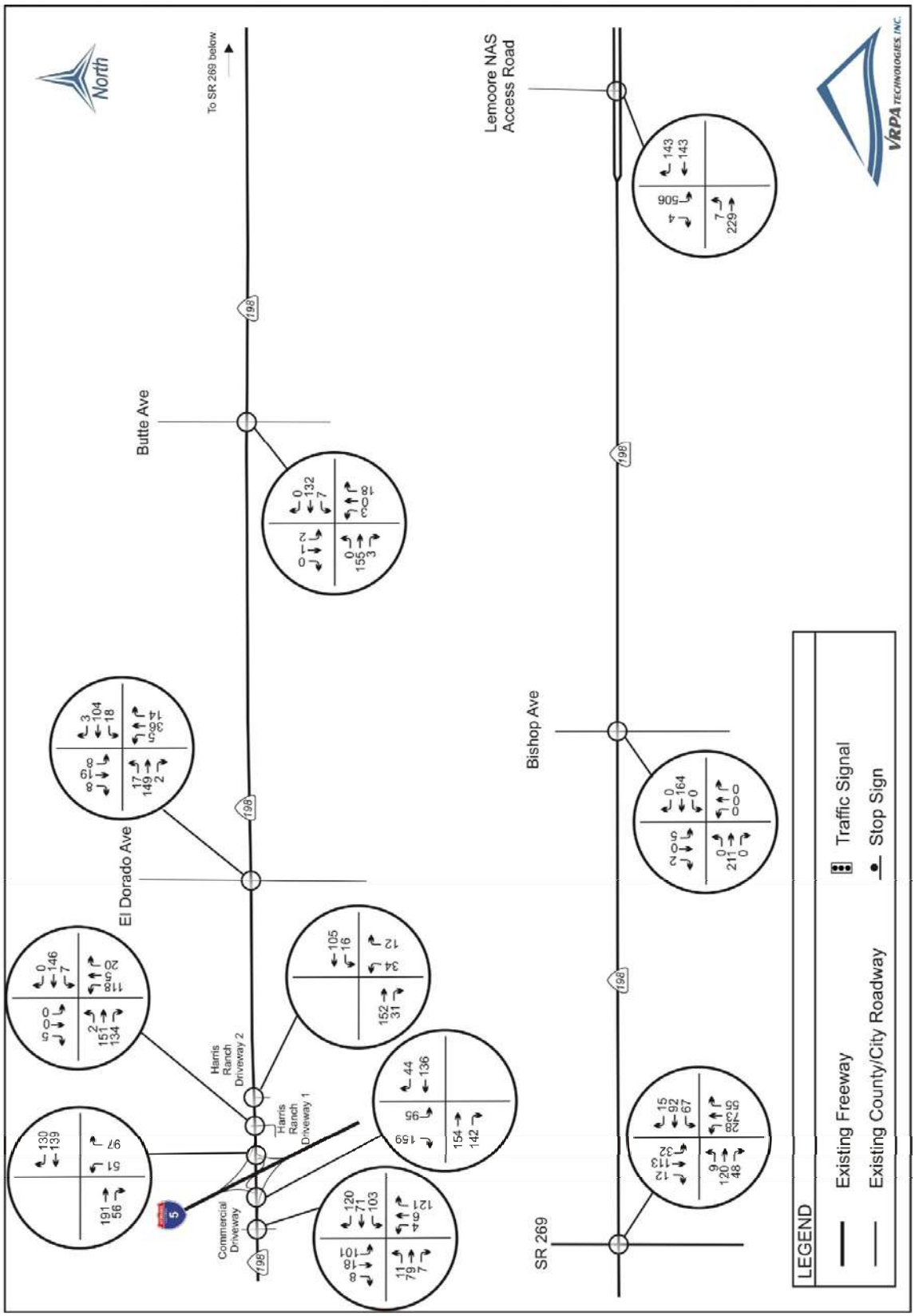


Figure 6.11 – Existing PM Peak Hour Traffic LNAS to State Route 99

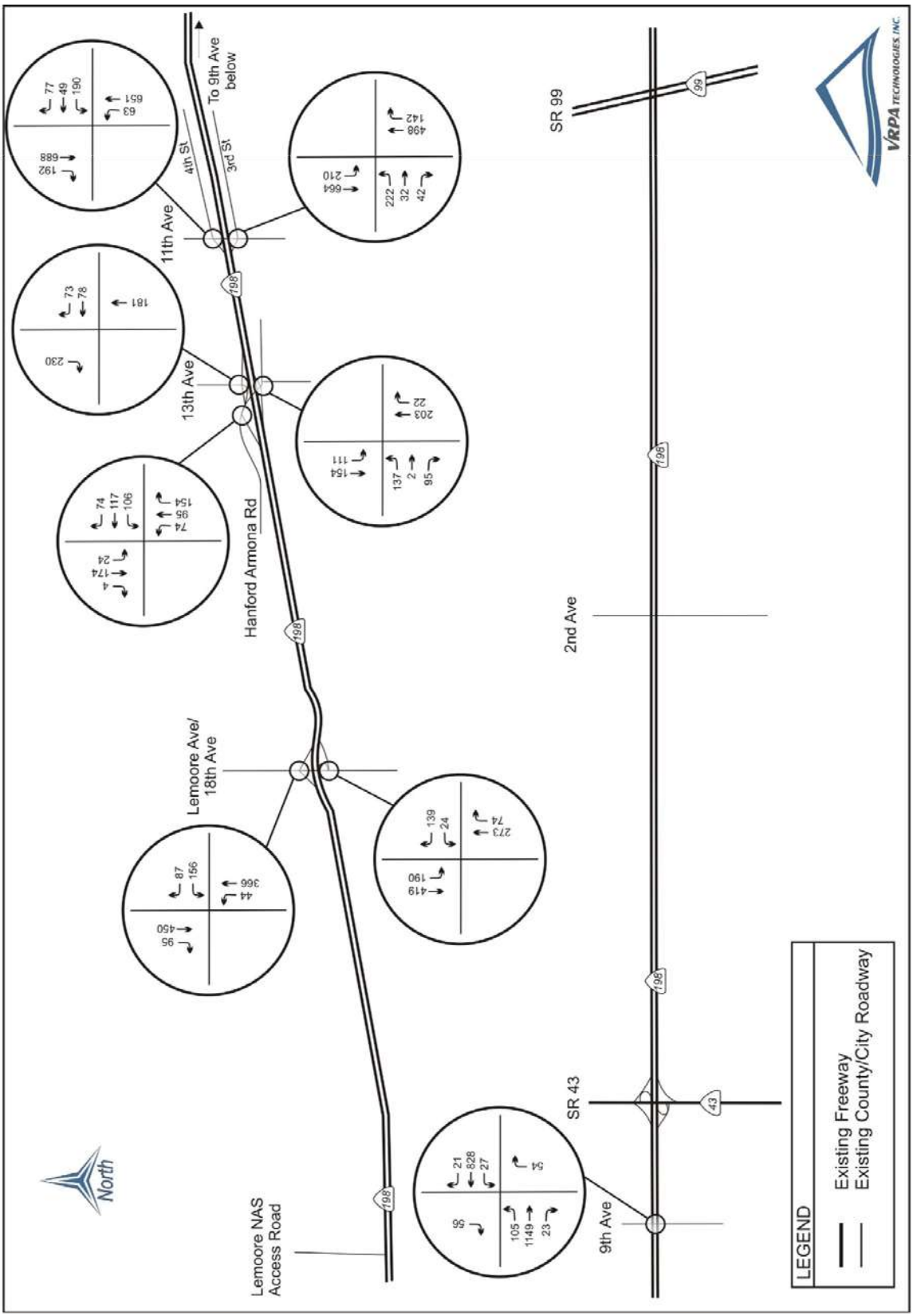


Figure 6.12 – Base Year Average Daily Traffic I-5 to LNAS

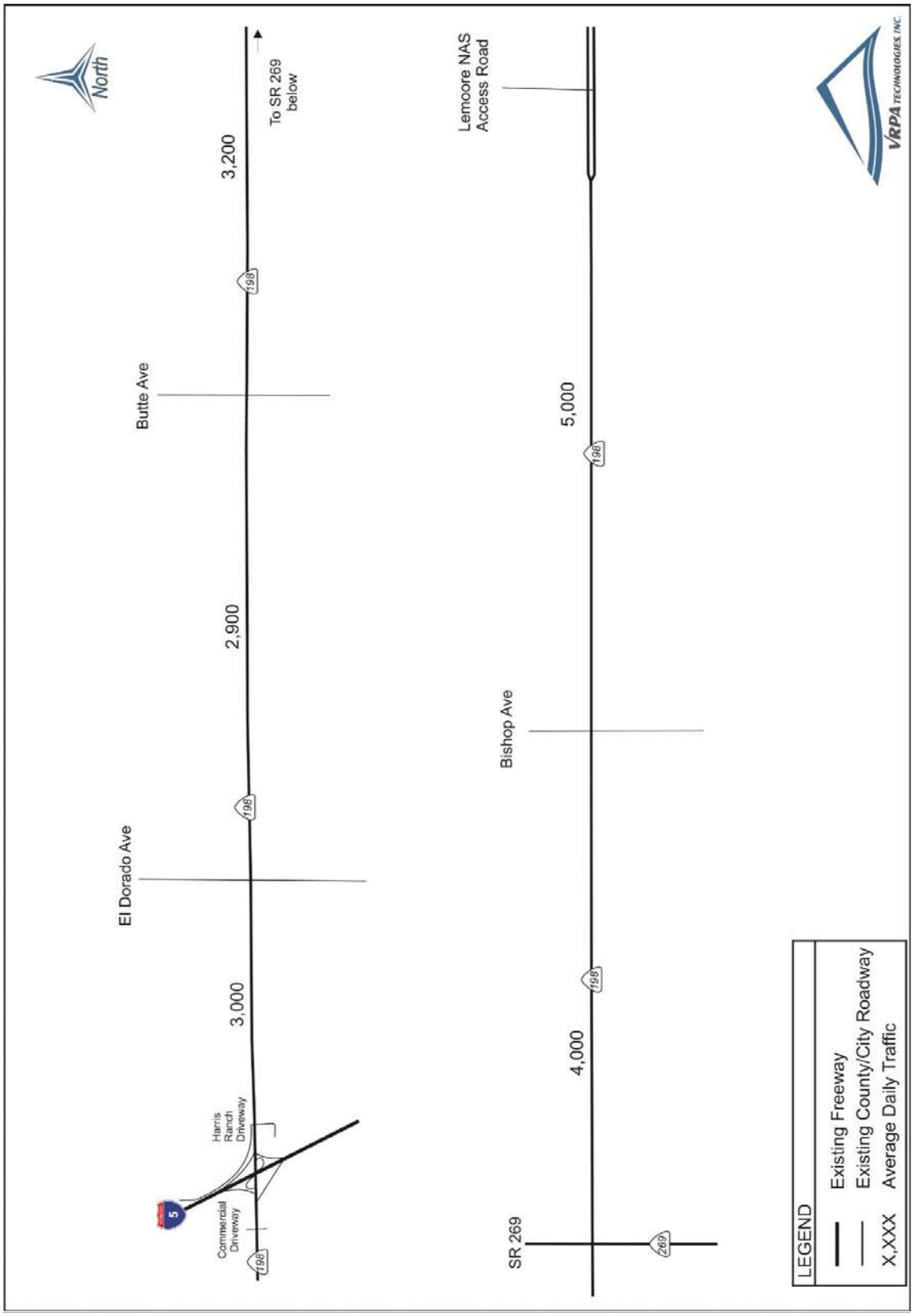


Figure 6.13 – Base Year Average Daily Traffic LNAS to State Route 99

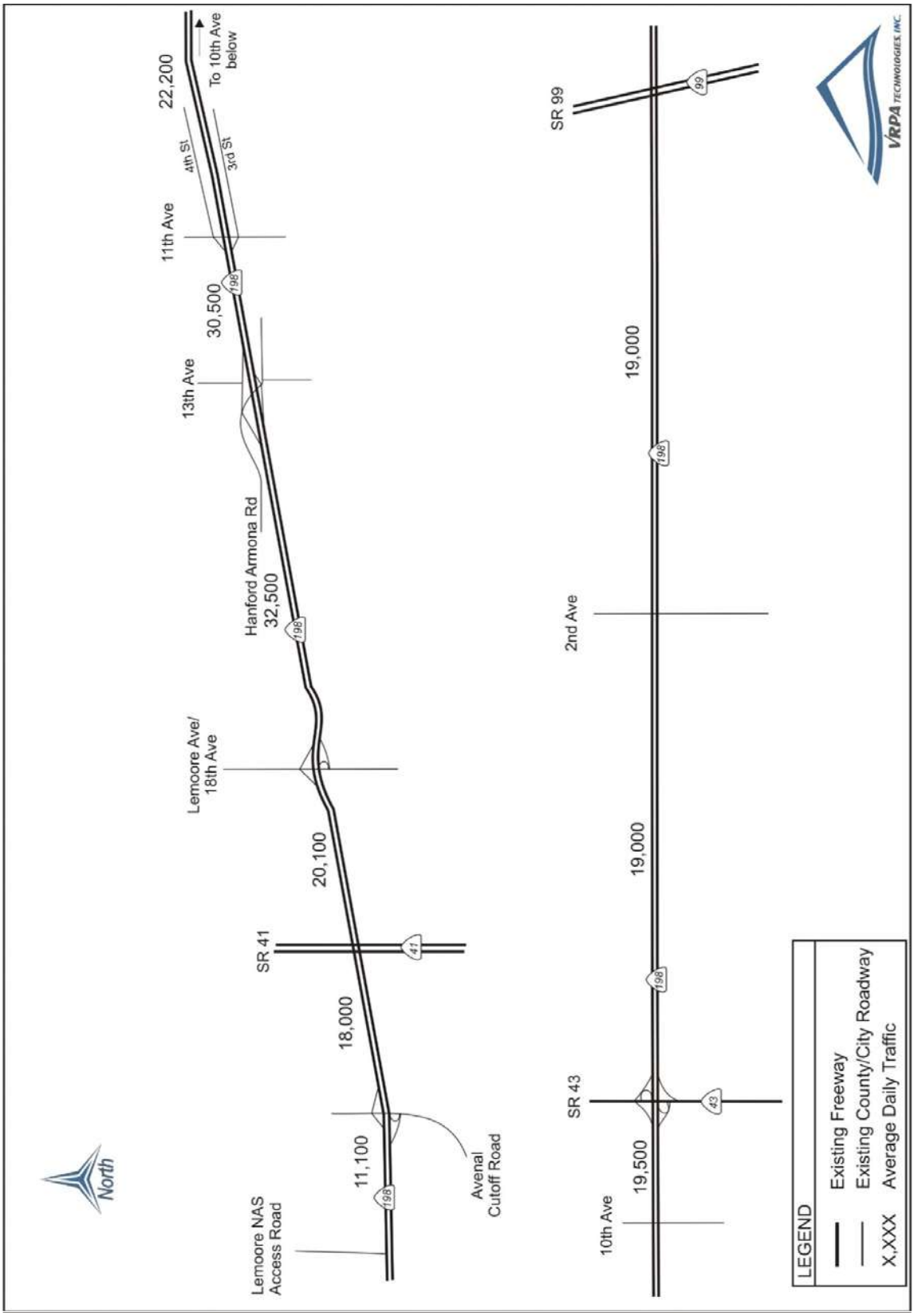


Figure 6.14 – Base Year AM Peak Hour Traffic I-5 to LNAS

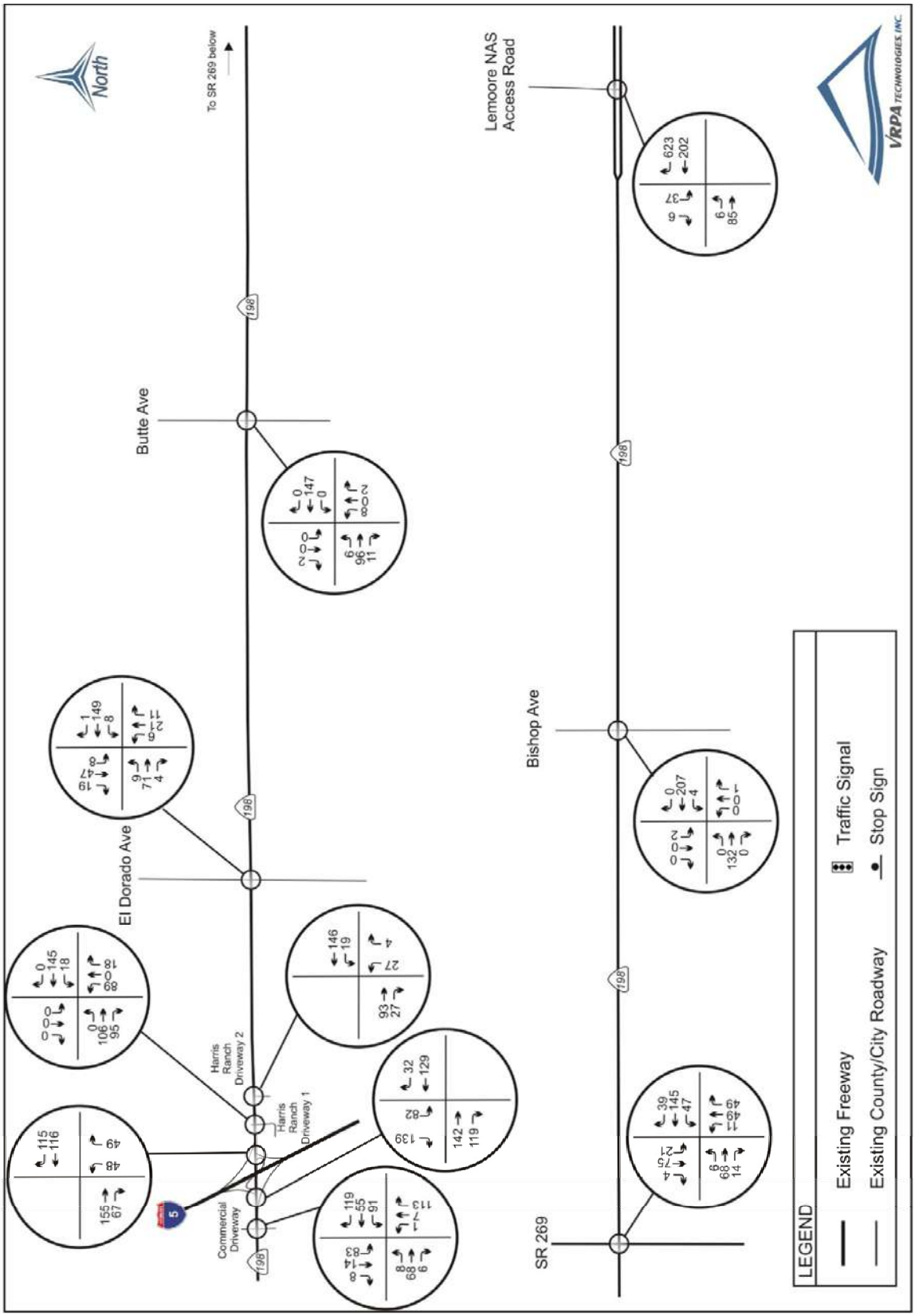


Figure 6.15 – Base Year AM Peak Hour Traffic LNAS to State Route 99

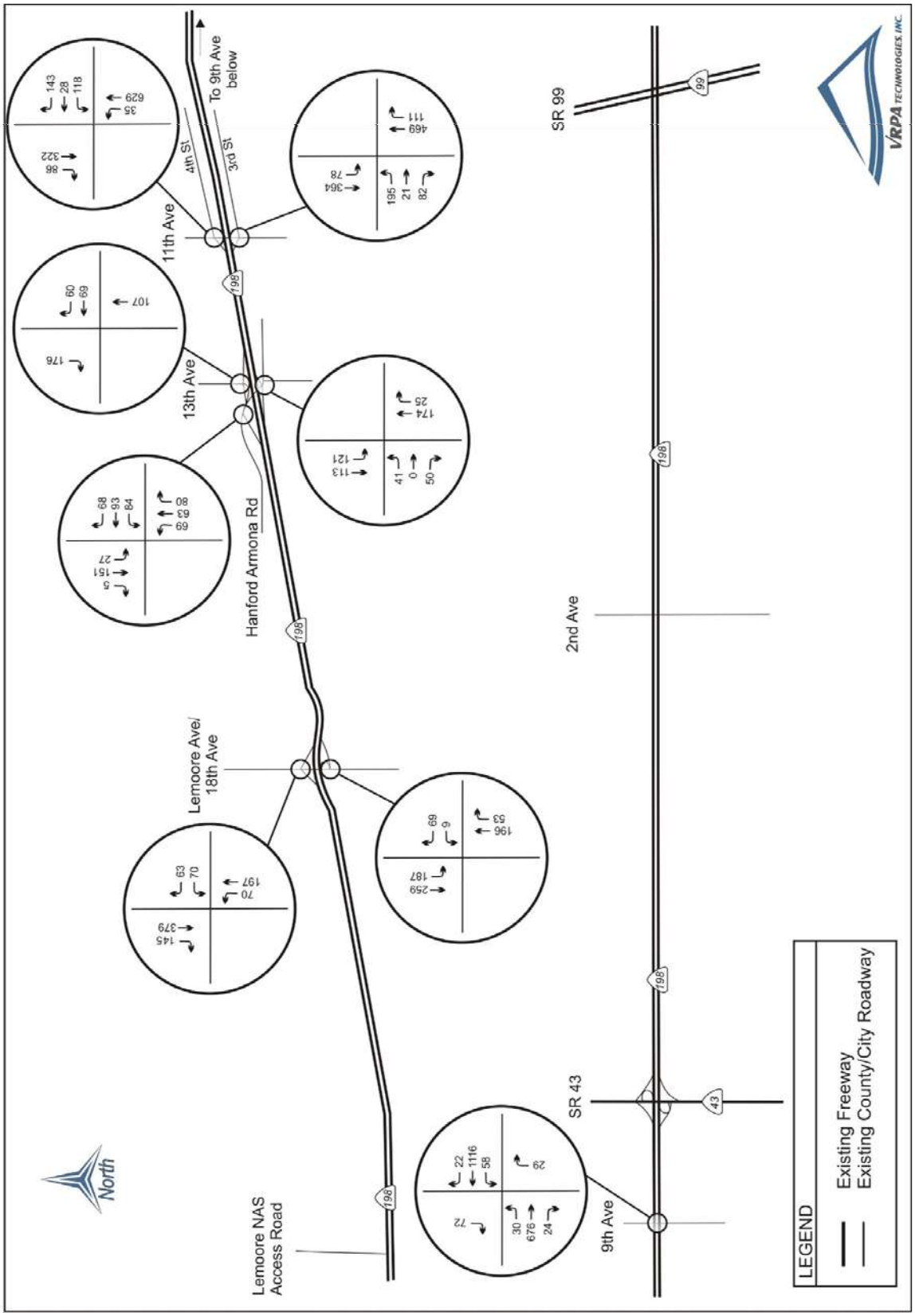


Figure 6.16 – Base Year PM Peak Hour Traffic I-5 to LNAS

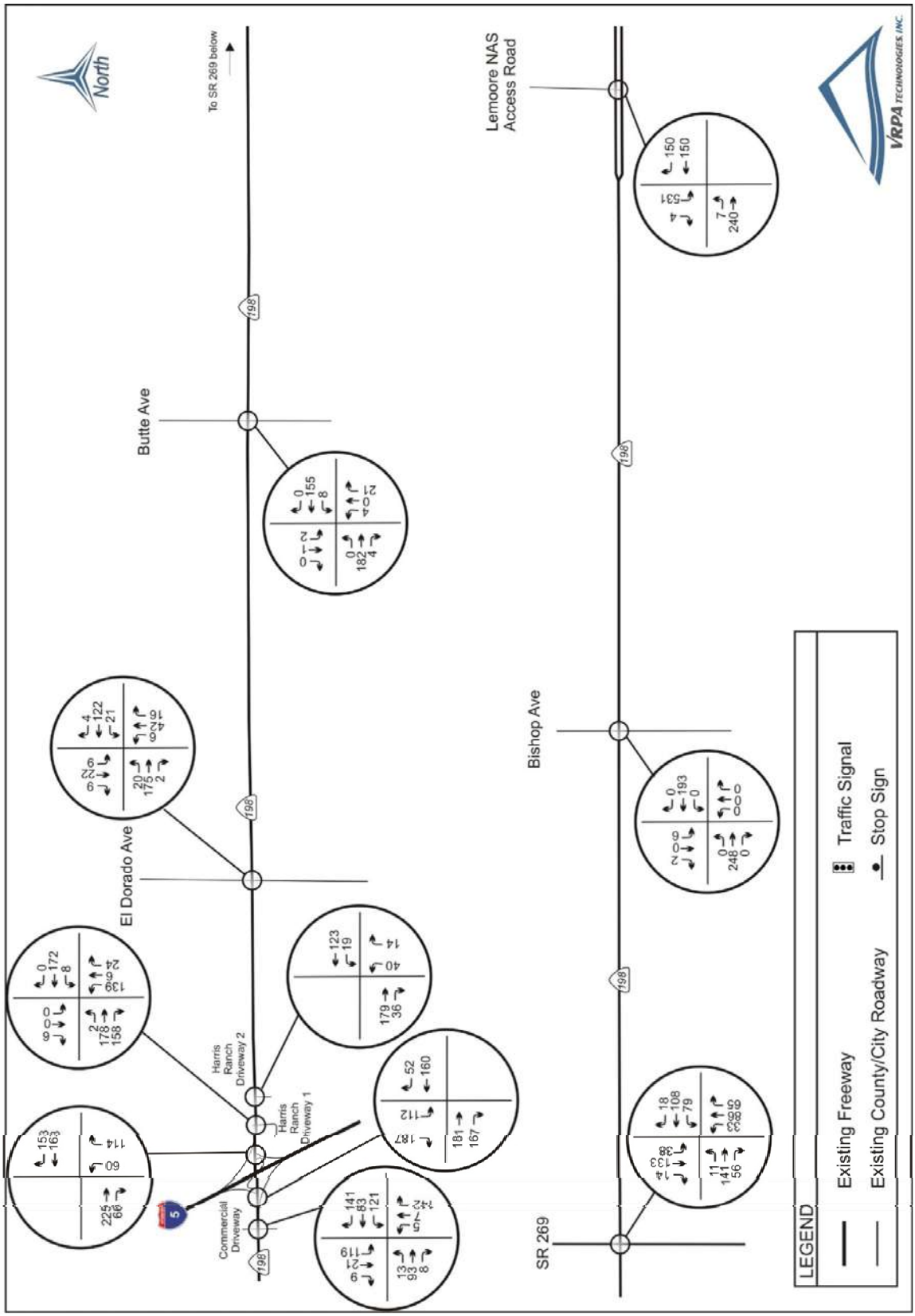


Figure 6.17 – Base Year PM Peak Hour Traffic LNAS to State Route 99

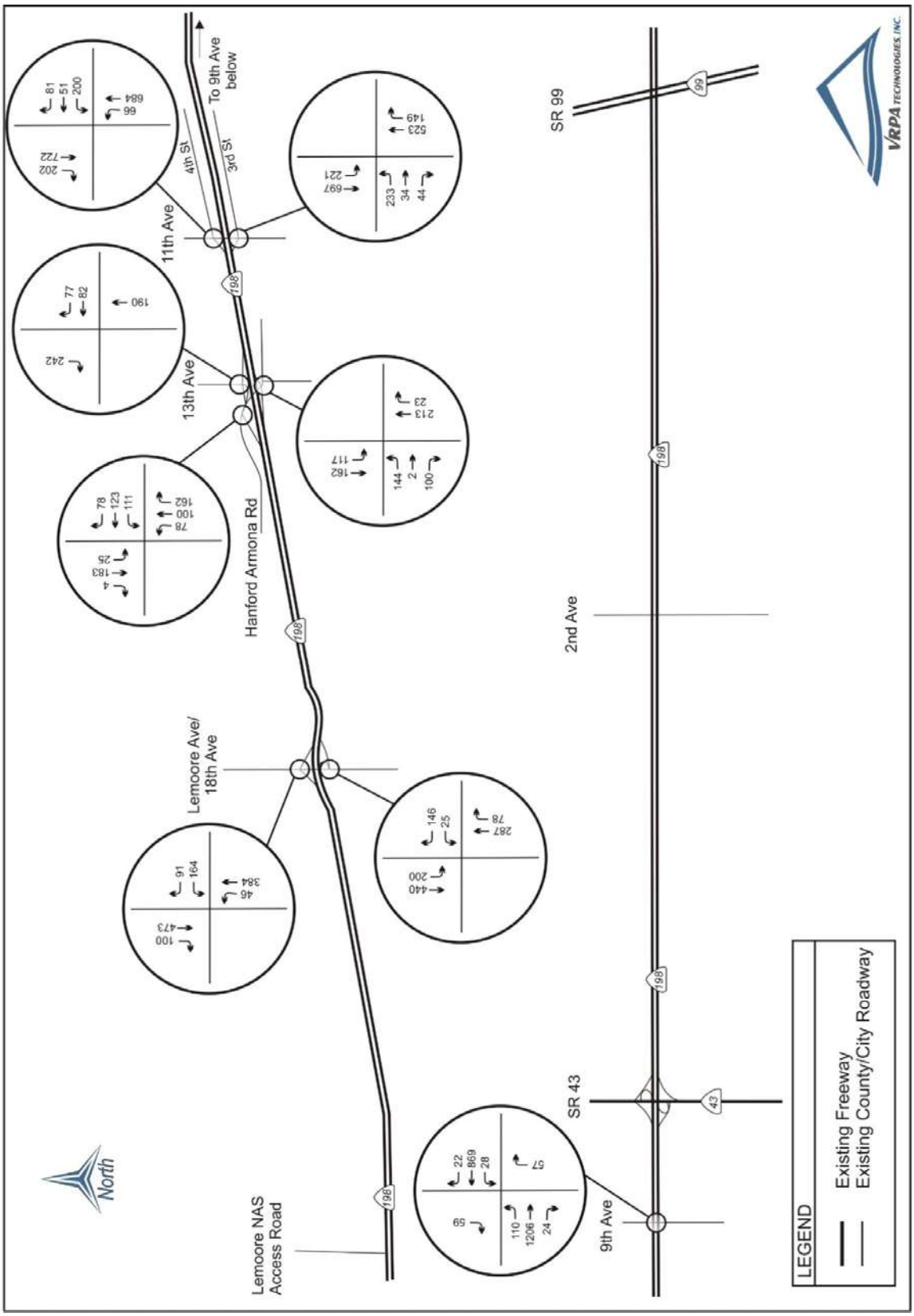


Figure 6.18 – Future Year (2040) Average Daily Traffic I-5 to LNAS

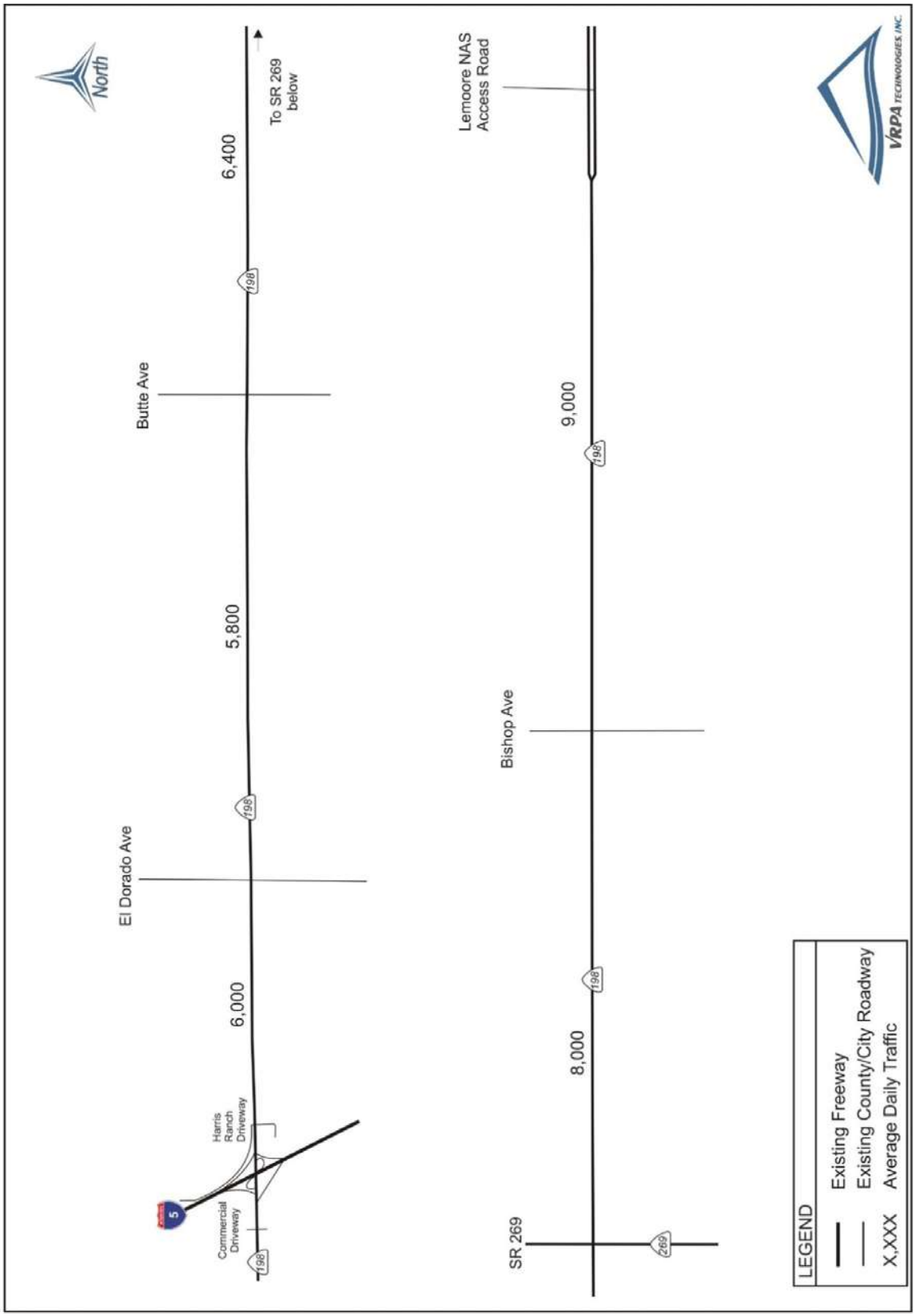


Figure 6.19 – Future Year (2040) Average Daily Traffic LNAS to State Route 99

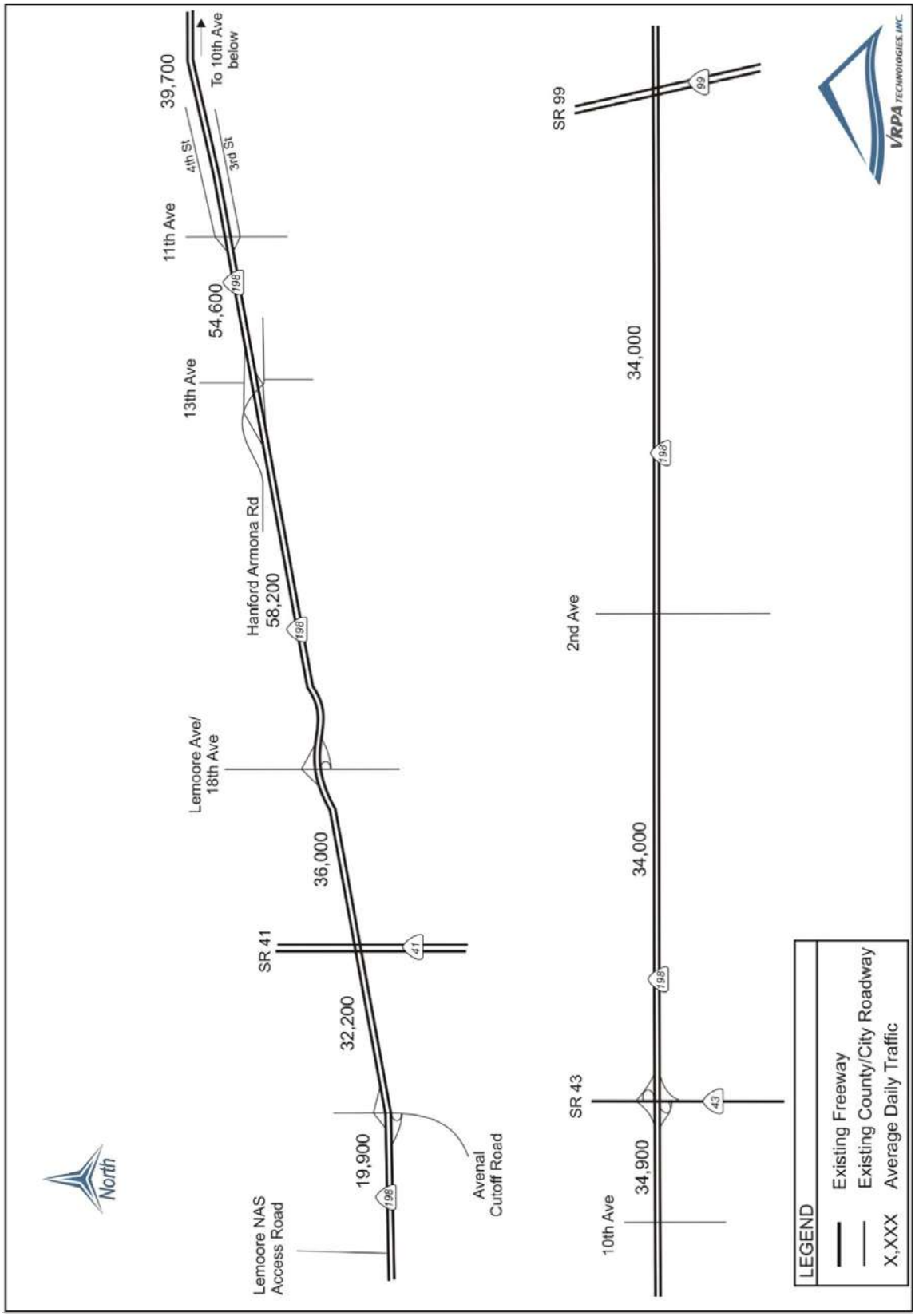


Figure 6.20 – Future Year (2040) AM Peak Hour Traffic I-5 to LNAS

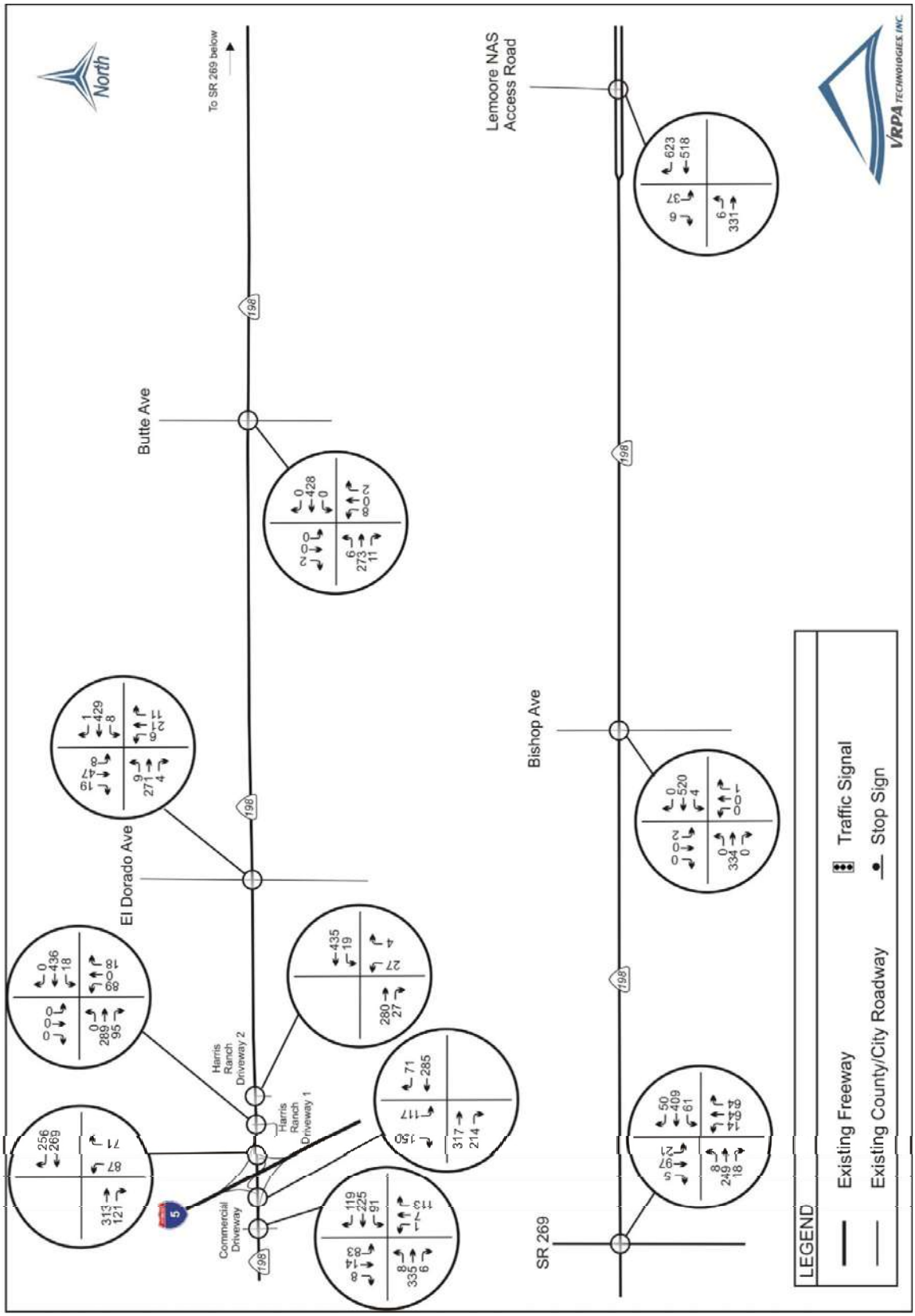


Figure 6.21 – Future Year (2040) AM Peak Hour Traffic LNAS to State Route 99

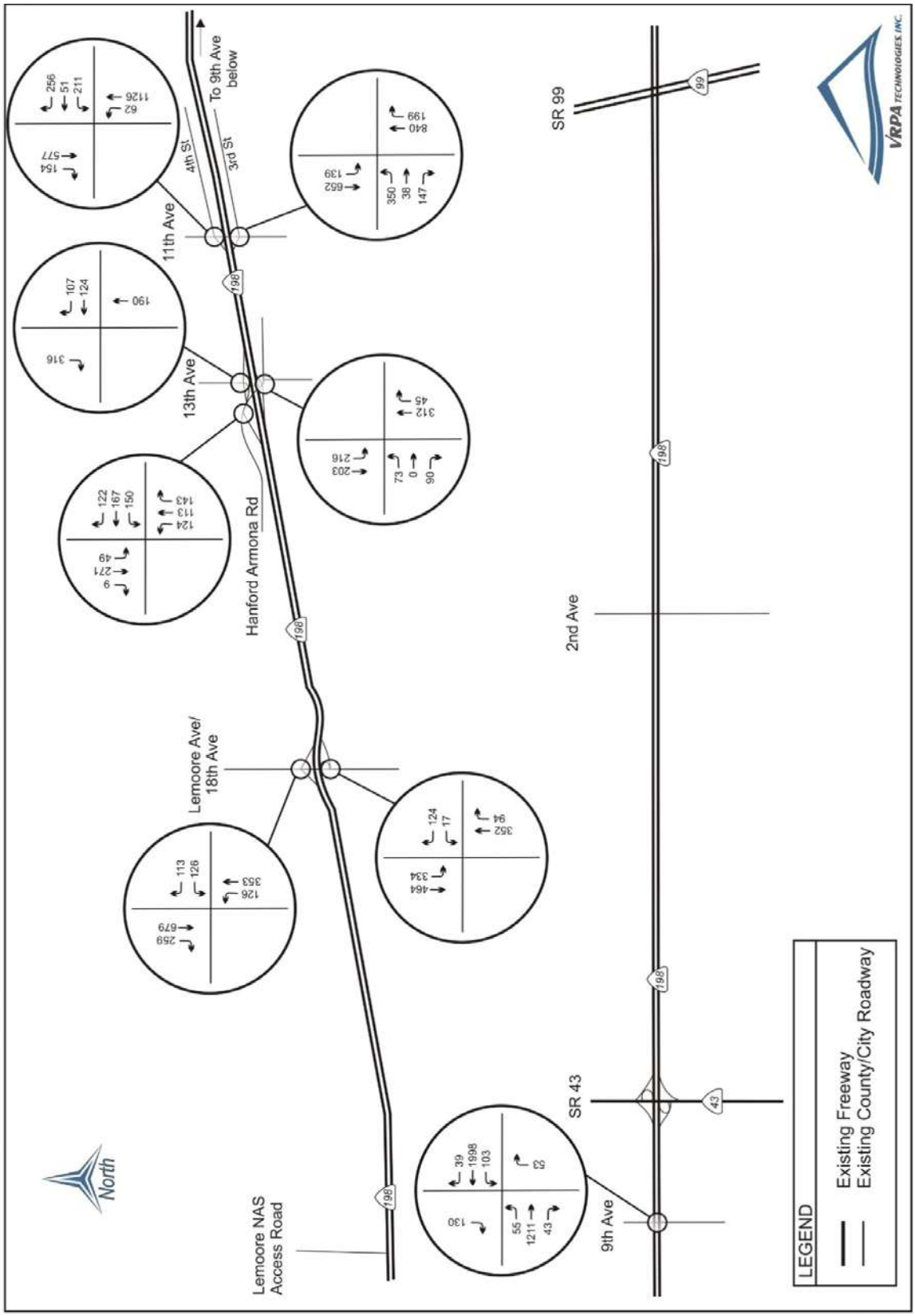


Figure 6.22 – Future Year (2040) PM Peak Hour Traffic I-5 to LNAS

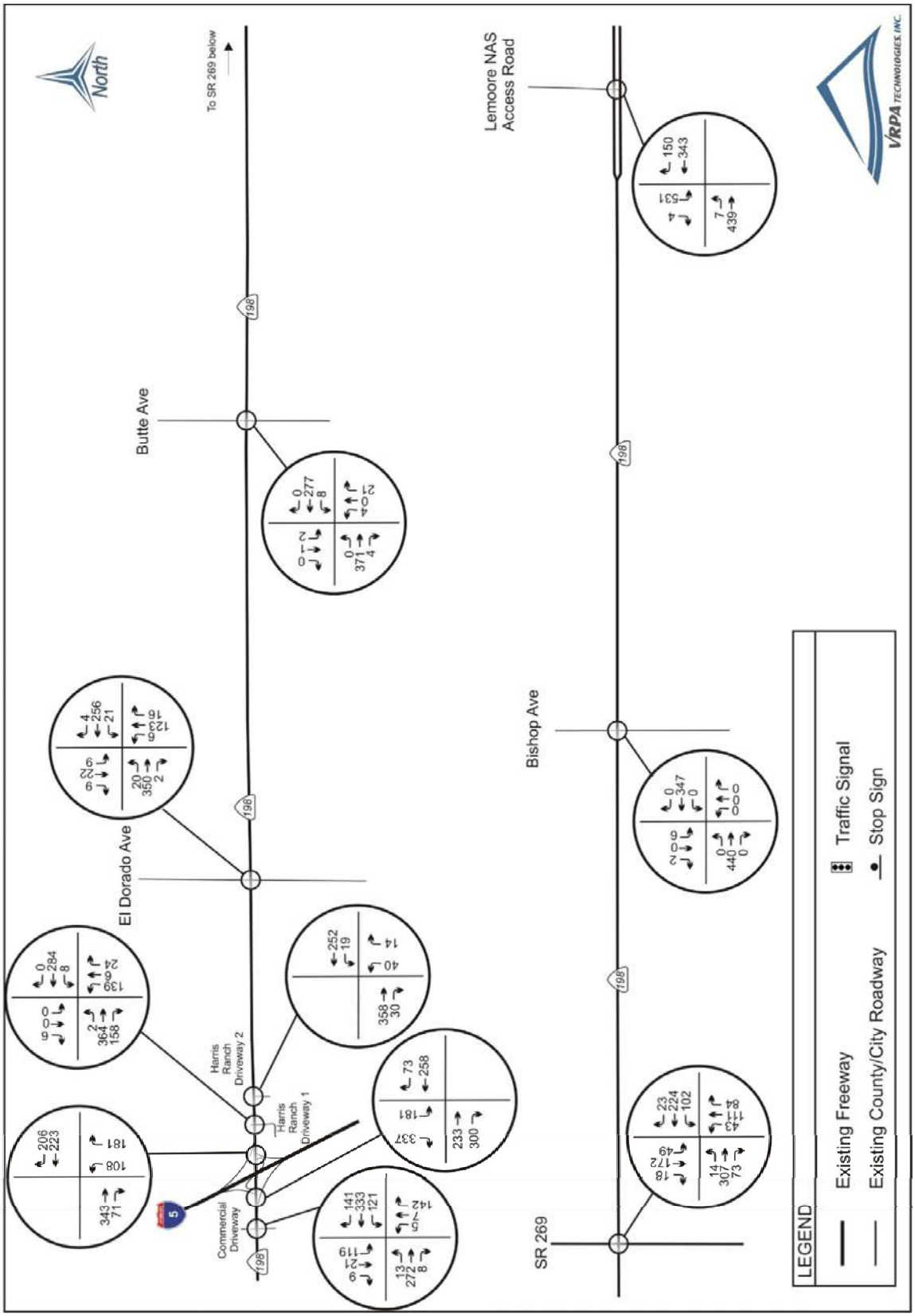
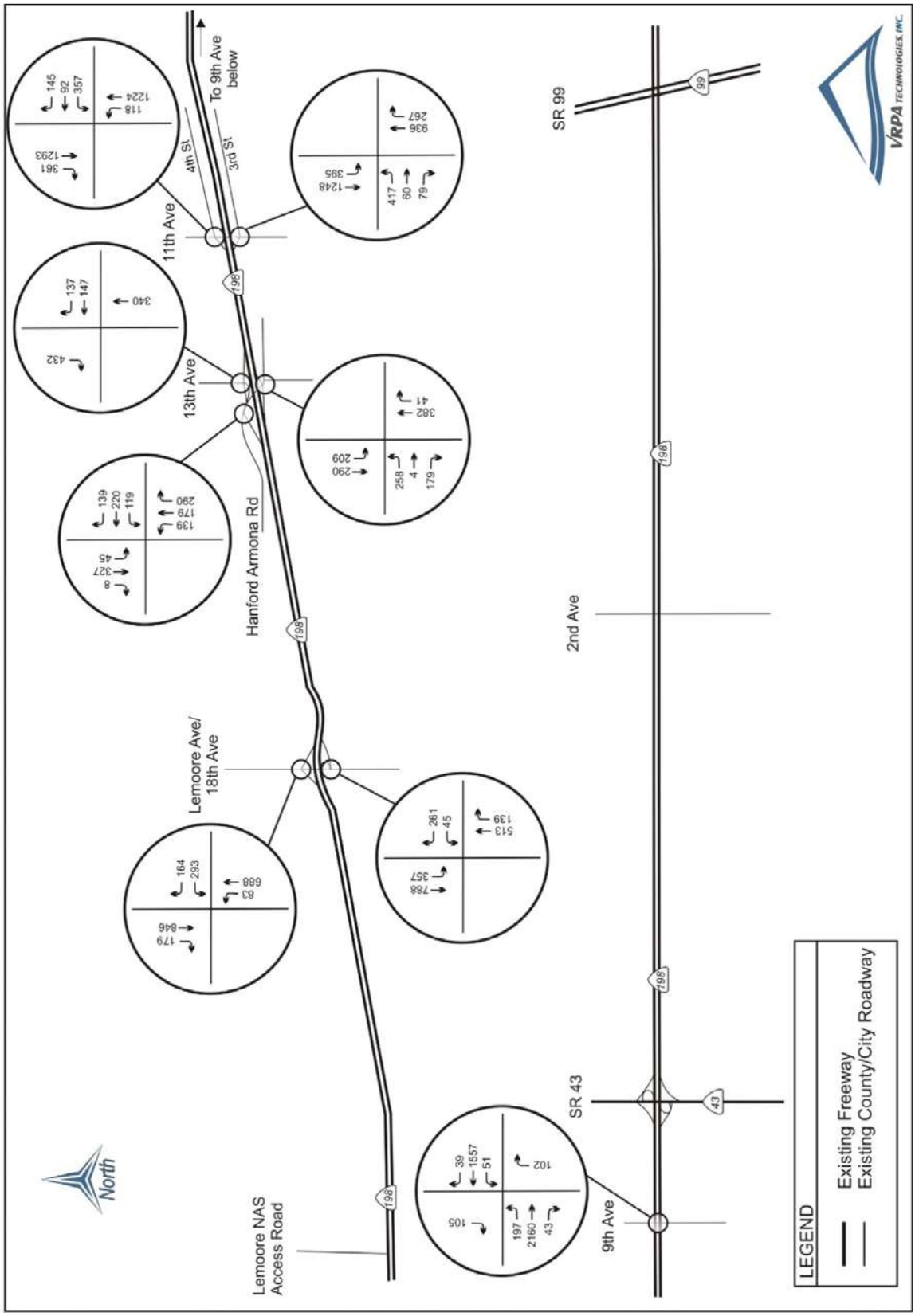


Figure 6.23 – Future Year (2040) PM Peak Hour Traffic LNAS to State Route 99



Capacity Analysis

This section provides roadway capacity analysis for base year and 2040 conditions for the SR 198 Corridor Preservation and Improvement Strategic Plan.

This analysis is considered to be a planning analysis appropriate for inclusion in this Strategic Plan and may not meet all of the requirements of a detailed operational capacity analysis. The capacity analysis has been conducted using the following general assumptions:

- Base year and 2040 traffic forecasts were based on the traffic forecasts that were documented above. Based on information determined in the goods movement analysis for this project, truck percentages were assumed to be 18% along SR 198 between I-5 and the LNAS, 10% along SR 198 east of the LNAS, and 5% at the SR 198 ramp terminal intersections.
- Roadway capacity analysis for SR 198 roadway segments between I-5 and the LNAS were conducted using the 2010 Highway Capacity Manual Two-Lane Highway methodology.
- Roadway capacity analysis for SR 198 intersections between I-5 and the LNAS and SR 198 ramp terminal intersections east of the LNAS were conducted using the Synchro signal timing and intersection analysis program.

Figure shows the results of the capacity analysis for SR 198 roadway segments and **Figure 6.25** shows the results for the intersection analysis. Capacity analysis worksheets are included in the attachments.

Location	Peak Hour	Base Year (2014)						Future (2040)					
		Westbound			Eastbound			Westbound			Eastbound		
		Volume	LOS	% Time Following	Volume	LOS	% Time Following	Volume	LOS	% Time Following	Volume	LOS	% Time Following
SR 198 Harris Ranch Driveway to El Dorado Ave	AM	174	C	42.1	97	C	24.3	454	D	65.6	284	C	49.3
	PM	142	C	29.7	193	C	44.8	271	C	45.8	372	C	62.1
SR 198 El Dorado Ave to Butte Ave	AM	158	C	39.9	113	C	29.1	438	D	64.2	290	C	50.3
	PM	159	C	37.4	200	C	45.6	281	C	50.6	375	C	61.3
SR 198 Butte Ave to SR 269	AM	147	C	38.5	98	C	26.1	428	C	64.4	275	C	49.3
	PM	163	C	37.8	205	C	46.1	285	C	51.5	394	C	62.0
SR 198 SR 269 to Bishop Ave	AM	231	C	49.2	138	C	32.6	520	D	69.1	334	D	54.7
	PM	205	C	44.0	244	C	49.9	349	D	57.1	440	D	65.0
SR 198 Bishop Ave to Lemoore NAS	AM	211	C	47.1	133	C	32.1	524	D	70.5	337	D	54.8
	PM	193	C	41.6	248	C	51.2	347	D	57.5	446	D	66.2

Figure 6.24 – Segment Analysis

Figure 6.25 – SR 198 Intersection Analysis

INTERSECTION	PEAK HOUR	INTERSECTION TYPE	BASE YEAR (2014)		FUTURE (2040)	
			Delay*	LOS*	Delay*	LOS*
Commercial Driveway @ SR 198	AM	TWSC	14.6	B	28.8	D
	PM		21.7	C	83.4	F
I-5 SB Ramps @ SR 198	AM	Signal	4.5	A	5.2	A
	PM		5.2	A	8.0	A
I-5 NB Ramps @ SR 198	AM	Signal	3.5	A	3.9	A
	PM		4.1	A	5.1	A
Harris Ranch Drvwy 1 @ SR 198	AM	TWSC	13.1	B	31.4	D
	PM		17.9	C	36.2	E
Harris Ranch Drvwy 2 @ SR 198	AM	TWSC	11.1	B	18.8	C
	PM		12.0	B	17.0	C
El Dorado Ave @ SR 198	AM	TWSC	11.9	B	22.1	C
	PM		13.6	B	29.5	D
Butte Ave @ SR 198	AM	TWSC	10.5	B	17.0	C
	PM		12.2	B	17.4	C
SR 269 @ SR 198	AM	AWSC	10.1	B	33.5	D
	PM		13.1	B	31.6	D
Bishop Ave @ SR 198	AM	TWSC	11.8	B	22.2	C
	PM		12.2	B	17.9	C
Lemoore NAS Access Rd @ SR 198	AM	Signal	18.1	B	13.0	B
	PM		15.7	B	15.4	B
Lemoore Ave/18th Ave @ SR 198 WB Ramps	AM	Signal	10.9	B	14.5	B
	PM		11.8	B	21.3	C
Lemoore Ave/18th Ave @ SR 198 EB On Ramp	AM	Signal	10.2	B	14.8	B
	PM		12.5	B	30.3	C
Hanford Armona Rd @ SR 198 WB On Ramp	AM	AWSC	10.4	B	22.9	C
	PM		12.5	B	40.5	E
13th Ave @ SR 198 WB Off Ramp	AM	AWSC	8.7	A	10.7	B
	PM		9.8	A	17.4	C
Hanford Armona @ SR 198 EB Ramps	AM	TWSC	14.4	B	34.6	D
	PM		21.2	C	433.1	F
11th Ave @ SR 198 WB On Ramp/4th St	AM	Signal	14.2	B	16.8	B
	PM		14.8	B	21.7	C
11th Ave @ SR 198 EB Off Ramp/3rd St	AM	Signal	18.5	B	26.5	C
	PM		20.7	C	42.3	D
9th Ave @ SR 198	AM	TWSC	16.0	C	66.2	F
	PM		16.5	C	64.4	F

* For traffic signals and AWSC intersections level of service and delay are based on the entire intersection. For TWSC intersections the level of service and delay is based on the worst movement.

Evaluate the List of Potential Projects

This section provides recommended roadway improvements for the SR 198 Corridor Preservation and Improvement Strategic Plan.

Background Information

The identification of recommended enhancements described below is based on the previous SR 198 Corridor System Management Plan (February 2012), as well as the following information prepared as part of the SR 198 Corridor Preservation and Improvement Strategic Plan:

- Traffic forecasts
- Performance measures
- Roadway capacity analysis

Recommended Improvements/ I-5 to LNAS

The recommended enhancements for SR 198 from I-5 to the LNAS are summarized in the table below. Improvements have been subdivided into short-term, medium-term, and long-term improvements, based on cost of implementation and need.

Additional detail on each of the recommended improvements follows.

Recommendation

The following are the recommended improvements, phased between now and 2040:

Table 6.1 - Summary of Recommended Enhancements I-5 to Lemoore NAS

Improvement		Time Frame	Comments
R1	Raised /Reflective Pavement Markings	Short-Term	Improves Safety and Quality of Service
R2	Traffic Signal/Roundabout at SR 269	Short-Term	Removes Requirement for All SR 198 Through Traffic to Stop at Intersection
R3	Passing Lanes	Medium-Term	Improves Travel Time for Through Traffic on SR 198
R4	Traffic Signal/Roundabout at Commercial Driveway	Medium-Term	Resolves Intersection Capacity Issues
R5	Widen to Four Lanes	Long-Term	Improves Travel Time and Resolves Capacity Issues
R6	ITS Improvements	Various	Per SR 198 Corridor Sytem Management Plan

Raised/Reflective Pavement Markings (Short-Term) (R1)

The SR 198 roadway from I-5 to the LNAS generally is built to current standards and includes the safety features that would typically be included on a two-lane rural highway. However, it is expected that improved safety and visibility and a greater degree of driver comfort could be achieved by taking advantage of the latest technology in raised and reflective pavement markings. Further analysis could lead to specific pavement marking details that would be appropriate for this corridor.

Traffic Signal/Roundabout at SR-269 Intersection (Short-Term) (R2)

This intersection is currently controlled by four-way stop control. While this type of control is considered to be safer than two-way stop control for the current levels of traffic, it does require all through vehicles on SR 198 to come to a complete stop prior to traveling through the intersection. Installation of a less restrictive form of traffic control (i.e., traffic signal or roundabout) would reduce travel time for through vehicles on SR 198 and would allow for a higher quality experience for drivers.

Passing Lanes (Medium-Term) (R3)

Although widening to four lanes is an ultimate goal for SR 198 between I-5 and the LNAS, the installation of passing lanes would be an interim step that would improve travel times and level of service. It is accepted that normally passing lanes are most needed on routes of limited forward visibility; however, the use of the section of SR 198 by slow moving agricultural vehicles suggests there should be a role for passing lanes. This should be subject to a more detailed review.

Traffic Signal/Roundabout at Commercial Driveway West of I-5 (Medium-Term) (R4)

This intersection is currently controlled by two-way stop control. Intersection capacity analysis indicates that this intersection will experience level of service F conditions in the PM peak hour prior to 2040 and improvements will be desired.

Widening to Four Lanes (Long-Term) (R5)

Widening to four lanes is a desirable improvement for SR 198 between I-5 and the LNAS in order to provide a continuous four-lane roadway between I-5 and SR-99 and to improve travel time and level of service.

ITS Improvements (Various) (R6)

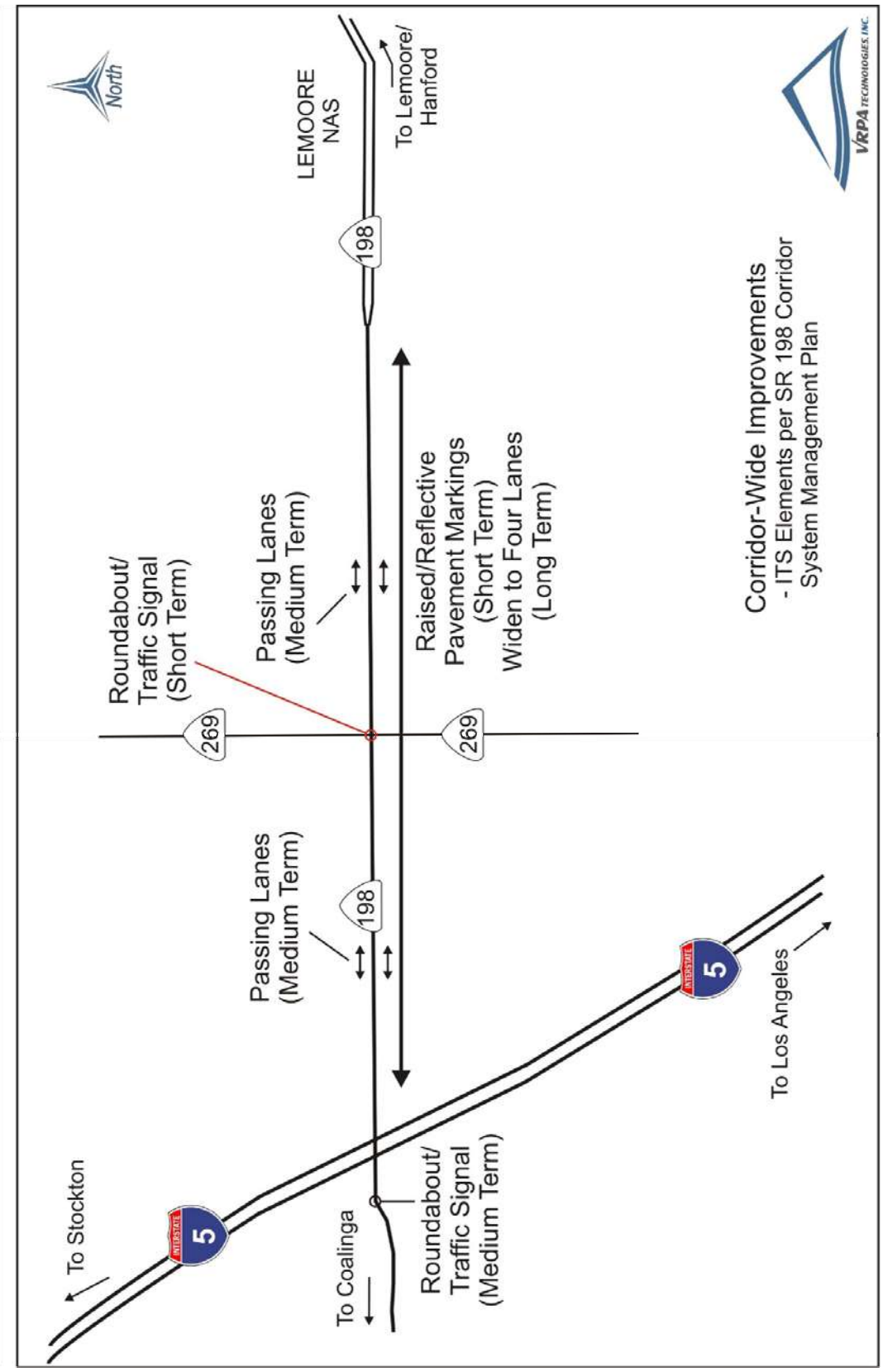
The previous SR 198 Corridor System Management Plan (February 2012) recommended a number of ITS improvements along SR 198 between I-5 and the LNAS. These included changeable message signs, highway advisory radio, and traffic count stations. The more detailed analysis of conditions included in the current SR 198 Corridor Preservation and Improvement Strategic Plan did not cause a change in conclusion with regard to ITS improvements. It is recommended that all improvements from the Corridor System Management Plan be carried forward. Additional ITS vehicle detection devices for the continuous monitoring of traffic operations are also recommended.

It is further recommended that due to the specific multi-purpose nature of the route, climactic conditions, the high reliance on transportation by the economy of the area, and well above average proportion of truck traffic, that consideration be given to accelerating the planning of these improvements.

LNAS to SR-99

The segment of SR-99 from the LNAS to SR-99 was analyzed at a lesser level of detail in the current Corridor Preservations and Improvement Strategic Plan than the segment from I-5 to the LNAS. However, interchange analysis was conducted at several interchanges and a need for future improvements was identified at two locations: the interchange at Hanford Armona Road and the intersection at 9th Avenue. In both of these cases, a need for improvement was also identified for improvement in the previous SR 198 Corridor System Management Plan. Therefore, it is considered appropriate to carry forward the improvement recommendations from that study.

Figure 6.26 – Summary of Recommended Improvements (I-5 to LNAS)



7 Economic & Quality of Life Assessment

7. Economic and Quality of Life Assessment Based on SR 198 Improvements

The Economic and Quality of Life chapter is broken into two sections. The first section provides a high-level summary of the economic context in which the SR 198 facility operates. This context includes key findings regarding demographic, employment, agricultural, and real estate trends within the three-county Study Area (Fresno, Kings and Tulare counties). The second section provides an overview of the industry sectors driving the movement of goods throughout the SR 198 Corridor and surrounding region. It is designed to illustrate how the economic activity dependent on goods movements is fostered by transportation infrastructure. This chapter draws on separate deliverables developed by the Project Team that contain more detailed documentation of the data and analysis provided herein.

Economic Development Analysis

This section provides an overview of the regional economy surrounding the SR 198 corridor between I-5 and SR-99. It describes the economic context for considering the impact of improvements to SR 198 by focusing on local and regional trends related to demographics, land use, and employment. While the study area includes portions of Fresno County (in the eastern section of the corridor study area), Tulare County (the western section of the corridor study area), and Kings County (where the largest proportion of the Study Area is located), the analysis focuses on communities and sectors particularly dependent on SR 198.

Overview of SR 198 and Study Area

SR 198 runs east-west between SR-99 and Interstate 5, connecting Monterey County with the Sierra Nevada as well as the southern portion of San Joaquin Valley with markets throughout California. While SR 198 transects three counties in the San Joaquin region, most of the corridor evaluated herein is in Kings County. Consequently, this study evaluates conditions and trends within a number of overlapping geographies depending on data availability and the issues under consideration. For the most part these geographies include:

- Study Area Region: Includes Kings County, Fresno County and Tulare County
- Kings County: Given data availability, the primary study geography is Kings County
- SR 198 Corridor: This area generally refers to specific communities located along SR 198 between I-5 and SR-99
- Cities of LNAS and Hanford: As the primary population and employment centers on the evaluated segment of SR 198, these communities are shown to be key economic drivers in the Corridor.

In addition to significant agricultural lands, SR 198 traverses several clusters of urban development that include residential, commercial, and industrial uses. Private sector employers include food production

and processing industries as well as several retail and commercial nodes. The public sector includes local agencies and municipalities as well as activities associated with the LNAS.[10]

Between SR-99 and the NAS in LNAS, SR 198 currently functions as a four-lane facility following a road expansion and associated improvements completed in 2012. West of the NAS, SR 198 becomes a two-lane conventional highway. Throughout the corridor, SR 198 maintains a high volume of truck traffic and, in the western segment of the facility, ingress and egress by farming equipment such as tractors, which can cause delays and pose safety risks.

Although Caltrans classifies SR 198 as a "key east-west corridor," according to the San Joaquin Valley Goods Movement Plan produced by Cambridge Systematics, this western portion of SR 198 "...is not suitable to carry existing heavy traffic/truck volumes and will also experience substantial truck growth into the future." As such, improvements of SR 198 will be a key factor to the economic development potential for the project area and areas connected to the corridor.

It should be noted that the three-county region that encompasses the Study Area is also served by other highly utilized transportation corridors such as SR-99 and I-5. However, SR 198 connects portions of all three counties and serves as an east-west corridor for populations and workforces located along and nearby the facility. Therefore, to understand the regional context within which SR 198 operates, an assessment of the regional trends (in this case the totality of Fresno, Kings and Tulare counties) is necessary.

Overview of Key Economic Conditions and Trends

1. While the three County Study Area experienced significant growth since 1970, far out-pacing the State as a whole, it was also disproportionately hurt by the so-called "Great Recession" commencing in 2008, reflecting a high degree of dependence on external economic trends. The SR 198 Corridor is located in the relatively fast growing Study Area region, with strong linkages to the broader California economy, as exhibited by an essential doubling of population (from 668,400 to 1,292,000) and employment (290,090 to 627,070) between 1970 and 2000. While the majority of this growth absolute terms occurred in Fresno County, with particular emphasis in the City of Fresno and surrounding suburbs, all three counties grew at relatively similar rates over this period. Strong growth continued in all three counties through 2007, but following the so-called "Great Recession" commencing in 2008, growth stagnated in Fresno and Tulare counties and Kings County saw year over year decreases in population from 2010 to 2013. These shifts reflect the Study Area Region's strong dependence on national, and in some cases international, business cycles -- a common attribute of export-oriented economies.

2. Recent population and job growth along the SR 198 corridor has been focused in the two largest urban centers in Kings County, Hanford and LNAS. LNAS and Hanford make up 54 percent of the total population and 45 percent of all employment in Kings County. Between 2005 and 2013, these two cities added nearly 11,000 residents, a 15 percent increase. Over that same period, the rest of Kings County lost approximately 4,000 residents, or down 6 percent since 2005. Similarly, Hanford and LNAS added just over 1,600 jobs between 2005 and 2013, an 11 percent increase. All other areas of Kings County experienced a net loss of 525 jobs, representing a two percent loss in jobs since 2005.

[10] The Lemoore Naval Air Station (LNAS) will be cited in certain instances where data is available and it is relevant to this study.

3. The Study Area Region is generally younger, poorer and less educated than the rest of the State, but it also has a more equal age and income distribution and a relatively large cadre of younger age cohorts who have recently or may soon join the workforce. In terms of income distribution, the region contains a much higher proportion of low income earners (i.e., below $25,000 and below $50,000) and fewer high income earners (i.e., above $75,000) than the State. The Study Area Region also has a higher proportion of children and young adults (i.e., populations below prime income earning years), and an above average proportion of adults without a high school diploma. This demographic profile suggests a region with strong future growth potential in economic sectors seeking younger and lower paid workforce, such as manufacturing, warehouse distribution, and agricultural-related sectors.

4. While Kings County currently accounts for a relatively small proportion of total population and employment in the three-county Study Area Region, the cities of Hanford and LNAS stand out as slightly older and more affluent. Fresno County supports the majority (354,000) of the nearly 550,000 non-farm jobs located within the Study Area jobs. Kings County has a population of just over 150,000 and supports approximately 43,000 jobs, or around 8 percent of the Study Area total. Kings County has a median household income of $47,035, slightly above both Fresno County ($43,785) and Tulare County ($40,960). The City of Hanford has a median household income of $51,013 and the City of LNAS has a median household income of $53,203.

5. As home to a large number of in-commuters and out-commuters, Kings County serves as both a bedroom community and job destination within the Study Area Region, with SR 198 serving as a critical link. The commute patterns along the SR 198 corridor reflect its role as both a small bedroom community for the broader San Joaquin Valley and beyond as well as an employment destination for workers throughout the region. Most notably, while roughly half of the employed residents of Kings County leave the County for jobs, a relatively large number of workers also commute in from elsewhere. This multi-directional commute pattern suggests that both the County and SR 198 Corridor are intricately linked to the regional economy, providing both jobs and workers for / to adjacent counties and beyond. Given this pattern, and the role of SR 198 as the primary east-west connection in the County, it is likely to continue to play a critical role in future economic growth and development. Residents in Hanford and LNAS would be particularly affected by transportation improvements to the western section of SR 198 as a significant number of residents in both communities are employed along the I-5 corridor in areas such as Avenal and Coalinga.

6. While agriculture and food processing / packaging industries continue to play a critical role in the Study Area Region economy, the educational, health care, and retail sectors have been growing in significance, especially in Kings County and along SR 198 in particular. Of the thirteen largest employers in Kings County, twelve are categorized in the food production and processing industry sector and the aggregate employment of these businesses comprises nearly one quarter of total employment in Kings County. In addition, Educational & Health Services has added 1,300 jobs or a 31 percent increase over 2005 levels and Retail Trade has added 300 jobs or an 8 percent increase since 2005. Local employment data indicate growth in these sectors has been focused primarily in the cities of Hanford and LNAS, with Hanford experiencing particular gains in these sectors due to the existence of large employers including Adventist Health and the regional shopping area. The scale of this economic cluster and its proximity to SR 198 demonstrate the economic importance of the facility to the Kings County economy.

7. Technological innovation and vertical integration is playing an increasingly important role in the evolution of agriculture and related industries in the Study Area Region and Kings County. Agricultural production value has increased significantly in Kings County since 2005, led by

increases in traditionally strong commodity categories such as Livestock and Poultry as well as commodities with an increasing market share such as Fruit and Nut crops. Since 2005, the total agricultural production in Kings County has increased in value from $1.4 billion to $2.3 billion in 2013, an increase of 61 percent. While reported job growth in the Kings County's agricultural sector has not occurred in recent years, the Study Area has seen growth in agricultural support jobs such as food processing and packaging. Total farm employment has decreased from 7,700 in 2005 to 6,400 in 2013, a 17 percent reduction. However, manufacturing employment has increased over that same period from 3,900 to 4,500, or an increase of 15 percent. Based on market research and interviews with local experts, it was found that the majority of these manufacturing jobs are in the food processing and packaging industries. The continuation of the food industry's vertical integration in and around the SR 198 Corridor has correlated with increased agricultural production value and will likely drive future economic growth along the Corridor and in the greater region.

8. Continued vertical integration within agricultural sectors within the Study Area will likely concentrate jobs and activity in and around existing urban centers, increasing land use intensity and potentially creating greater demand for east-west passenger and freight movement along the SR 198 corridor. Interviews with local experts indicate a continuation of agricultural vertical integration by large producers in the Study Area. The continuation of this trend suggests more intensive land use, greater employment density and an increase in goods movement, all of which may increase auto and truck trips on SR 198. While Kings County has not yet established the necessary critical mass of office and industrial commercial space to become a regional job center, its strategic location between the Bay Area and Los Angeles may support growth in transportation, warehousing and logistics industries in the future. The increase in transportation-related activity in the Study Area in recent years has largely focused on the I-5 and SR-99 corridors. For instance, the FedEx freight facility built in 2012 is located outside of Kettleman City south of SR 198 along I-5. Similarly Kettleman City has long been used by truckers as an informal "turnaround facility." However, the strategic position of SR 198, and continued growth in higher intensity production facilities, may in turn increase demand for east-west goods movement along the corridor.

Evaluate Goods Movement

Overview of the Corridor from a Goods Movement Perspective

As with the traffic and economic analysis components of the study, the goods movement evaluation focused on two geographic areas of impact and benefit:

- The western SR 198 corridor from Interstate 5 to LNAS
- The eastern SR 198 from LNAS to State Highway 99.

The western part of the corridor is predominately rural, and largely agricultural in nature. Harris Ranch and several large dairy operations rely heavily on SR 198 for both delivery of agricultural inputs (e.g., feed and as a farm-to-market route. Dairying and farming operations also occur in the eastern part of the corridor, but there are several urban centers and a number of plants processing agricultural products and other materials needed by the agricultural sector. Throughout the corridor, agricultural equipment, such as large tractors and combines, travel on this route as permitted under the California Vehicle Code.

According to the Caltrans Route 198 Corridor System Management Plan (CSMP, February 2012) SR 198 is classified as a principal arterial from I-5 through the remainder of Fresno County. Through both Kings County and Tulare County, SR 198 is classified as a principal arterial. According to the Federal Aid programs, SR 198 from I-5 to the LNAS is recognized as a Strategic Highway Corridor Network (STRAHNET). This designation indicates that it is a route of importance to the United States' strategic defense policy, mainly due to the access it provides for LNAS. SR 198 is also part of the National Highway System (NHS) from LNAS east to the end of the route in Sequoia National Park. The entire route is eligible for funding under the Surface Transportation Program (STP) under MAP-21.

The Surface Transportation Assistance Act (STAA) of 1982 designated SR 198 as part of the National Truck Network (NTN) for large trucks between I-5 and SR-99. The CSMP also notes that SR 198 is designated by the State of California as a High Emphasis (HE) Focus (F) Route of the Interregional Road System (IRRS) from I-5 to SR-99.

Current Truck Traffic

Estimates of truck movements on SR 198 are shown in **Figure 7.1** and **Figure 7.2.** In developing these estimates, several sources were consulted, including:

- Caltrans *Truck Volumes* (for 2013, as well as for earlier years)
- SR 198 Corridor System Management Plan (Caltrans District 6, 2012)
- SR-99 / SR 198 Gateways Truck Origin and Destination Study (TCAG/Fehr & Peers, January 2015)
- June 2014 peak-hour vehicle classification counts at the intersection of SR 198 / SR 269 conducted for this study.

Truck volumes as a percentage of total daily traffic in the corridor range from eight to 18 percent, generally increasing from east to west. These truck percentages numbers are derived from the Caltrans Truck Volumes report for 2013. Based on this data, plus consideration of data from the other sources listed, and consultation with Caltrans staff, the following represents the percentage of total truck traffic:

- I-5 to LNAS: 18% trucks
- LNAS to SR-99: 10% trucks
- SR 198 Interchange Ramp Terminal Intersections: 5% (peak hour percentage)

The truck share of total traffic is higher on the western segment of SR 198 (west of LNAS) since there is less commuting in this mainly rural environment. The western segment also experiences substantial truck traffic associated with agricultural activities and the supply of LNAS.

Year 2040 Truck Forecasts

Several data sources were examined in the development of the truck forecasts for 2040:

- Travel Demand Model forecasts from the three relevant Regional Transportation Planning Agencies (Kings CAG, Fresno COG and TCAG) developed for this study. Each of these agencies' models now includes a truck traffic modeling component developed as part of the Valley-wide Model Improvement Program from 2010–2012.

- The study's regression analysis of Caltrans truck volumes time series data
- San Joaquin Valley Goods Movement Plan Final Report (August 2013), which incorporated information from the eight-county Valley-wide Goods Movement model.
- The Federal Highway Administration (FHWA) Freight Analysis Forecast FAF3 modeling tool

Model results were examined for major connecting facilities (i.e., I-5, SR-41, SR-43 and SR-99) were also examined to confirm that the model results were reasonable throughout the study area. Based on the model forecasts, an annual percentage rate of increase of 2.1% was determined. This corresponds to a total growth factor for truck traffic from 2014 to 2040 of 1.72. Since this value is between the annual growth factors determined for all traffic in the corridor (1.71 for the western segment, and 1.79 for the eastern segment) it is reasonable to assume that truck traffic will grow at the same rate as total traffic in the corridor. This means that although truck traffic will increase substantially, the percentage of total traffic represented by trucks is expected to essentially be the same in 2040 as today.

The Freight Analysis Framework (FAF) integrates data from the national 2007 Commodity Flow Survey and additional sources, FAF version 3 (FAF3) provides estimates for tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for 2007, the most recent base year, and forecasts through 2040. As this data is compiled at a fairly aggregate level, it was used mainly as a check on the local forecast data. In this regard, it is noteworthy that the FAF model forecast indicates an increase in truck traffic very similar to that projected by the regional models.

Forecasts of truck movements on SR 198 in 2040 are shown in **Figure 7.3** and **Figure 7.4.**

Rationale for SR 198 Improvements

SR-99 was developed as a state highway in the early 20th Century to connect the cities of the San Joaquin Valley with each other and to the rest of California[11]. It was constructed parallel to the Central Pacific (now Union Pacific) Railroad line that was built through the Valley in the 1870s. In large part because of the railroad, cities such as Modesto, Fresno and Hanford became major population centers during the railroad era. Consequently, Highway 99 was routed through them. (Visalia predates the railroad, and is the only major Valley city that is not directly served by the main rail line and SR-99).

From its origins, SR-99 has been a crucial link in transporting the Valley's agricultural products to market. As irrigated agriculture developed and expanded through the 20th century, crop yields and values have increased, resulting in increasingly intensive use of SR-99. Since 1970 the San Joaquin Valley's population has experienced rapid growth, also leading to increased traffic on SR-99.

I-5 was completed in the 1970s as an inter-state and interregional facility primarily serving traffic traversing all or most of the Valley. While traffic has steadily increased on I-5 since its completion, it carries lower volumes than SR-99 in large part because it does not directly serve the Valley's major urban areas south of San Joaquin County.

The 2013 *San Joaquin Valley Goods Movement Plan* prioritized SR 198 as an important east-west connector between SR-99 and I-5. The only State Highways running east-west that could serve as alternatives to SR 198, as east-west connectors, are SR 180 in Fresno County and SR- 58 in Kern County. There are shorter State Highway segments (portions of SR-137 and SR-145) that are closer, but neither connects SR-99 and I-5 directly as does SR 198. State Route 180 is over 30 miles north of SR 198 and does not currently connect directly to I-5, and SR-58 is over 50 miles south of SR 198 . Thus, SR 198 is uniquely situated, as the only state highway directly connecting the San Joaquin Valley's two major north-south highways in the heart of the Valley.

The SR 198 corridor's mid-Valley location means that it is just over 200 miles from the Ports of Los Angeles and Long Beach as well as the Port of Oakland. It is also approximately 170 miles from the Port of Stockton. **Figures 7.5. 7.6, and 7.7** indicate travel times and distances from the corridor to major ports using LNAS as the reference point, based on Google Map calculations of free flow times and minimum distances.

Traffic flow, capacity and safety improvements in the SR 198 corridor, particularly along the western segment of SR 198 (i.e., the two-lane segment from I-5 to LNAS) would create road user benefits, including benefits for goods movement operations. These benefits could include savings in travel time, greater travel time predictability, lower accident costs, and lower vehicle operating costs. Existing SR 198 corridor businesses would have lower operating costs. New businesses would have incentives to locate in the corridor with improvements to SR 198, thus providing additional job opportunities to local residents. Moreover, better access to I-5 via an improved SR 198 will confer a measure of benefits to SR-99 and SR-41, by creating an alternative goods movement route for some users of these facilities.

[11] http://www.fhwa.dot.gov/planning/economic_development/studies/casr992005.cfm

FHWA Economic Development Study of SR-99 in California (2002) with 2005 update

The table below outlines the initial framework for the goods movement evaluation.

Initial Performance Measures for Assessing SR 198 Improvements

Factor	Metrics
Safety	• Accident Rate Severity Ratio • Property Damage
Mobility	• Travel time savings • Travel time reliability
Access	• Access to Jobs and Labor • Access to non-work activities (e.g., recreation)
Jobs and Commerce	• ← in jobs, value added, output • ← in Freight Tonnage or ton-miles by Value
Benefits to the wider regional highway network	• Traffic diverted from SRs 99 & 41 • Truck traffic diverted from SRs 99 & 41 • Reductions in Vehicles Miles Traveled (VMT)

Figure 7.1 – Existing Average Daily Truck Traffic I-5 to LNAS

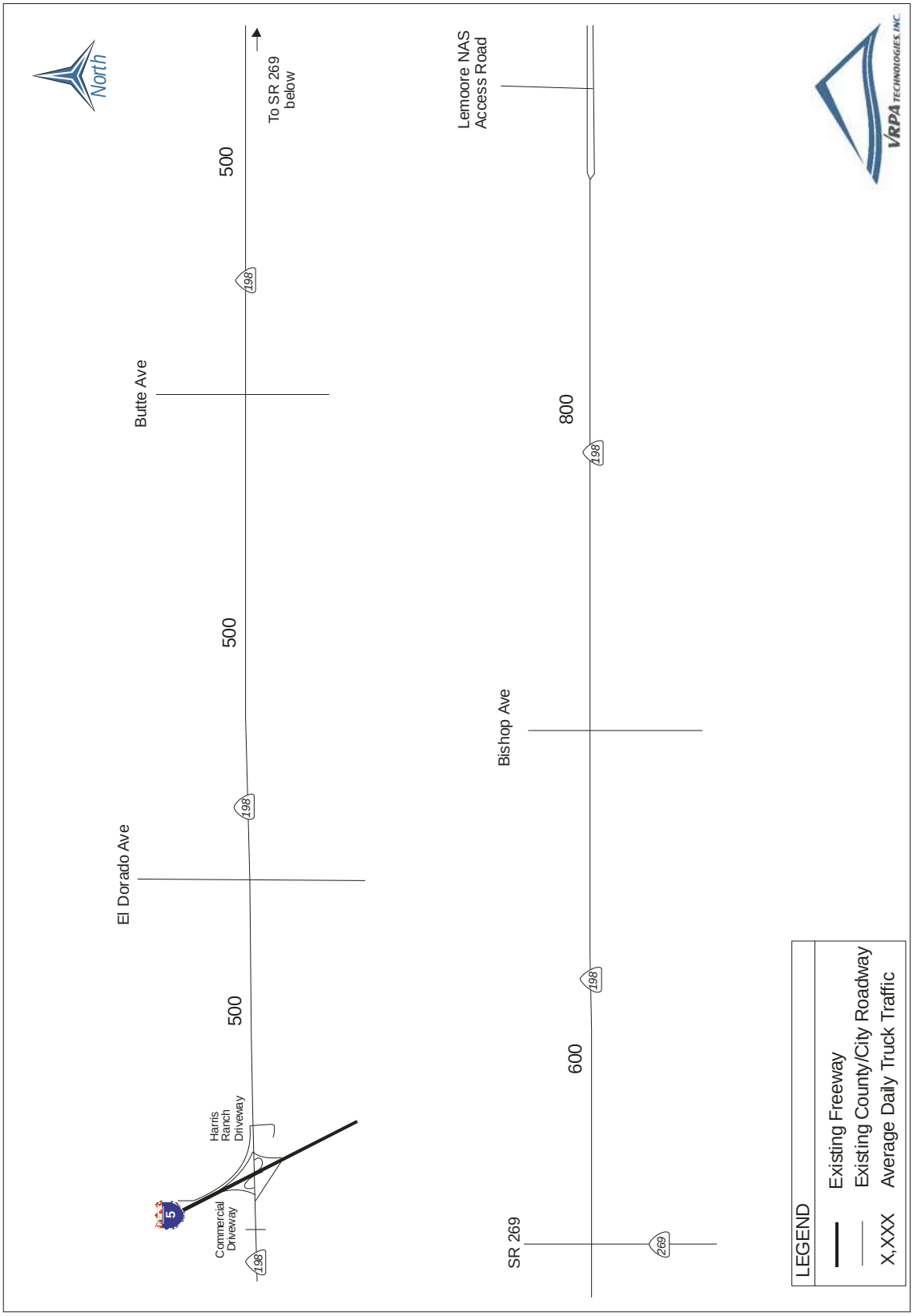


Figure 7.2 – Existing Average Daily Truck Traffic, LNAS to State Route 99

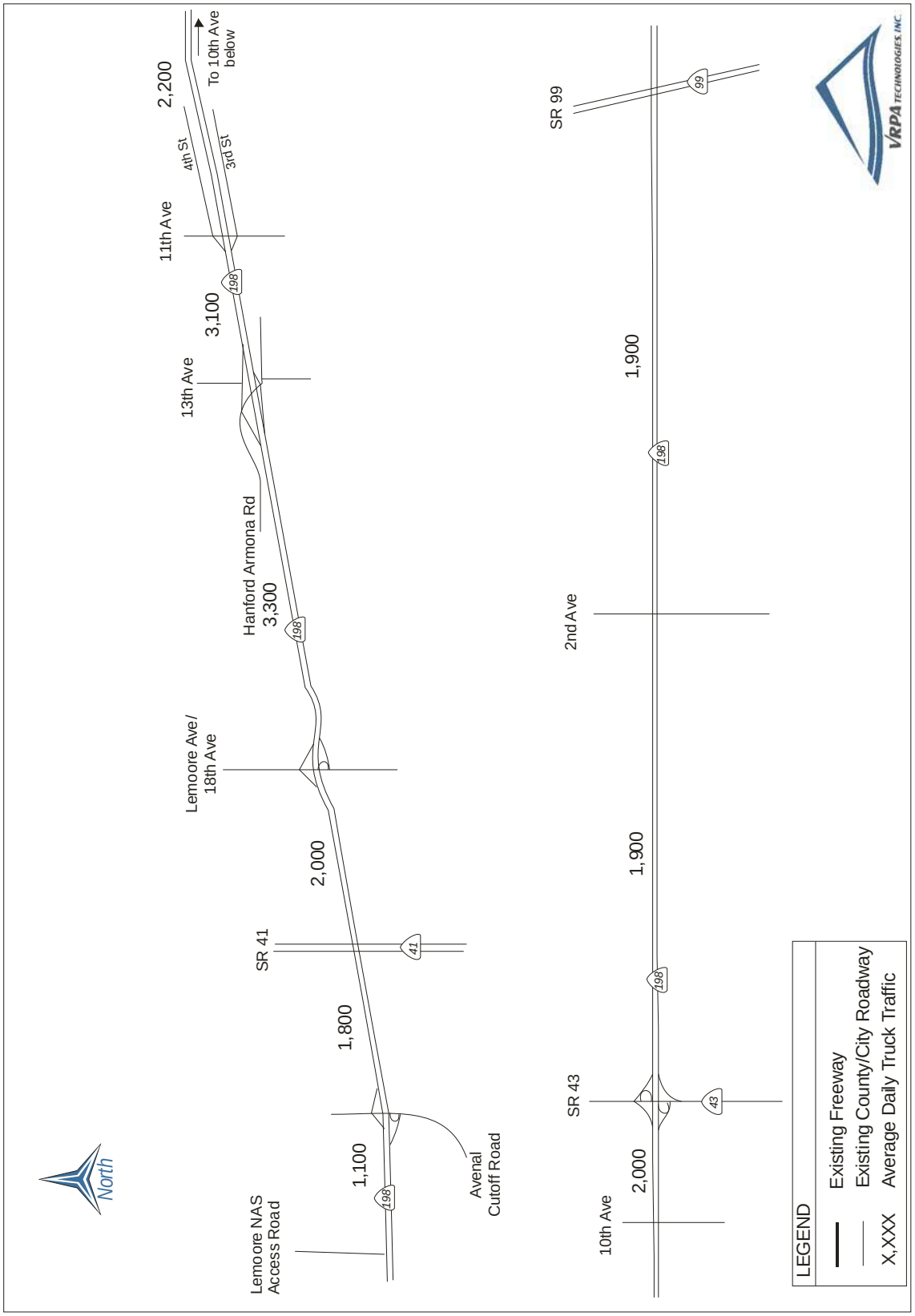


Figure 7.3 – Future year (2040) Average Daily Truck Traffic I-5 to LNAS

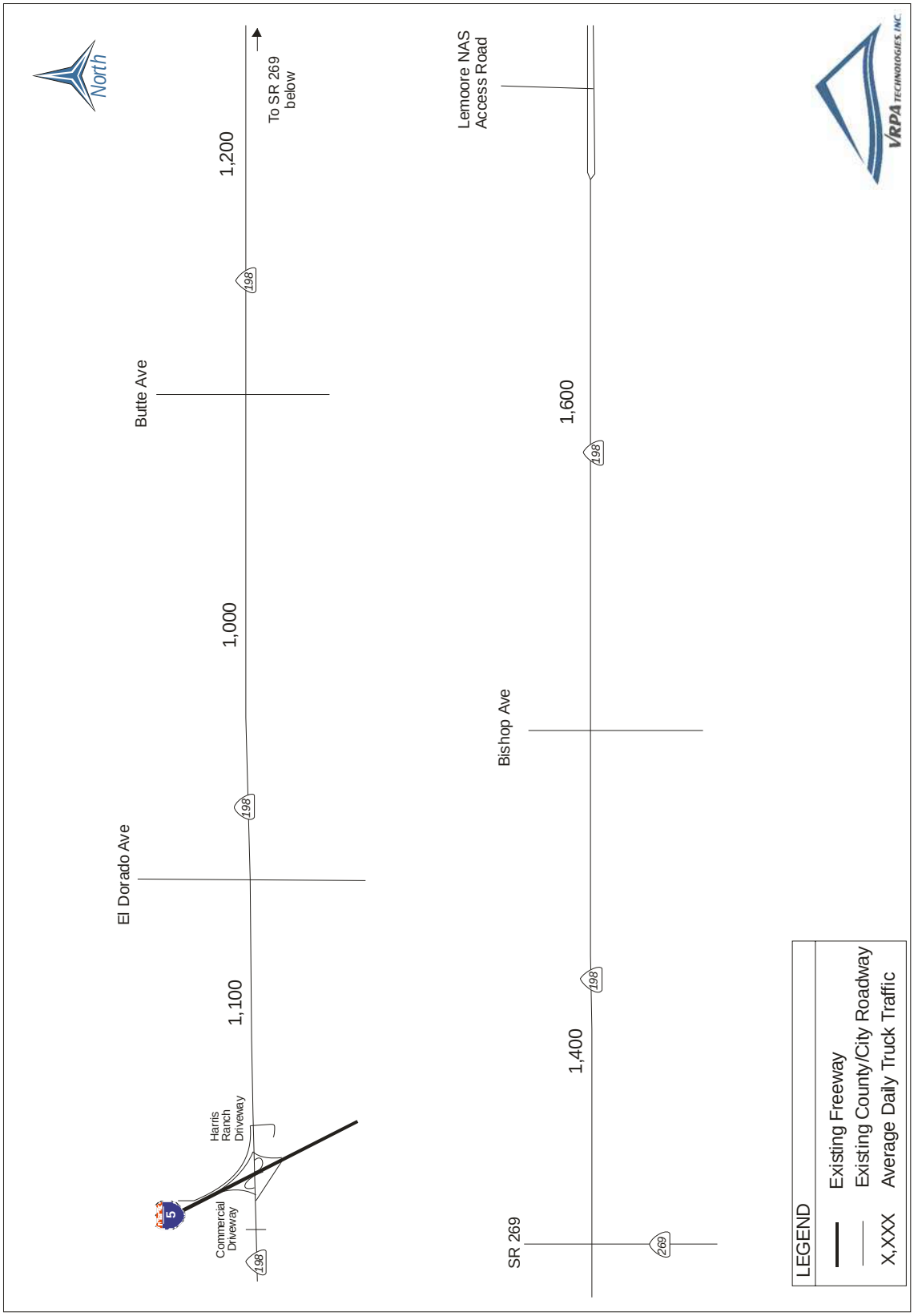


Figure 7.4 – Future Year (2040) Average Daily Truck Traffic LNAS to State Route 99

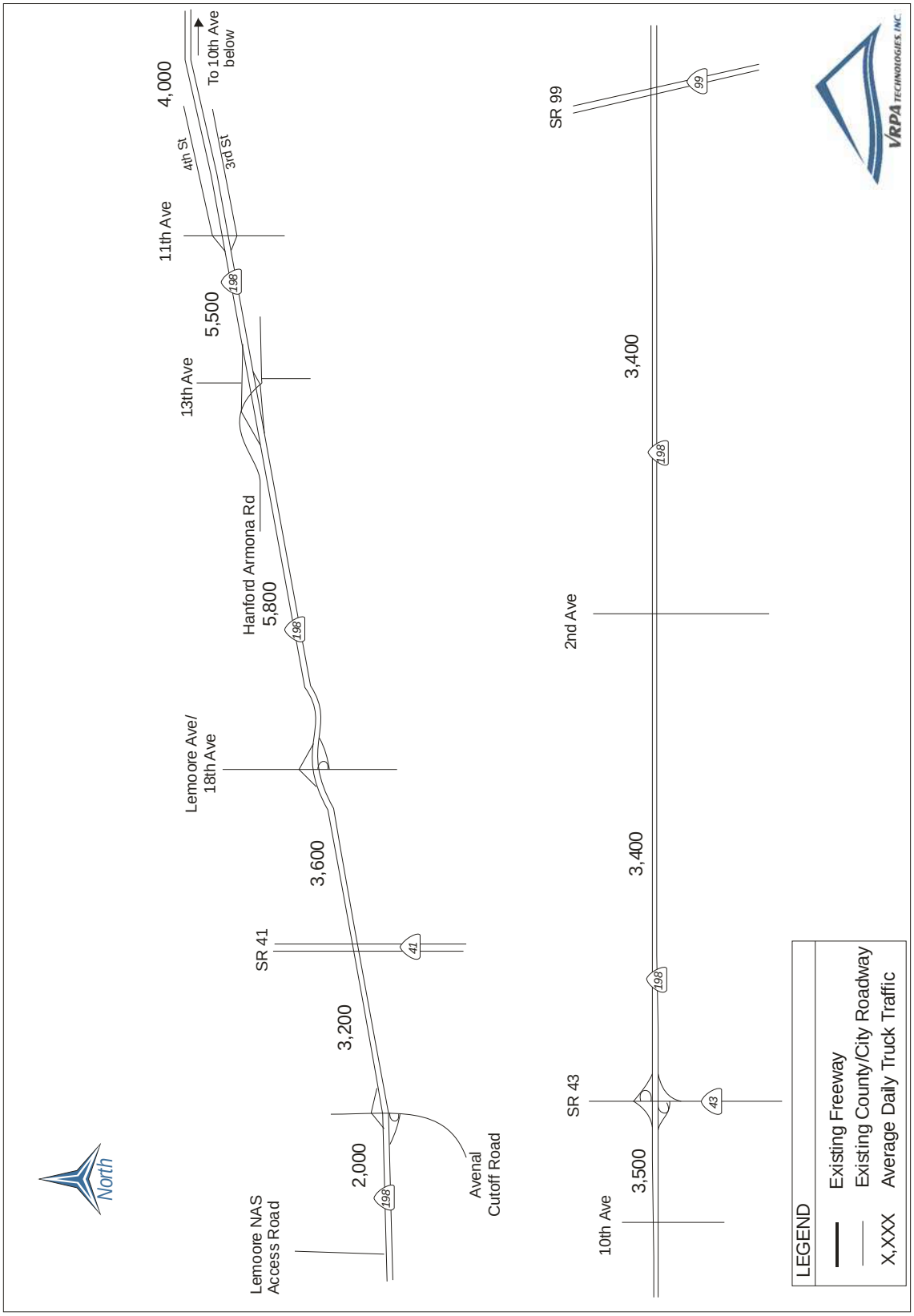


Figure 7.5 - Distance and Travel Time from LNAS to the Port of Stockton

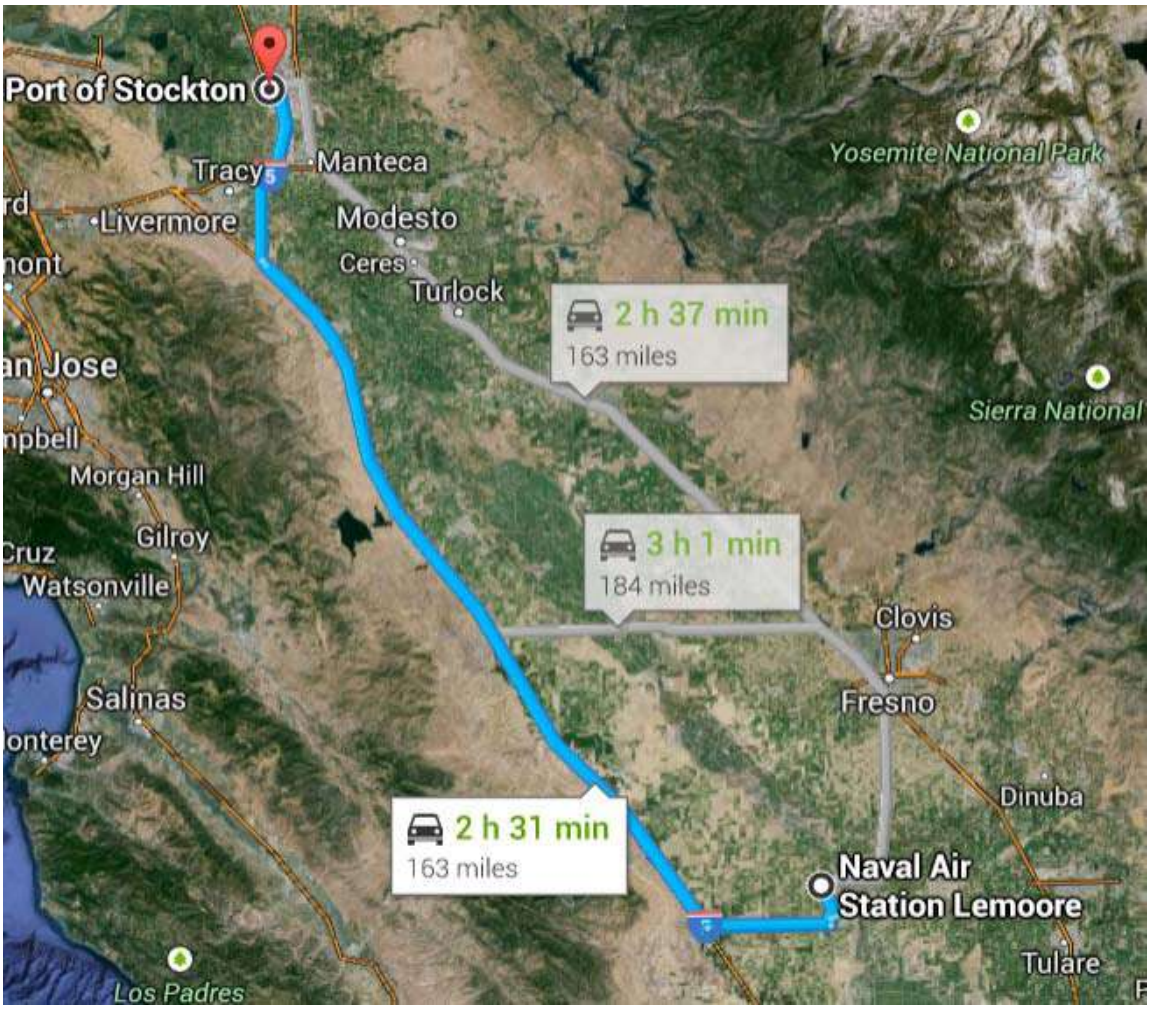


Figure 7.6 - Distance and Travel Time from LNAS to the Port of Oakland

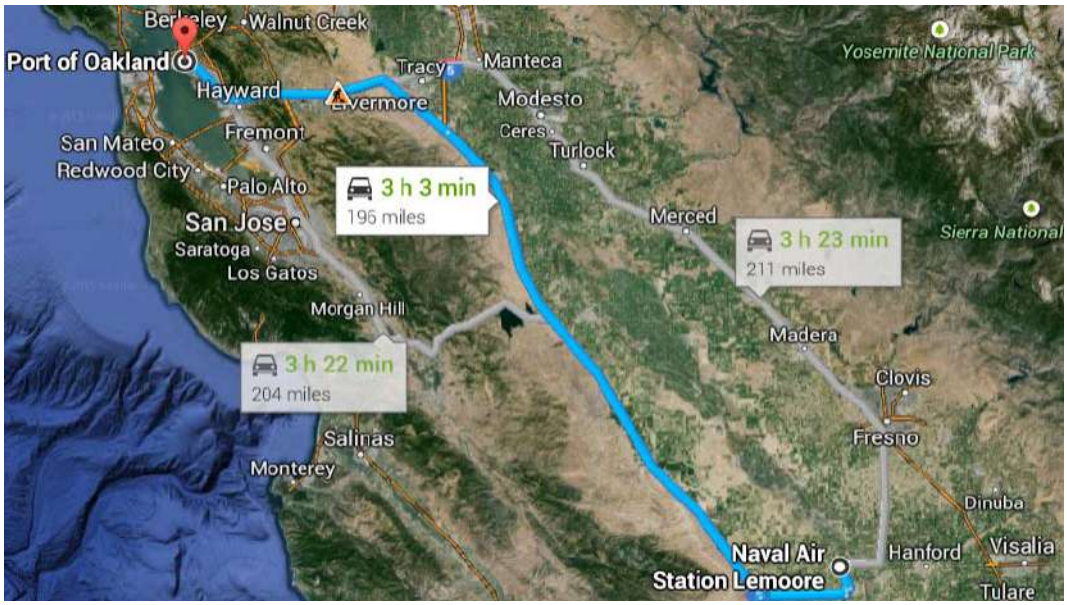


Figure 7.7 - Distance and Travel Time from LNASto the Port of Los Angeles

Goods Movement Analysis

This section provides an overview of the industry sectors driving the movement of goods throughout the SR 198 Corridor and surrounding region. It is designed to illustrate how the economic activity dependent on goods movements is fostered by transportation infrastructure. This chapter builds upon previous sections, which evaluate key trends in demographics, employment, industry and land use in the SR 198 Corridor, and the three county region of Kings, Fresno and Tulare counties. However, as the primary economic drivers in the SR 198 Corridor are located in Kings County (Hanford and LNAS), this evaluation primarily focuses on goods movement trends within Kings County.

Overview of SR 198 Goods Movement Sectors

1. Based on economic input-output analysis of Kings County, about 36 percent of the jobs and 31 percent of the Gross Regional Product (GRP) can be attributed to goods movement related to dependent sectors. While the network of warehouse and distribution facilities and shippers that receive, store, and ultimately ship goods to intermediate or end users represent a relatively small proportion of Kings County economy (less than four percent), they provide critical services to other key sectors in the economy. Specifically, an estimated 30 percent of the Kings County economy consists of sectors that produce goods (and to a lesser extent services) that must be shipped to market, either as inputs or final products. Available data suggest that a large portion of this transport relies on truck traffic along SR 198.

2. The significant amount of both import and export of goods and services to and from Kings County reinforces the critical role of SR 198 as the primary east / west transportation corridor to ensure ongoing economic sustainability. While Kings County businesses export more goods and services than they sell locally, the County is still a net importer, suggesting significant economic dependence on regional trade flows. For example, the value of Kings County exports exceeded final sales to local households, government and industries combined by about $1 billion in 2012 (i.e., exports represent about 125 percent of local final demand). Agricultural-related sectors make up 82 percent of all these exports and contain all of the top ten largest exported commodities. The County also imports approximately $8.7 billion in goods and services, 47 percent of which are goods and services to be reincorporated into further production, and 53 percent of which represent finished goods and services for consumption within the County. About 51 percent of the goods and services purchased by households and government entities in Kings County are imported from elsewhere.

3. A large proportion of all warehousing, distribution and truck terminal users in Kings County are located within five miles of SR 198 and all industrial square footage supporting goods movement activities along the corridor is located east of LNAS. About 87 percent of all warehouse, distribution and truck terminal industrial facilities in Kings County are located within five miles of SR 198. These facilities are primarily located around LNAS and Hanford, indicating the importance of both urban centers in supporting the goods movement sector along the corridor and countywide. Another major cluster of facilities supporting goods movement is located at the junction between SR 198 and SR-99 in the western-most section of Tulare County. The existence of these clusters indicates the import role goods movement plays in both the local economies surrounding urban centers, such as LNAS and Hanford, as well as within the greater San Joaquin Valley region.

4. Preliminary truck survey data suggest that the SR 198 facility prominently functions in a local and regional capacity and is used for goods movement to and from neighboring and nearby counties. Data suggest that goods travelling along SR 198 most commonly originate from, or are delivered to, markets in counties located on SR-99 (e.g., Tulare, Fresno, Sacramento and Los Angeles) and rarely originate from, or are delivered to, markets which would be accessed via I-5 such as those located in the Bay Area (e.g., Alameda, Contra Costa, San Francisco, Santa Cruz and Santa Clara). Additional analysis finds that truck volumes range from eight to 18 percent of total daily traffic along the SR 198 facility, demonstrating the importance of freight movement by truck along the corridor. The lower total truck volumes in the western section reflect lower intensity land uses, fewer major employers and no urban centers.

Kings County Economic Output and Trade Overview

The section provides high-level or macro view of the Kings County economy based on the total value of its output, key sources of demand, and trade flows. It largely relies on results from IMPLAN (Impact Analysis for Planning) software, an input / output model that uses data from several State and federal sources, including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the Census Bureau.

Table 7.1 provides an overview of Kings County Gross Regional Product (GRP), key sources of demand, and import / export activity based on the IMPLAN model outputs. As shown, the County GRP, a key measure of the size and productivity of an economy, is estimated at $5.1 billion in 2012. GRP consists of locally produced goods and services sold to Kings County households, government entities and industries as well as exports (i.e., demand generated from outside of the County). It represents the portion of total economic activity or sales produced locally (i.e., it nets out the cost of intermediate goods and services produced elsewhere from the value of total County production).

Table 7.1 clearly illustrates the important role of trade as a major driver in the Kings County economy, both in terms of exports and imports. The following indicators stand out in this regard:

- **Kings County businesses export more goods and services than they sell locally**: The value of Kings County exports exceeded final sales to local households, government and industries combined by about $1 billion in 2012 (i.e., exports represent about 125 percent of local final demand). In other words, a large proportion of the economic production in the County is destined for markets elsewhere.

- **Kings County is a net importer of goods and services**: Kings County had a trade deficit of $3.3 billion in 2012, meaning that the value of imports exceeded exports. Thus, while exports represent a major economic driver in the County, a large component of the value of goods and services purchased by local residents and government entities are produced elsewhere (i.e., imported). For example, about 51 percent of the goods and services purchased by households and government entities in Kings County are imported from elsewhere.

- **Kings County businesses account for almost half of all imports:** Intermediate imports, or goods and services used in the production process rather than for final consumption, represent about 47 percent of all imports into the County. In other words, a large portion of the value of Kings County economic output represents the cost of imported goods and services needed to produce and deliver local products to market. For example, agricultural processing activity relies on a variety of intermediate inputs, including trucking services, provided by businesses located outside of the County

The above results are typical of relatively undiversified, resource-based economies (i.e., agricultural) that produce raw materials for export (i.e., to the rest of the State, nation, and even abroad) either as a final product or intermediate input. The results also reflect Kings County's role as a bedroom community for residents who work elsewhere and home to several large government entities (e.g., military base and State prison) that demand goods and services produced elsewhere. Finally, both conditions illustrate how Kings County is inextricably linked to the broader regional economy.

Table 7.1 – Kings County Overview Value Added and Trade Flow

Category	formula	Kings County Amount	Kings County % of total
Purchases (Finald Demand) of Locally Produced Goods and Services by:			
Local Households[1]		$2,084,470,546	48%
Local State/Local Government Entities[2]		$942,447,002	22%
Local Federal Government Entities[2]		$1,226,460,058	28%
Capital Investment [3]		$118,374,419	3%
Total	a	**$4,371,752,025**	**100%**
Exports of Locally Produced Goods and Services (Includes Visitor Spending)	b	**$5,412,753,120**	
Exports as % of GRP	= b / e	105%	
Inventory Adjustments[4]	c	**$547,607,048**	
Imports of Intermediate Goods and Services	d	**$4,100,104,194**	
Intermediate Imports as a % Gross Regional Product[5]	= d / e	80%	
Gross Regional Product (or Value Added)[5]	e = a + b - c - d	**$5,136,793,903**	**100%**
Employee Compensation		$2,647,859,717	52%
Proprietor Income		$500,700,924	10%
Other Property Type Income		$1,789,038,317	35%
Tax on Production and Import		$199,194,842	4%
Imports of Final Goods and Services by:			
Local Households[1]		$2,698,003,899	59%
Local State/Local Government Entities[2]		$492,742,047	11%
Local Federal Government Entities[2]		$1,214,632,338	26%
Capital Investment [3]		$182,951,089	4%
Total	f	**$4,588,329,373**	**100%**
Imported Final Demand as a % of total	= f / (a + f)	51%	
Trade Balance	g = b - (d + f)	**($3,275,680,447)**	
As a percent of Value Added	= g / e	64%	

[1] Households represent demand for nondurable goods and services by local residences of King County.

[2] Sales of all goods and services to federal, state and local government (and their agents) in King County. Local sales includes the wages and salaries of government workers.

[3] Capital represents sales of durable goods and infrastructure to households and private firms within King County. A durable good is one which may be used repeatedly or continuously over a period of more than a year, assuming a normal or average rate of physical usage.

[4] Inventory adjustments account for goods that were not produced in the current year, so their value should not be included in the current year's GRP. Their value was already counted in the GRP value in the year in which they were produced.

[5] Gross Regional Product (GRP), also known as Value Added, equals the proportion of total ouput that is produced locally.

Sources: IMPLAN; EPS.

The significant amount of both import and export of goods and services to and from the County reinforces the critical role of transportation infrastructure to ensuring ongoing economic sustainability. SR 198's function as the primary east / west facility in the County makes it a critical economic link for existing and expanding industries located throughout the Valley, including agriculture, processed foods and energy products and the logistics and distribution industry.

Kings County's Goods Movement Sectors

The goods movement industry is characterized by a network of warehouse and distribution facilities and shippers that receive, store, and ultimately ship goods to intermediate or end users. This section examines employment, Regional Gross Domestic Product (RGDP), building space, and trucking patterns associated with the goods movement sectors in Kings County in general and along SR 198 in particular.

Goods Movement Jobs and GRP

Table 7.2 summarizes total jobs, GRP, and imports for the sectors that provide the bulk of goods movement-related services. As shown, the County had an estimated 2,183 jobs and $172 million in GRP in these sectors in 2012, representing less than four percent of the total economy. Of this amount, the vast majority represents jobs and related output in "truck transportation services" and "wholesale trade distribution services". Other goods movement sectors that are typically significant in larger economies, such as air, rail and pipeline services, are relatively absent in Kings County.

Table 7.2 – Goods Movement Jobs and RGDP in Kings County

Goods Movements Sector	Goods Movement Jobs		Goods Movement GRP		Goods Movement Imports	
	Amount	% of Total	Amount	% of Total	Amount	% of Total
Wholesale trade distribution services	748	34%	$98,184,145	57%	$481,389,876	61%
Air transportation services	10	0%	$718,992	0%	$71,875,168	9%
Rail transportation services	3	0%	$342,581	0%	$39,642,025	5%
Water transportation services	2	0%	$201,246	0%	$17,601,867	2%
Truck transportation services	1,124	52%	$56,565,484	33%	$126,749,574	16%
Transit and ground passenger transportation services	141	6%	$6,675,831	4%	$8,958,639	1%
Pipeline transportation services	2	0%	-$741,164	0%	$9,294,636	1%
Scenic / sightseeing transportation services & support	9	0%	$334,363	0%	$6,879,075	1%
Couriers and messengers services	6	0%	$550,861	0%	$17,616,100	2%
Warehousing and storage services	140	6%	$9,246,552	5%	$9,669,760	1%
Total	2,183	100%	$172,078,892	100%	$789,676,721	100%
As a % of King County Total	3.9%		3.3%		9.1%	

It is also worth noting that Kings County imports a significant amount of goods movement-related services from elsewhere. Specifically, the County imported $790 million in goods movement-related services, about nine percent of total imports, compared to $172 million in goods movement GRP (i.e., produced locally). In other words, many of the trucking and warehouse distribution companies that serve the County are located elsewhere, despite the importance of this sector to overall economic activity. It is likely that a large portion of these goods movement service providers are located along SR-99, as discussed further below.

Warehouse and Distribution Space

While detailed goods movement job and GRP data for the SR 198 corridor is unavailable, the location of warehouse distribution space in the County can provide a good proxy for the geographic concentration of this sector. As illustrated in **Table 7.3,** in Kings County this network is primarily clustered along SR 198 due to the existence of the LNAS, Hanford and Visalia urban centers. Of the 94 total warehouse, distribution and truck terminal facilities located in Kings County, 84 or 87 percent are located within five miles of SR 198.[12] An additional 20 goods movement supporting industrial properties, which corresponds to nearly a quarter of all properties in Kings County, are located along the SR 198 corridor in Tulare County west of SR-99.

Table 7.3 - Kings County Warehouse and Distribution Space

Geography	Properties		Site Area		Square Footage	
	#	% of Kings County Total	Acres	% of Kings County Total	S.F.	% of Kings County Total
SR 198 Corridor [1]	102	109%	406	58%	1,176,318	34%
within Kings County	82	87%	315	45%	851,873	25%
within Tulare County	20	21%	77	11%	242,278	7%
Other Kings County	12	13%	383	55%	2,608,916	75%
Kings County	94	100%	698	100%	3,460,789	100%

[1] Corridor encompasses all properties located within five miles of SR 198, east of I-5 and west of SR 99.

Sources: CoStar; Economic & Planning Systems, Inc.

This clustering is further illustrated in **Figure 7.8** and **Figure 7.9** below, which identifies all warehouse, distribution and truck terminal uses within five miles of SR 198 and in all of Kings County, respectively.

[12] However, only 45 percent of the total site acreage and 25 percent of the total square footage associated with these industrial uses in located within the SR 198 corridor, indicating that a small number of large warehouse users choose to locate away from urban centers.

Figure 7.8 - Existing Industrial Uses Within Five Miles of SR 198

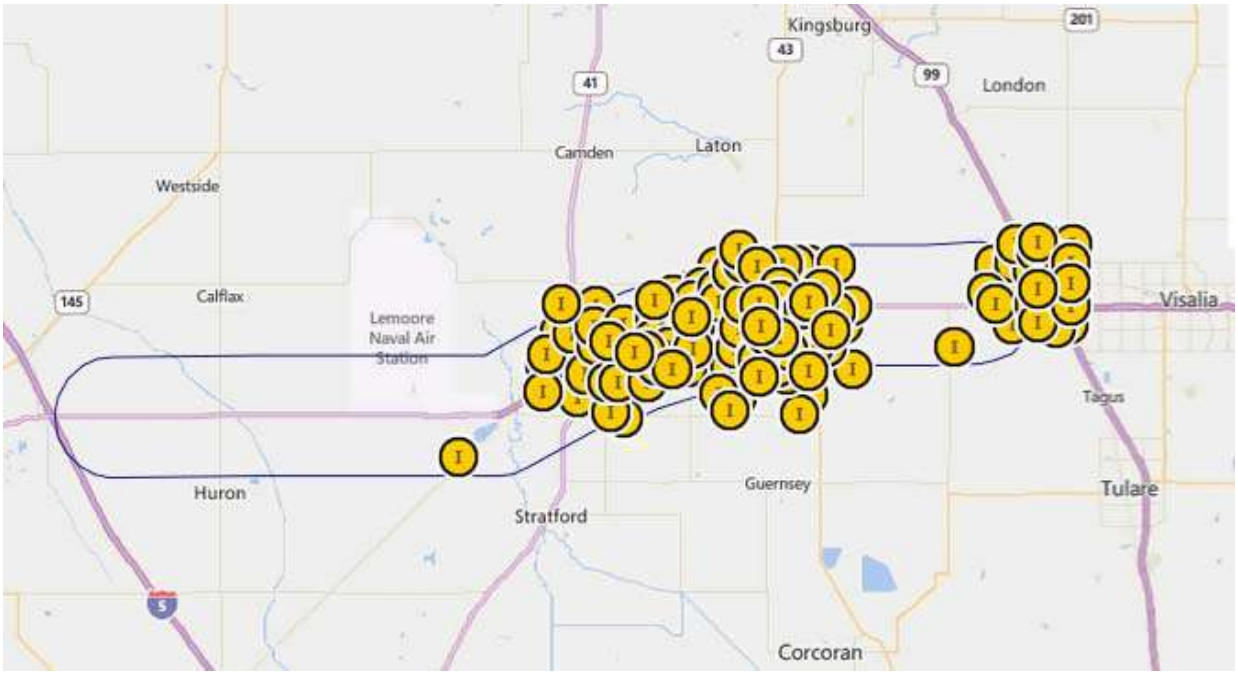
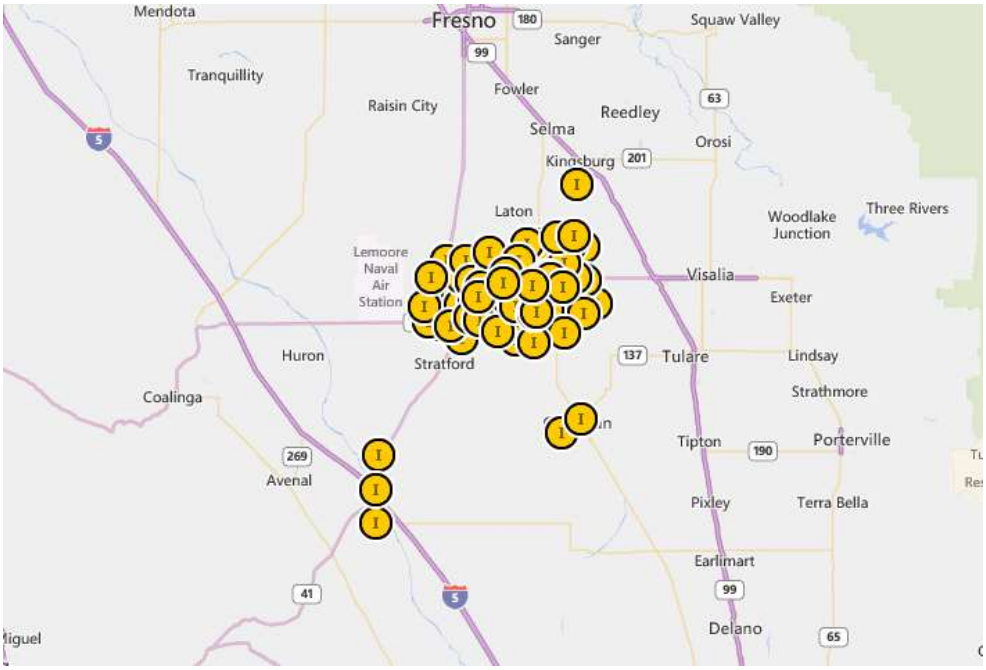


Figure 7.9 - Existing Warehouse, Distribution and Truck Terminal Uses in Kings County



As shown in **Figure 7.8** and **Figure 7.9** above, all existing goods movement-related industrial inventory along the corridor is located east of LNAS and nearly all inventory is located east of SR-41. Industrial clusters exist around Hanford and LNAS as well as adjacent to Visalia. As discussed in the previous section, these clusters indicate that a large number of goods movement-related businesses serving Kings County are located along SR-99 in Visalia.

However, while no existing goods movement users have chosen to locate west of LNAS SR 198, roadway improvements to that segment may increase the competitiveness of the area and attract industrial uses in the future. Recent market trends along the SR 198 corridor indicate a competitive advantage for certain types of industrial users compared to Kings County as a whole.

Truck Volumes and Travel Patterns

In September 2014, a survey was conducted as part of the study along SR 198 to determine origin/destination, trip purpose and freight commodity groups for truck traffic along the corridor. Preliminary results indicate that the majority of trucks originate in California (76 percent). The most common origination counties within California for SR 198 truck traffic include Tulare (13 percent of total truck traffic), Fresno (11 percent), Los Angeles (11 percent) and Kern (7 percent) counties. A nearly identical proportion of trucks indicated a California destination and the most common counties being Tulare (15 percent), Fresno (14 percent), Los Angeles (10 percent) and Kern (6 percent).

Further analysis found that truck volumes range from 10 to 18 percent of total daily traffic, demonstrating the importance of freight movement by truck along the corridor. Truck volumes as a proportion of overall traffic flows increase along the western section of the facility (west of the LNAS but decreases significantly in total truck volumes as shown in **Table 7.4** below). The lower total truck volumes in the western section reflect lower intensity land uses, fewer major employers and no urban centers.

Table 7.4 - SR 198 Corridor Traffic Volumes

Road Segment	Truck Volumes 2014	All Traffic Volume 2014	% Truck Traffic 2014
Western Segment (I-5 to Lemoore NAS)			
I-5 to SR 269	500	2,733	18%
SR 269 to Lemoore NAS (avg)	700	4,050	17%
Eastern Segment (Lemoore NAS to SR 99)			
Lemoore NAS to Lemoore Ave/18th Street (avg)	1,633	16,400	10%
Lemoore Ave/18th Street to 11th Avenue (avg)	3,200	31,500	10%
11th Avenue tp SR 43 (avg)	2,100	20,850	10%
SR 43 to SR 99	1,900	19,000	10%

Sources: VRPA; EPS.

These data suggest that the SR 198 facility prominently functions in a regional capacity, being utilized for goods movement to and from neighboring and nearby counties. Furthermore, these data suggest that goods most commonly originate from, or are delivered to, markets in counties located on SR-99 (e.g., Tulare, Fresno, Sacramento and Los Angeles) and rarely originate from, or are delivered to, markets which would be accessed via I-5 such as those located in the Bay Area (e.g., Alameda, Contra Costa, San Francisco, Santa Cruz and Santa Clara).

As demonstrated in more detail in the *SR 198 Truck Forecast and Goods Movement Analysis*, drive times from central locations along SR 198 (e.g., LNAS) to various major markets indicate longer haul freight movement would likely only use the western segment of SR 198 when destined for the Bay Area, the Stockton/Tracy market or markets farther north. For instance, for all markets located on SR-99, the shortest drive time under optimal conditions is to use SR 198 east to SR-99. Furthermore, while travel to the Port of Los Angeles does utilize I-5, it is far more efficient to use SR-41, south to I-5 than SR 198. It is likely only when trucks originate from, or are destined for, the Bay Area, the Port of Stockton or

locations further north in California, Oregon or Washington that the western segment of SR 198 is likely to be utilized for long-haul goods movement.

The 2013 *San Joaquin Valley (SJV) Interregional Goods Movement Plan* stresses the importance of improving east-west capacity between I-5 and SR-99 in order to support the existing and expanding industries located throughout the Valley including agriculture, processed foods and energy products and burgeoning logistics and distribution industry. The corridor's strategic location (communities along SR 198 are located a little over 200 miles from both the Ports of Long Beach and Los Angeles and Southern California and the Port of Oakland in the San Francisco Bay Area) further indicates the potential goods movement activity that could be supported with improved east-west capacity.

Kings County Goods Movement Customers

The role of goods movement in the Kings County economy is also shaped by the type and size of sectors that ship their goods to intermediate or end users. This section provides an estimate of the jobs and GRP in Kings County for sectors dependent on goods movement services to receive and/or transport goods to the market. It then provides a more detailed review of primary Kings County export and import sectors since they represent the primary goods movement customers.

Kings County Jobs and GRP Dependent on Goods Movement Services

Sectors that depend on goods movement consist predominantly of those that buy or sell physical commodities as opposed to services. While is some cases sectors that buy or sell physical commodities interface with consumers directly without shippers, as in the case of farmers markets or production facilities with a retail component, this represents a relatively small portion of total economic activity.

Table 7.5 estimates the GRP and associated employment for sectors that ship their goods and services to intermediate and end users. It is based on an analysis of the type of goods and services produced in each of IMPLAN's 440 sectors and the estimated percent of their total GRP that requires transport (see **Appendix A** for sector by sector break-out). Overall, an estimated 31 percent of GRP and 32 percent of jobs in Kings County are estimated to be heavily reliant on goods movement services. These are composed primarily of businesses that produce physical commodities rather than services.

Table 7.5 - Estimated Jobs and GRP Dependent on Goods Movement Services

Item	Jobs		GRP	
	Amount	% of Total	Amount	% of Total
King County Total	56,327	100%	$5,136,793,800	100%
Sectors Heavily Reliant on Goods Movement Services[1]	18,130	32%	$1,607,591,980	31%
Sectors Minimally Reliant on Goods Movement Services[2]	38,197	68%	$3,529,201,820	69%

[1] Mostly includes industries the produce physical commodities for intermediate use or final consumption (See Appendix A for sector by sector breakout).

[2] Mostly includes service sectors (e.g. professional, retail, hospitality, medical), entertainment, and government (See Appendix A for sector by sector breakout).

Sources: IMPLAN; EPS

Kings County Exports

The Kings County economy produces $5.4 billion in exported commodities. Unlike professional services-based economies, those dependent upon the production and exportation of goods require the movement of those goods to market. In the case of Kings County, the majority of all the exported value in the Agricultural, Agricultural Processing and Food Production sector is assumed to be physically transported out of Kings County, primarily by truck.

As shown in **Table 7.6** the largest commodity exports are Cheese ($1.2 billion), Canned, Pickled and Dried Fruits and Vegetables ($485 million), Soybean Oil and Other Oilseed Products ($420 million), All Other Crop Farming Products ($320 million) and Cotton ($315 million). The Agricultural, Agricultural Processing and Food Production sectors make up 82 percent of all exports and contain all of the top ten largest export commodities. Other notable export sectors include Professional and Business Services (six percent of total exports), All Other Manufactured Products, Equipment, and Components (four percent), and Transportation and Distribution Services (three percent).

Table 7.6 - Kings County Major Exports

Export Sector	Total Exports	Percent of County Total
Agriculture, Ag Processing and Food Production	$4,417,968,322	82%
Cheese	$1,160,410,001	21%
Canned, pickled and dried fruits and vegetables	$466,095,902	9%
Soybean oil and cakes and other oilseed products	$416,361,101	8%
Cotton	$315,509,677	6%
All other crop farming products	$309,358,681	6%
Snack foods including nuts, seeds and grains, and chips	$300,609,431	6%
Dairy cattle and milk products	$272,496,798	5%
Tree nuts	$195,618,779	4%
Processed animal (except poultry) meat and rendered byproducts	$148,695,865	3%
Cattle from ranches and farms	$130,645,819	2%
Other Agriculture, Ag Processing and Food Production	$765,777,956	14%
Professional & Business Svcs	$318,043,265	6%
All Other Manufactured Products, Equipment, and Components	$200,205,387	4%
Government and Other Services	$151,033,167	3%
Transportation and Distribution Services	$136,743,295	3%
Construction Materials, Natural Resources and Mining	$63,932,418	1%
Transportation Equipment (Cars, Boats, Tanks, etc.)	$40,912,437	1%
Retail Goods	$28,967,015	1%
Utilities	$27,719,407	1%
Leisure & Hospitality	$27,228,407	1%
Kings County Total	**$5,412,753,120**	**100%**

Sources: IMPLAN; EPS.

Of the Kings County exports, the vast majority (97 percent) are classified as domestic exports (within the United States), which is consistent with interview responses from Kings County businesses and previous analysis documenting trade flows in the San Joaquin Valley. Commodities of notable exception

to this trend include Tree Nuts and Cotton, of which a majority of exports are estimated to go to foreign markets.

Kings County Imports

Total value of commodities imported to Kings County is approximately $8.7 billion. As illustrated in **Tables 7.7** and **7.8**, imports are broken into two categories: Intermediate Imports and Final Demand Imports. Intermediate imports refer to unfinished goods and services that will be incorporated into further production by industries within Kings County. For example, Kings County imports $329 million in oilseeds to be used in the production of other processed foods such as cheese and canned fruits. In contrast, imported Final Demand goods and services include food products and professional services.

Intermediate imports total $4.1 billion and includes goods and services to be used in further production prior to consumption. The largest of these commodity sectors are Oilseeds ($328 million), Wholesale Trade Distribution Services ($245 million), Cheese ($225 million) and Refined Petroleum Products ($179 million). These imported goods and services are used by industries to produce other goods and services, either for local purchase or export.

Final Demand imports total nearly $4.6 billion and feature some of the same prominent sectors as Intermediate Imports. The largest Final Demand imports include Wholesale Trade Distribution Services ($236 million), Refined Petroleum Products ($155 million), Real Estate Buying and Selling, Leasing, Managing and Related Services ($151 million) and Insurance ($150 million).

It should be noted that both Wholesale Trade Distribution Services and Refined Petroleum Products are in the top five sectors imported for intermediate uses (Intermediate Imports) and for final consumption. The prominence of these sectors speaks to the reliance on goods movement services, both bringing in imported goods but also in intra-Kings County movement and in exporting finished and intermediate goods to markets outside of the County.

Table 7.7 - Kings County Major Imports

Import Sector	Intermediate Imports	Final Demand	Total Imports	Percent of County Total
Professional & Business Svcs	$785,865,799	$1,639,086,615	$2,424,952,414	28%
Agriculture, Ag Processing and Food Production	$1,681,006,820	$301,433,229	$1,982,440,049	23%
All Other Manufactured Products, Equipment, and Components	$906,976,977	$999,458,113	$1,906,435,090	22%
Transportation and Distribution Services	$411,695,023	$377,981,697	$789,676,721	9%
Transportation Equipment (Cars, Boats, Tanks, etc.)	$36,631,268	$392,397,268	$429,028,536	5%
Government and Other Services	$42,305,884	$285,024,536	$327,330,420	4%
Construction Materials, Natural Resources and Mining	$200,245,141	$118,347,337	$318,592,477	4%
Retail Goods	$12,962,261	$254,307,528	$267,269,789	3%
Leisure & Hospitality	$22,415,020	$220,293,051	$242,708,071	3%
Utilities	$0	$0	$0	0%
Kings County Total	**$4,100,104,194**	**$4,588,329,373**	**$8,688,433,566**	**100%**

Sources: IMPLAN; EPS.

Table 7.8 - Kings County Top 10 Import Commodities

Import Sector	Intermediate Imports	Institutional Imports	Total Imports	Percent of County Total
Wholesale trade distribution services	$245,838,025	$235,551,851	$481,389,876	6%
Refined petroleum products	$179,306,787	$155,065,300	$334,372,087	4%
Oilseeds	$328,652,007	$0	$328,652,007	4%
Real estate buying and selling, leasing, managing, and related services	$135,570,593	$150,831,705	$286,402,298	3%
Cheese	$224,505,792	$2,728,606	$227,234,398	3%
Monetary authorities and depository credit intermediation services	$113,930,588	$92,336,169	$206,266,757	2%
Insurance	$49,732,311	$149,906,868	$199,639,179	2%
Offices of physicians, dentists, and other health practitioners	$0	$141,953,179	$141,953,179	2%
Electricity, and distribution services	$68,429,054	$66,755,513	$135,184,567	2%
Noncomparable foreign imports	$16,814,811	$117,491,364	$134,306,175	2%
Subtotal Ten Largest Import Sectors	$1,362,779,968	$1,112,620,555	$2,475,400,523	28%
Kings County Total	**$4,100,104,194**	**$4,588,329,373**	**$8,688,433,566**	**100%**

Sources: IMPLAN; EPS.

Summary of Total Goods Movement Impacts

Based on the above analysis, the movement of goods (and to a lesser extent services) throughout Kings County plays a critical role in the functioning of the overall economy. As summarized in **Table 7.9**, this analysis suggests that goods movement supports 33 percent of GRP and 34 percent of jobs in Kings County by directly enabling the distribution of goods to, from and within the County, combining the impact of both warehouse and distribution providers and the sectors that rely on these services.

Table 7.9 - Summary of Goods Movement Support of Kings County Economy

Item	Jobs		GRP	
	Amount	% of Total	Amount	% of Total
Goods Movement Suppliers	2,183	4%	$172,078,892	3%
Goods Movement Customers	18,130	32%	$1,607,591,980	31%
Total Goods Movement Impact	20,314	36%	$1,607,594,163	31%

Sources: IMPLAN; EPS

As discussed above, the critical location of SR 198 as the primary east/west facility and proximity to existing urban centers, major employers, and goods movement service providers suggests it plays a critical role is sustaining this economic activity.

Another important characteristic of the SR 198 corridor is the existence of parallel rail service. The San Joaquin Valley Railroad operates a branch freight rail service from Exeter through Goshen to Huron (58.8 miles) with long haul rail connections available at Goshen Junction. The fact that there is rail service means that economic activities that import or export goods over long distance have access to this mode as well as trucking over much of the corridor. The 2013 California State Rail Plan includes the San Joaquin Valley Railroad as a significant local and regional rail service provider; however, it reports that no information on rail freight activity in terms of rail carloads or tons shipped was available when the Plan was finalized.

8 Economic Performance Measures & Funding

8. Economic Performance Measures & Funding

General

This section provides an overview of the initial performance measures evaluated, a brief summary of the methodologies utilized for the various metrics and a cost benefit analysis. A short description is then provided on possible funding sources. In order to conduct a cost-benefit analysis for particular roadway improvements and/or improvement packages in comparison to the baseline that forecasted performance of the SR 198 facility, data were provided by the traffic analysis as well as collected internally to evaluate the economic benefits across a number of categories. The evaluated categories of impacts included travel times savings and safety benefits and are summarized below in **Figure 8.1**.

Figure 8.1 Performance Metrics

CBA Category	Metrics
Safety	• Fatalities / injuries • Property Damage
Mobility	• Travel time savings

Input for the assessment of the safety and mobility metrics, including accident rates and travel times both under the baseline scenario and improved scenario, were provided by the traffic analysis. To assess these various metrics, accepted US DOT valuations adjusted for the regional economic environment were relied upon. **Figure 8.2** below provides an overview of the analytical framework for evaluating the economic impacts of the SR 198 corridor.

Figure 8.2 Overview of Economic Benefits Analysis Metrics

Benefit Category	Benefit Description	How Benefit Can be Monetized
Congestion relief and reduced travel time	Roadway improvements that improve overall traffic conditions throughout the corridor.	(Estimated decrease in travel time with implementation of selected improvements) multiplied by (time value of money).
Improved travel safety	Roadway improvements result in fewer injuries and fatalities passenger per trip (or mile) relative to baseline.	Value of forecasted avoided collisions and related injuries / fatalities with roadway improvements compared to projected baseline.

The following performance measures are recommended for SR 198 between Interstate 5 and the LNAS:

Safety

- Number of accidents - fatality or injury
- Number of accidents – property damage only

Mobility

- Travel time: I-5 to LNAS (measured in minutes)
- Total vehicle stops: I-5 to LNAS

Access

- Access to jobs and labor (reduced travel time for employees)
- Access to non-work activities (attractiveness of corridor for business due to improved access to destinations)

Jobs and Commerce

- Number of jobs
- Value added/output
- Freight tonnage/ton-miles

The performance measures listed above were used, along with engineering judgment, to guide the development of roadway improvement recommendations.

Benefit-Cost Analysis

The Benefit Cost Analysis (CBA) provides a monetary estimate for a range of societal benefits and costs that are expected to result from the identified SR 198 improvements. While not all potential benefits described in the previous section have been quantified, given data availability and methodological complexity, the calculations that are provided for travel time savings and improved safety benefits are based on standard DOT guidance and values. These calculations demonstrate that the proposed improvements are likely to generate significant net positive impacts relative to the "No Project Baseline". The key project benefits assessed as a part of this analysis are described below with the cost-benefit analysis calculations summarized in **Table 8.1** below.

Benefits of Improved Travel Time: The proposed improvements are expected to improve vehicle and transit travel times by providing for better traffic flow and less congestion. The BCA monetizes these benefits based on DOT guidance for the value of personal and business-related commutes.

Benefits of Improved Travel Safety: The proposed improvements include a variety of elements that are likely to improve the overall safety for all modes along the corresponding segments of SR 198. This analysis provides a quantitative estimate of the benefits from improved safety based on DOT guidance related to monetizing the value associated with reduced fatalities, injuries, and property damage.

Table 8.1 - SR 198 Corridor Improvement Cost Benefit Analysis

Project Name	Project Time Frame (Assumed Start of Construction)	25-Year Net Present Value @ 7% Discount Rate [1]
Raised/Reflective Pavement Markings	Short-Term (2016)	
Project Costs		
Capital Costs		($327,103)
O&M Costs		($174,804)
Project Benefits		
Travel Time Savings		$0
Safety		$11,121,608
Net Project Benefit		**$10,619,702**
Signal/Roundabout at State Route 269	Short-Term (2016)	
Project Costs		
Capital Costs		($841,121)
O&M Costs		($139,843)
Project Benefits		
Travel Time Savings		$1,364,787
Safety		$7,454,267
Net Project Benefit		**$7,838,090**
Passing Lanes	Medium-Term (2022)	
Project Costs		
Capital Costs		($3,736,498)
O&M Costs		($620,136)
Project Benefits		
Travel Time Savings		$271,979
Safety		$8,782,585
Net Project Benefit		**$4,697,930**
Signal/Roundabout at Commercial Driveway	Medium-Term (2022)	
Project Costs		
Capital Costs		($560,475)
O&M Costs		($82,645)
Project Benefits		
Travel Time Savings		$550,220
Safety		$4,356,349
Net Project Benefit		**$4,263,450**
Widen to Four Lanes	Long-Term (2027)	
Project Costs		
Capital Costs		($15,984,431)
O&M Costs		($1,994,356)
Project Benefits		
Travel Time Savings		$968,822
Safety		$17,961,062
Net Project Benefit		**$951,098**
ITS Improvements	Various (2027) [2]	
Project Costs		
Capital Costs		($666,018)
O&M Costs		($311,618)
Project Benefits		
Travel Time Savings		$56,709
Safety		$1,311,026
Net Project Benefit		**$390,099**
Total For All Proposed SR 198 Improvements		
Project Costs		
Capital Costs		($22,115,646)
O&M Costs		($3,323,401)
Total		**($25,439,047)**
Project Benefits		
Safety Benefits		$50,986,899
Travel Time Benefits		$3,212,516
Total		**$54,199,415**
Net Project Benefit		**$28,760,368**

[1] Benefits assumed to accrue beginning in the year following construction.
[2] ITS Improvements assumed to be constructed as a long-term project (construction in 2027).

Sources: VRPA; US DOT; EPS

As is standard procedure, these benefits and costs were assessed over a 25-year life cycle assuming a seven percent annual discount rate to enable an estimate of the Net Present Value of the project benefits at the base year.

This should be considered as a preliminary estimate as a "unit cost" estimate approach was assumed for the improvements using nominal values. No right-of-way costs were assumed and no benefit attributed from emission savings or reduction in costs for off-setting the normal maintenance costs for the "No Build" condition. Similarly, the higher value of the FHWA discount rate (seven percent) was used, which gives a conservative estimate of the Net Present Value.

As demonstrated in Table 10, given these preliminary assumptions, all of the recommended improvements have a positive net present value of benefits. The Benefit-to-Cost (BCR) ratios vary dramatically for over twenty to just over one. However, under this analysis alone, the benefits accrued from time and accident savings, exceed the build costs demand rating and all are "worthy" of construction on an economic basis. The whole improvement program has a BCR in excess of two. Additional benefits will occur for economic impacts on businesses, industry and commerce because of the increased accessibility and mobility from the improvements.

Funding

There are a wide variety of funding sources that may be available to support the enhancements the study team has recommended. A selection of the most likely sources are set out below:

1. State Transportation Improvement Program (STIP): This comprises the Interregional Transportation Improvement Program (ITIP) and the Regional Transportation Improvement Program (RTIP). The STIP is a five year plan that is updated biennially. It is used for state highway improvements, intercity rail and regional highways and transit improvements. The Interregional Improvement Program (IIP) received 25% of STIP funding and the Regional Improvements funding receives 75% of STIP funds. An allocation is made to each County that is managed by the RPTA's. This is focused on congestion reduction, goods movement and interregional connectivity.

2. State Highway Operation and Protection Program (SHOPP). This is managed by Caltrans and updated biennially. This is primarily used for safety, preservation of existing facilities and operational improvements. It cannot be used to add extra lanes to existing facilities. Thus, this source is not available for recommendation R5 to increase the two lane section to four.

3. Active Transportation Program (ATP). These funds can be used for any project that promotes cycling and walking as well as safety and visibility for non-motorized travel.

4. Cap and Trade Proceeds. These funds are focused on projects that help reduce transportation-related emissions. Although much of this is directed to the California High-Speed Rail project, it could still provide suitable funding for some of the recommendations. It may also grow significantly if industries have to buy more credits.

5. Federal Funds. Congestion Mitigation and Air Quality (CMAQ) program can also be used for reducing transportation-related emissions. The Surface Transportation Program (STP) can fund safety, construction and operational improvements to any highways receiving federal aid.

6. Local Sales Tax Measures and other local funds. For self-help counties, sales tax revenues are eligible for use for transportation projects. Both Fresno and Tulare are self-help counties.

7. Traffic Congestion and Relief Programs (TCRP). Some $475 million remains available. Timing is uncertain on the sunset of this source.

8. Stimulus Funds. This was successfully used by agencies to fund transportation projects and may do again.

9. Trade Corridor Improvements Fund (TCIF) Program. A primary purpose of the interregional system is the efficient movement of goods. It could be used to channel funds from the cap and trade programs.

CSMP Potential Funding

In the CSMP [13] a number of funding sources were recommended to be considered for the improvement plans described. This included SHOPP, STIP, RIP, local and Measure R.

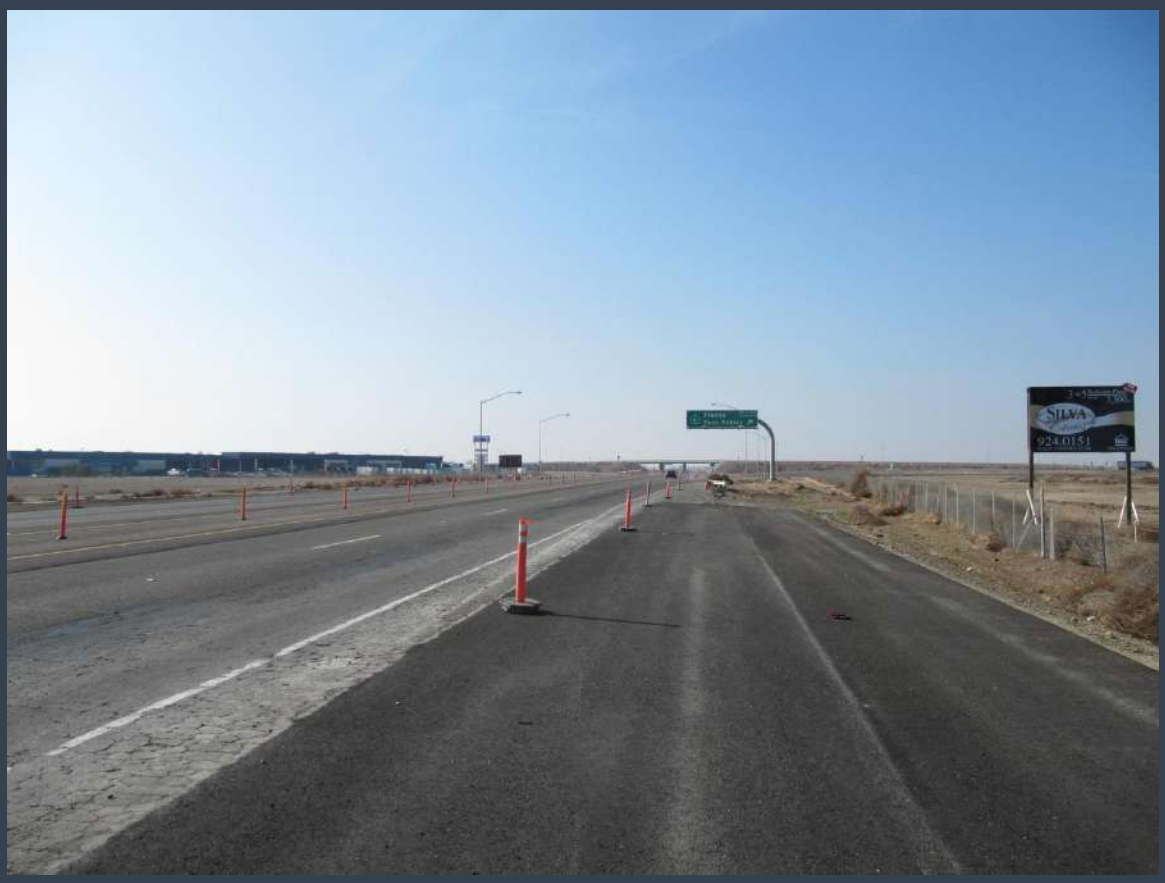
Fixing America's Surface Transportation (FAST) Act.

The President has signed into law the Fast Act, a five year, $305 Billion Bill – this includes $10.8 billion dedicated to freight infrastructure funding, according to the Coalition for America's Gateway and Trade Corridors (CAGTC). This will consist of $4.5 billion through a freight-specific competitive grant program and $6.3 billion through a freight formula program. This bill also allows project sponsors to use revenue from the Value Capture Financing Mechanism as local matching funds for capital projects and operating costs.[14]

Funds from this source may be available to be channeled through the systems mentioned above.

[13] Tables 6, 7, and 8; State Route 198 Corridor System Management Plan; February 2012; Caltrans
[14] AIAI Briefing: Fixing America's Surface Transportation (FAST) Act 12/04/2015

9 Community Outreach & Participation



9. Community Outreach and Participation

Introduction

Two types of outreach programs were held during the course of the study. The first was for a stakeholder advisory group and the second for the general public.

Three stakeholder meetings were held: the first was at the beginning of the study program in Hanford on April 4, 2014; the second a few months later on July 31, 2014 at Harris Ranch and the third on January 14, 2016, again at Hanford.

For the public Community Outreach, four meetings were held between April and July 2015 in strategic locations to cover the study area.

These are described in more detail below:

Objectives of the Outreach Process:

The meetings with stakeholders were held near the beginning of the study and the main intention was to gather information and draw benefit from local knowledge and user experience. Also, the view of facilities' users on possible solutions to the problems they had identified were sought. This was carried out with a workshop type of presentation.

The four meetings held for the general public had a different approach. The work done to identify existing conditions, socio-economic and business/industry background, the technical analysis and the recommended improvements were fully presented. The floor was then opened up to the public for discussion and to hear and note the responses and views expressed.

Throughout the project, many opportunities were made available for public input to the process. Two types of groups were involved throughout – the Stakeholder Advisory Group and the Community Workshops. All of the public interface meetings were well attended.

The workshops followed a consistent content, starting with a full PowerPoint presentation of the background, objectives, approach to the study and the results of surveys, research and performance appraisals. The workshops then moved to the major part where comments and questions were received from the public. There was strong input from the public and this is described in the following pages. Many interesting points were raised from local experience in using SR 198.

Postcards were also available which members of the public could enter their comments and points of view and submit to the consultant team. This made input available to those who didn't necessarily like to present in front of an audience.

At all times, Spanish translation facilities were available.

Summary of the Outreach Program

The following summarizes the outreach meetings that were held:

Meeting Type	Date	Location	No. of Attendees*
Stakeholder Advisory	04/04/2014	Hanford, Kings County	9
Stakeholder Advisory	07/31/2014	Harris Ranch, Coalinga, Fresno County	16
Stakeholder Advisory	01/14/2016	Hanford, Kings County	XX
Public Meeting No. 1	05/14/2015	Huron, Fresno County	12
Public Meeting No. 2	05/20/2015	LNAS, Kings County	17
Public Meeting No. 3	06/17/2015	Visalia, Tulare County	12
Public Meeting No. 4	06/25/2015	Fresno, Fresno County	23

*Excluding the consultant team

Summary of Comments Received

Introduction

The comments and information gained from Stakeholders are presented first, followed by those from the public meetings. These are summaries of the main points. Full details are in Appendix X. **Note: C** = Comment; **R**= Response

Stakeholders

1) **C:** The SR 198 should be upgraded to a four-lane route from LNAS to the I-5.
   R: That is one of the study recommendations for the long-term improvement.

2) **C:** Unrestricted access to the two-lane section of SR 198 by agricultural vehicles was an issue for traffic flow and road safety
   R: A number of safety measures are recommended for the short-term to address this.

3) **C:** The 9th Avenue SR 198 interchange should be grade separated.
   R: This would need to be subject to a further specific study.

4) **C:** Further development at the LNAS could increase traffic generation.
   R: The LNAS Installation Master Plan will detail this.

5) **C:** The SR 198 and SR-269 interchange is frequently flooded with heavy rain.
   R: The information will be forwarded to Caltrans.

6) **C:** Fog is a major safety issue.
R: The short-term recommended improvements include high-visibility striping and signing.

7) **C:** There is the potential for developing increased economic activity in Huron, south of the SR 198.
R: The travel demand situation is under constant review, so official updated forecasts would be included in any revision to the intersection analysis.

8) **C:** Signalized and roundabout solutions to interchange problems should be extensively considered.
R: These are features in the recommended improvements.

9) **C:** A Gate Interchange on SR 198 for LNAS is required.
R: Any future consideration would be subject to detailed design.

10) **C:** Accesses onto SR 198 required reviewing.
R: These would be subject to design for the improvements recommended.

11) **C:** There were a number of potential major traffic-generating developments in the area, particularly around Highway 41, north of SR 198.
R: Travel demand is under constant review and new developments proposed would be within any further analysis.

12) **C:** The interchange of Highway 41 with SR 198 had a number of road safety hazards.
R: This has been passed to Caltrans for further study.

13) **C:** The use of level-of-service (LOS) as a performance metric for congestion – has it been replaced?
R: No. It is used for this study, as well as others.

14) **C:** Impact of the California water drought on agriculture industry and consequent traffic levels.
R: The traffic analysis took account of the current drought situation and the forecast figures are a "neutral" period, i.e., an average normal, non-drought condition.

The General Public

1) **C:** Passing lanes should be considered in the short-term, not the long-term.
R: Currently in the medium-term.

2) **C:** The SR 198/SR-269 interchange was in urgent need of replacement with a controlled layout. Preferably a roundabout. No other equivalent route had four-way stops. Peak congestion was a problem.
R: This is recommended as a short-term improvement.

3) **C:** Safety hazards were numerous when normal road traffic tried to pass slow-moving agricultural vehicles.
R: The short-term measures would help this, but the passing lanes would be a progressively better solution until funding was available for the full conversion to four lanes.

4) **C:** Bad visibility from fog was a road safety issue.
R: High visibility signing and striping would assist in reducing this hazard together with the replacement of four-way stop intersections with ones with signal or infrastructure controls.

5) **C:** The amount of mud left on the road by agricultural vehicles presented a hazard for traffic, obscuring road striping and the location of the edge of the roadway.
R: See #4 Response. This may also be a roadway maintenance issue.

6) **C:** The very heavy loads carried by a large volume of truck traffic were breaking up the road pavement and is presenting a hazard.
R: This is dealt with in the section on "Roadway Pavement Analysis."

7) **C:** The transition from the four-lane section to the two-lane section of SR 198 caused a congestion "plug" to form at peak times.
R: This would be relieved to an extent by all the improvement measures, but not finally resolved until the two-lane sections were replaced by four lanes.

8) **C:** It was queried whether frontage access would be maintained with a four-lane system from the existing two lanes.

R: The conversion of a two-lane section to a four-lane section would be the subject of a full detailed design that would consider all functions of the route.

9) **C:** There existed several safety hazards at the interchange of SR-41, with SR 198, on the SR-41. Trucks crossing the median on the SR-41 at the interchange had insufficient storage space and presented a severe hazard to moving traffic. There were also issues of vehicle separation facilities at this interchange.
R: This full information had been passed to Caltrans, who is carrying out an investigation.

10) **C:** As there are higher traffic volumes on SR-41 than SR 198, why was SR-41 not being studied, as well as SR 198?
R: Each route is studied in its own right and this study concentrated on SR 198. Other studies may be directed to SR-41.

11) **C:** The gate entrance arrangements for LNAS under future conditions of increased development could become hazardous.
R: The issues for the LNAS were constantly under review both from a development and infrastructure point of view. When the NAS Master Plan becomes an official document, all

planned development will go into any future forecasts of travel demand. The intersection infrastructure is also considered in the improvement recommendations.

12) **C:** How was the time phasing of the improvements identified?
R: The phasing is related to the incremental increases in demand using roadway level-of-service as a metric. This is constantly under review and may change if there are changes in the forecast level-of-travel demand.

13) **C:** Was the increase in the future of the I-5 to fully six lanes from four accounted for in the study?
R: The planned improved capacity for both the I-5 and SR-99 are taken into account in the travel demand projections.

14) **C:** Was the Sustainable Community Strategies (SCS) taken into account in the study?
R: The SCS was not in existence when the study commenced, but will play into later stages as the project proceeds to implementation.

15) **C:** Had an Environmental Impact Report (EIR) been done for the study?
R: The EIR process will come into later stages of the process.

16) **C:** Was Vehicle Miles Traveled (VMT) a statistic that should be used for the study?
R: VMT is not predicted to significantly change for this route between a "No build" and project scenario as reassignment of traffic is unlikely. Traffic operational metrics are more relevant for the analysis for this study.

17) **C:** Was there any loss of farmland with the recommended improvements?
R: Right-of-Way (ROW) acquisition for improvements will be part of the detailed design processes for each individual improvement.

18) **C:** Dust storms presented a driving hazard reducing visibility.
R: The high-visibility striping and signing recommended will help to mitigate these operational hazards.

10 The Incorporation of the LNAS

10. The Incorporation of the LNAS

The NAS is developing a Master Plan for future capital improvements to respond to development generating increased travel demand. Both analysis and urban design and visioning will go into this Master Plan.

NAS is planned to be a Master Jet Base that will incorporate changing technologies and weapons systems. Currently, the population is approximately 12,000.

The proposed installation Master Plan considers not only the entire footprint of the base, but the outside areas, as well. This will contain the NAS LNAS Vision, Life Cycle Costs and a base-wide Mobility Plan.

The plan will have a number of specific elements, but those related to the SR 198 include, under an access and mobility heading:

- Gates and entries
- Parking
- Pedestrian and bike paths
- Shuttle and Bus Services

Entry and egress and the timing of travel demand during the day are clearly key issues for the operational conditions on the SR 198.

As more information from the Master Plan becomes available, a travel demand review of the additional impacts generated by the new proposals will need to be incorporated into the planning process for HSR 198 enhancements program. This will require a multi-modal assessment of travel demands for both people and goods. The intersection of the LNAS gates access road with SR 198 will, in particular, require investigation and analysis to determine any necessary improvement.

11 Community Impact Assessment

11. Community Impact Assessment

The SR 198 Corridor Preservation and Improvement Strategic Plan sets out a number of recommended improvements for the section of SR 198 between the LNAS and the I-5.

A final Community Impact Assessment will be completed as a part of ongoing procedures for taking the recommendations through to implementation. At this stage, a brief preliminary discussion is included. This section of the plan relates to potential land use and socio-economic impacts associated with the recommended improvements for SR 198.

This is a phased plan that progressively improves traffic operations and conflicts at the section of SR 198 under consideration. The short-term recommendations would improve safety and resolve unsatisfactory intersection arrangements. In the medium term, the capacity would be improved by introducing passing lanes, allowing overall improvements in journey times and journey time reliability and further intersection improvements. The longer term includes full dualization with the SR 198 then becoming a continuous four-lane route between I-5 and SR-99.

Land Use

Widening of SR 198 would be consistent with local planning goals and policies. The proposed projects would be compatible with surrounding uses. The implementation of passing lanes and upgrading to four lanes will require right-of-way acquisitions from adjacent farmlands, although this should be minimal. Some of the currently carried out accesses/egresses to the SR 198 from agricultural land may have to be more formalized to conform to new highway design standards. No full-grade separation of intersection is currently contemplated.

Growth

The proposed widening and other interim measures would not open new areas to unplanned growth or commercial development. It would however improve capacity and operational efficiency to accommodate projected 2040 traffic compatible with the growth assumption by Kings, Tulare, and Fresno Council of Governments in their long-term planning programs. The proposed projects are unlikely to affect the location, distribution, density or projected growth rate of the population.

The longer term recommended measures are likely to encourage confidence in attracting planned increases in industrial and commercial development and the generation of increased employment.

Community Character

The implementation of the recommendations would result in short-term effects in the farm operation related to the construction. The current SR 198 is an established line of severance and no new severance would be introduced.

The recommended projects would not adversely change the overall character or lifestyle associated with the established residential or commercial areas located on both sides of the SR 198. Minority and low-income groups would not be disproportionately affected by the implementation of the proposals.

Traffic and Transportation/Pedestrian and Bicycle Facilities

The project's long-term operational effects would be beneficial in nature, as the roadway widening and intersection improvements would result in improved levels of service over the "No Build" alternative. Specifically, both travel time and peak hour performance would be improved via the widening of SR 198.

No designated bike or pedestrian trails or paths exist along SR 198 within the vicinity of the project study area and none are designated in the applicable General Plan. Though bike paths may not be formally designated, there are no restrictions on bicyclists using SR 198. Sidewalks are provided in some locations throughout the study area. The preliminary design will not place any restrictions on the use of SR 198 by bicyclists or pedestrians. Therefore, no related impacts would occur. In general, all the recommended improvements would reduce the impact of road accidents on all users.

Public Involvement

Public involvement opportunities will occur during the review of the environmental document that will be prepared for detailed design of the improvements consistent with the California Environmental Quality Act and the National Environmental Policy Act.

Environmental Justice & Disadvantaged Communities

Any project that may come out of the SR 198 enhancement program will need to be developed in accordance with Title VI of the Civil Rights Act of 1964, as amended, and Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations". Title VI states that "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Executive Order 12898 requires each federal agency (or its designee) to take the appropriate and necessary steps to identify and address "disproportionately high and adverse" effects of federal or federally funded projects on minority and low-income populations.

Any analysis for environmental consequences would need to consider whether there would be a disproportionate number of minority, elderly, or low-income groups that would be potentially affected by the proposed recommended enhancements to SR 198.

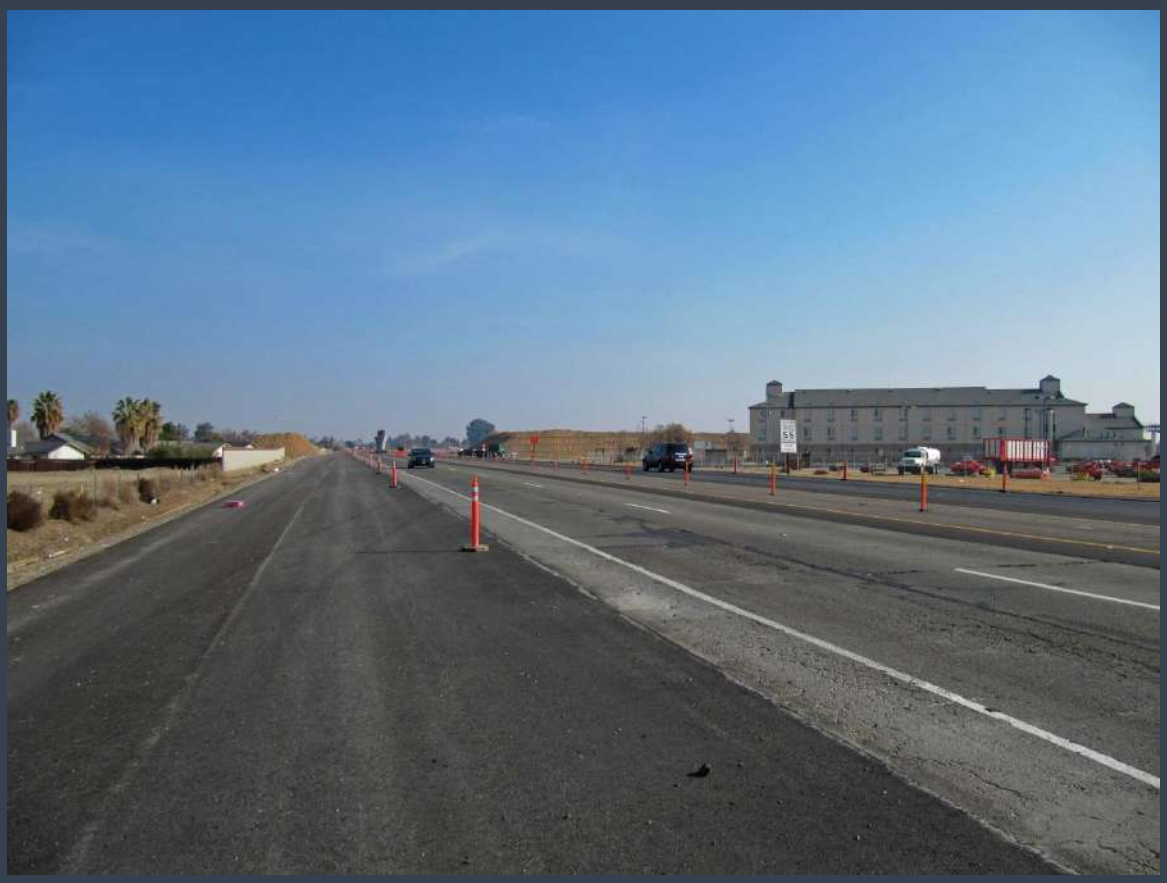
Since the enhancements would improve traffic flow, and no increases in demand are likely, the quantity of air emissions would be reduced compared to the No Build condition. The enhancements would not necessitate any modifications to transit operations, which is often a concern to minority elderly or low-income groups who are more likely to be transit dependent.

The construction of the enhancements would not be likely to result in impacts to facilities that provide services to minority, elderly or low-income groups.

This would be subject to a more rigorous and detailed analysis at a further stage in the process of taking the enhancement recommendations to implementation.

But it is likely that Environmental Justice will not be an issue and that no minimization or mitigation measures would be required on the basis of environmental justice.

12 Conclusions & Recommendations



12. Conclusions and Recommendations

Conclusion

The study work carried out on this project to develop this plan included new traffic surveys, re-forecasting of future demand capacity analysis, identification of improvements and evaluating the performance of those improvements. A pavement condition assessment was also carried out.

Extensive public outreach exercises were conducted with both stakeholders and the public in a number of different locations in the study area. Although all the recommended improvements can be justified, both on a capacity analysis basis and performance against the normal metrics used for infrastructure improvement appraisals, the public outreach exercise identified a number of other issues of concern. These concerns do not normally feature in exercises of this nature, but are driven by the multi-functionality of the section of the SR 198, the climatic conditions and its future role to stimulate the economic well-being of the area.

There is little doubt of the strategic significance to California, the San Joaquin Valley and the Counties of Kings, Fresno and Tulare of SR 198 and its ability to provide a high level of accessibility for goods and people. However, the section of SR 198 under review for this plan relates strongly to origins and destinations in Kings County.

Kings County itself has substantial "in and out" movements for both jobs and goods. Around 50% of Kings County employees work outside the County and the same approximate percentage number of places of employment with the County are filled by those from outside.

Much of the goods shipped into Kings County are processed and then shipped out again. These are titled intermediate goods and represent some 30% of the total goods for the County.

Thirty-six percent of jobs in Kings County are related to the transportation industry, either directly or indirectly. Thirty-one percent of the gross regional products are similarly related. The SR 198 is a major transportation artery to Kings County and its importance is clear from the clusters of industry and commercial operations surrounding it.

There is currently considerable focus on the "first mile/last mile" access to major freight generators and the SR 198 forms a critical part of the hierarchy of accessibility that feeds traffic into the major San Joaquin Valley North-South links of I-5 and SR-99. To fully realize the benefits of the planned capacity improvement for SR-99 and I-5, the feeder routes should be able to fully support their function with equivalent accessibility.

Although the current forecasts of traffic demand taken at purely their numeric value would only justify an upgrade to four lanes by 2040, the composition of traffic is not characteristically typical of the average route. Between LNAS and the I-5, truck traffic represents 18% of all traffic during the day. This constitutes a higher level of driving stress for all vehicles than the average.

On single two-lane routes, the speed of traffic is often controlled to the slowest moving vehicle or platoon of vehicles on the road, which when combined with high truck traffic content can seriously reduce operating efficiency. In the case of SR 198, it is exaggerated by the addition of slow-moving agricultural vehicles that frequently move along and access the highway. Fully loaded trucks also generally have a lower accelerated capability to overtake slow-moving vehicles. These types of factors are not always clearly identified in the purely technical analysis.

Another critical element that is also not clearly significant from the technical analysis is the visibility issues associated with this section of the SR 198. Fog, particularly in the early morning commute times, can be dense and therefore hazardous to traffic. Single-lane roads and poor quality intersections combined with the consequent poor visibility form significant road safety hazards.

Another visibility issue that is generated by the dry climate and surrounding farmland is that of dust clouds and farm dirt deposited on the roadway by agricultural vehicles. The dust clouds are a driver visibility problem and the dirt on the roadway obscures central striping and the delineation of the edge of the roadway.

The layout of the section of the route also allows for undisciplined and random entry and egress onto the roadway by slow-moving agricultural vehicles, whereas a four-lane modern highway designed to the appropriate standards, would formalize and manage crossing and entry/exit points.

The community impact of the recommended improvements is likely to be marginal and totally dwarfed by the considerable benefits. There will be a slight loss of land for ROW for new intersection, passing lanes and full four-lane construction. This should not be detrimental to local communities.

Kings County and surrounding areas are likely to achieve greater growth than the state average and there is a huge potential for economic stimulation activity that can attract further industrial and commercial development with its consequent increases in employment. By upgrading the remaining section of SR 198 between SR-99 and I-5 and to therefore have a full four-lane route for its entirety would enhance freight mobility and economic activity for all parts of the three counties that it crosses.

Recommendation

I-5 to LNAS

The following are the recommended improvements, phased between now and 2040:

Table 12.1 – Summary of Recommended Enhancements I-5 to Lemoore NAS

Improvement		Time Frame	Comments
R1	Raised /Reflective Pavement Markings	Short-Term	Improves Safety and Quality of Service
R2	Traffic Signal/Roundabout at SR 269	Short-Term	Removes Requirement for All SR 198 Through Traffic to Stop at Intersection
R3	Passing Lanes	Medium-Term	Improves Travel Time for Through Traffic on SR 198
R4	Traffic Signal/Roundabout at Commercial Driveway	Medium-Term	Resolves Intersection Capacity Issues
R5	Widen to Four Lanes	Long-Term	Improves Travel Time and Resolves Capacity Issues
R6	ITS Improvements	Various	Per SR 198 Corridor Sytem Management Plan

Raised/Reflective Pavement Markings (Short-Term) (R1)

The SR 198 roadway from I-5 to the LNAS generally is built to current standards and includes the safety features that would typically be included on a two-lane rural highway. However, it is expected that improved safety and visibility and a greater degree of driver comfort could be achieved by taking

advantage of the latest technology in raised and reflective pavement markings. Further analysis could lead to specific pavement marking details that would be appropriate for this corridor.

Traffic Signal/Roundabout at SR 269 Intersection (Short-Term) (R2)

This intersection is currently controlled by four-way stop control. While this type of control is considered to be safer than two-way stop control for the current levels of traffic, it does require all through vehicles on SR 198 to come to a complete stop prior to travelling through the intersection. Installation of a less restrictive form of traffic control (i.e., traffic signal or roundabout) would reduce travel time for through vehicles on SR 198 and would allow for a higher quality experience for drivers.

Passing Lanes (Medium-Term) (R3)

Although widening to four lanes is an ultimate goal for SR 198 between I-5 and the LNAS, the installation of passing lanes would be an interim step that would improve travel times and level of service. It is accepted that passing lanes are more normal in mountain areas where visibility is limited by road geometry. However, the multi-functional use of this route means that out-of-the-normal conditions may apply at times.

Traffic Signal/Roundabout at Commercial Driveway West of I-5 (Medium-Term) (R4)

This intersection is currently controlled by two-way stop control. Intersection capacity analysis indicates that this intersection will experience level of service F conditions in the PM peak hour prior to 2040 and improvements will be desired.

Widening to Four Lanes (Long-Term) (R5)

Widening to four lanes is a desirable improvement for SR 198 between I-5 and the LNAS in order to provide a continuous four-lane roadway between I-5 and SR-99 and to improve travel time and level of service.

ITS Improvements (Various) (R6)

The previous SR 198 Corridor System Management Plan (February 2012) recommended a number of ITS improvements along SR 198 between I-5 and the LNAS. These included changeable message signs, highway advisory radio, and traffic count stations. The more detailed analysis of conditions included in the current SR 198 Corridor Preservation and Improvement Strategic Plan did not cause a change in conclusion with regard to ITS improvements and it is recommended that all improvements from the Corridor System Management Plan be carried forward.

It may be beneficial to put additional detection loops or equivalent ITS elements to continually collect and monitor vehicular operations in the corridor.

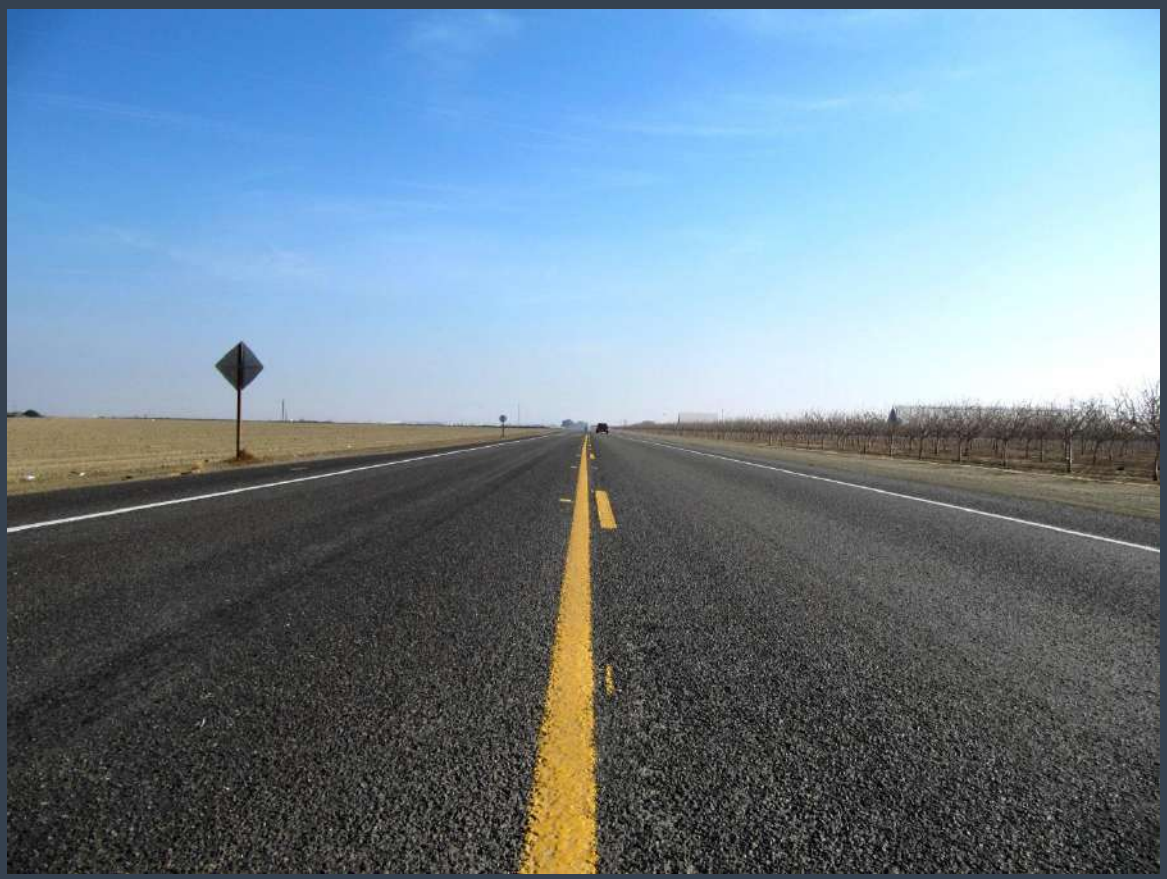
It is further recommended that due to the specific multi-purpose nature of the route, climactic conditions, the high reliance on transportation by the economy of the area, and well above average proportion of truck traffic, that consideration be given to accelerating the planning of these improvements.

LNAS to SR-99

The segment of SR-99 from the LNAS to SR-99 was analyzed at a lesser level of detail in the current Corridor Preservations and Improvement Strategic Plan than the segment from I-5 to the LNAS.

However, interchange analysis was conducted at several interchanges and a need for future improvements was identified at two locations: The interchange at Hanford Armona Road and the intersection at 9th Avenue. In both of these cases, a need for enhancement was also identified in the previous SR 198 Corridor System Management Plan. Therefore, it is considered appropriate to carry forward the enhancement recommendations from that study.

Appendices



Appendix A

Acronyms and Abbreviations

AADT – Average Annual Daily Traffic

ADT - Average Daily Traffic

ATP – Active Transportation Program

AVE – Avenue

B/C or BCR – Benefit to Cost Ratio

BNSF – Burlington Northern Santa Fe

BRT – Bus Rapid Transit

CAGTC – Coalition for America's Gateway and Trade Corridors

CalVANS – California Vanpool Authority

CBA – Cost Benefit Analysis

CCTV – Closed Circuit Television Cameras

CFMP – California Freight Mobility Plan

CMAQ – Congestion Mitigation and Air Quality

COG – Council of Governments

CSMP – Corridor Systems Management Plan

DOTP – Division of Transportation Planning

EB – East Bound

EIR – Environmental Impact Report

EJ – Environmental Justice

FAF – Freight Analysis Framework

FAST – Fixing America's Surface Transportation

FCOG – Fresno Council of Governments

FHWA – Federal Highway Administration

FRE – Fresno County

GRP – Gross Regional Product

HMM – Hatch Mott MacDonald

I – Interstate

IIP – Interregional Improvement Program

IMPLAN – Impact Analysis for Planning

IRI – International Roughness Index

IRRS – Interregional Road System

ITS – Intelligent Transportation System

ITIP – Interregional Transportation Improvement Program

ITSP – Interregional Transportation Strategic Plan

JCT – Junction

KCAG – Kings County Association of Governments

KIN – Kings County

LNAS– Lemoore Naval Air Station

LOS – Level of Service

MIP – (San Joaquin Valley) Model Improvement Plan

MPO – Metropolitan Planning Organization

MTC – Metropolitan Transportation Commission

NAS – Naval Air Station

NB – Northbound

NHS – National Highway System

NTN – National Truck Network

PCR – Pavement Condition Report

PCS – Pavement Condition Survey

PDT – Project Development Team

PSR – Project Study Report

RGDP - Regional Gross Domestic Product

ROW – Right-of-Way

RTIP – Regional Transportation Improvement Program

RTPA – Regional Transportation Planning Agency

SB – Southbound

SCS – Sustainable Community Strategies

SHOPP – State Highway Operation and Protection Program

SJV – San Joaquin Valley

SJVTPA – San Joaquin Valley Regional Transportation Planning Agencies

SR – State Route

STAA – Surface Transportation Assistance Act

STIP – State Transportation Improvement Program

STP – Surface Transportation Program

STRAHNET – Strategic Highway Corridor Network

TAZ – Transportation Analysis Zones

TCAG – Tulare County Association of Governments

TCIF – Trade Corridor Improvement Fund

TCRP – Traffic Congestion and Relief Program

TUL – Tulare County

UP – Union Pacific Railroad

UPRR – Union Pacific Railroad

V/C – Volume/Capacity Ratio

VHT – Vehicle Hours Traveled

VMT – Vehicle Miles Traveled

WB - Westbound