LAKE 29 IMPROVEMENT PROJECT
PROJECT REPORT
For Project Approval

California Department
Of Transportation

Lake County/City Area
Planning Council

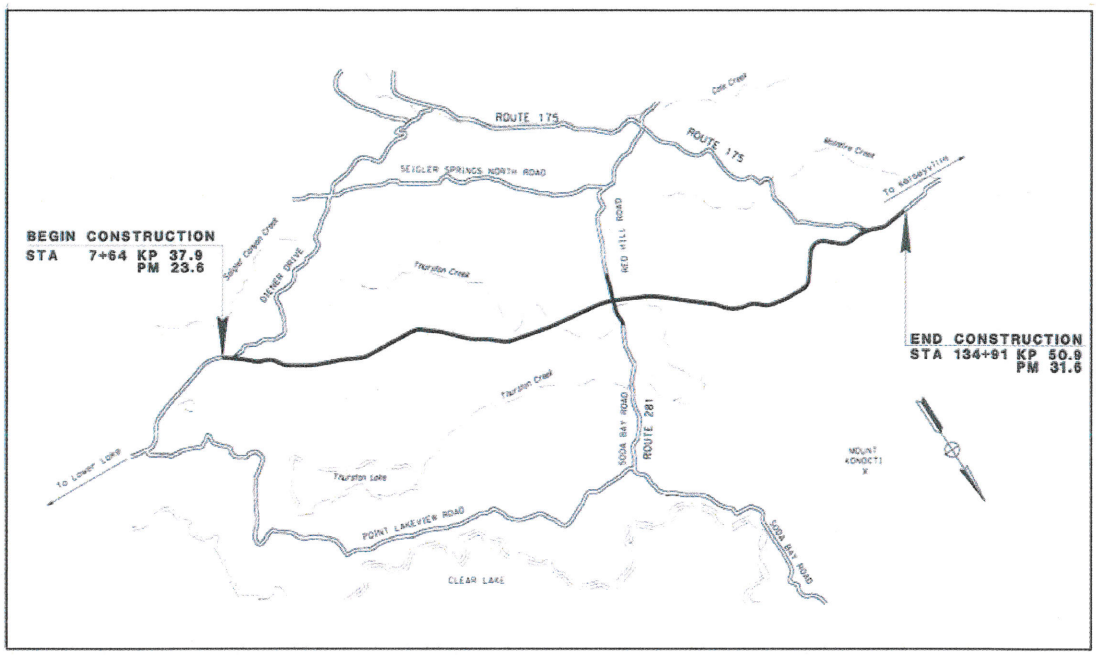
Federal Highway Administration

1-Lak-29 PM 23.6/31.6
EA 01-2981U0
EFIS 01 0000 0090
Responsible Unit 03-0311
NOVEMBER 2016

LAKE 29 IMPROVEMENT PROJECT

PROJECT REPORT

FOR PROJECT APPROVAL



In Lake County On Route 29 Near Lower Lake
From 0.1 miles (0.2 KM) South Of Diener Drive To
0.6 miles (0.9 KM) North Of The State Route 175 Intersection

I have reviewed the right of way information contained in this Project Report and the Right of Way Data Sheets attached hereto, and find the data to be complete, current, and accurate.

Robert Close for

KAREN HAWKINS, NORTH REGION DIVISION CHIEF – RIGHT OF WAY

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APPROVED:

TIM CRAGGS, DISTRICT 1 DIRECTOR (INTERIM)

11/30/16

DATE

This Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Mark Sobota

MARK F. SOBOTA, REGISTERED CIVIL ENGINEER

11/30/16

Date

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1. INTRODUCTION

As required in the Project Development Procedures Manual (PDPM), this Project Report has been prepared to present and document the recommendation for project approval with Alternative D as the preferred alternative for the Lake 29 Improvement Project.

Prior to this report, a Draft Project Report (DPR) was approved on June 29, 2007 to document the initial analysis of all alternatives considered. Although the merits of the analysis in the DPR remained valid, an Amendment to the 2007 Draft Project Report was approved on May 18, 2016 to authorize release of a Revised Partial Draft Environmental Impact Report/Environmental Assessment (RDEIR/EA). The RDEIR/EA documented significant new information obtained from additional environmental studies that were performed after the DPR. The RDEIR/EA also analyzed impacts that cost saving recommendations made in the 2008 Value Analysis Study would have on the project.

The project proposes to widen a portion of State Route (SR) 29 in Lake County from an existing two-lane conventional highway to a four-lane divided expressway with access control (PM 31.1/31.6 is already an expressway). The 8.0 mile project corridor is roughly located between the communities of Lower Lake and Kelseyville. More precisely, the proposed improvements would occur from east of the intersection with Diener Drive at post mile (PM) 23.6 to west of the junction with SR 175 at PM 31.6 (Attachment A). The end goal of the project is to improve east-west[1] connectivity, relieve congestion, reduce delays and improve safety for interregional traffic on SR 29. The project is referred to as the Lake 29 Improvement Project and is included in the Lake County/City Area Planning Council (APC) 2010 Lake County Regional Transportation Plan (RTP).

The project would likely be constructed in phases (segments) as full funding sources have not been identified. The recommended sequence of construction will be to construct the 8.0 miles in three segments, proceeding from west to east. It is proposed to first construct the segment from approximately PM 28.5 to 31.6, then the segment from PM 26.1 to 29.1, and lastly the segment from PM 23.6 to 26.9. These segments are referred to herein as Segments 2C, 2B and 2A, respectively. Maps included in Section 1.4.2 of the FEIR/EA graphically display the locations of these segments.

Existing funding for the project is currently split between several programs within the State Transportation Improvement Program (STIP) and the Highway Safety Improvement Program of the State Highway Operation and Protection Program (SHOPP). The SHOPP & STIP funding will provide the necessary funding for construction, right of way and support capital through construction for Segment 2C (PM 28.5/31.6) with a delivery date in the FY 2018/19.

This project has been assigned Project Development Category 1[2] because it involves conversion of a conventional highway without access control to an expressway with access control. The project falls into this category on account of the project requiring new right of way, route adoption, freeway agreement, and relinquishment agreements.

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[1] Although SR 29 is considered a northbound/southbound highway, the roadway trends east/west in the project corridor. Except where the specific direction of travel on SR 29 is discussed (northbound or southbound), or unless otherwise noted, the directions of east and west are used in this document.

[2] Project development categories have been established to assure that project-related differences and state and federal requirements are addressed in the project development process. Each category consists of groups of projects having similar characteristics and therefore similar development procedures.

Some of the legacy deliverables from the 2007 Draft Project Report (DPR) that are included as attachments to this PR were prepared prior to Deputy Directive DD-12-R1, which transitioned the Department back from the Metric System of measurement to U.S. Customary units (English) in 2006. In the interest of preserving resources, these deliverables have not been converted to the English System and thus, some materials within this report are in Metric System units. All products developed after the DPR was approved and future products after this PR is approved will conform to the requirements of DD-12-R1.

Project Limits	*D1-LAK-29* *PM 23.6/31.6*	
Number of Alternatives Considered in this PR	*2, including no build*	
	Current Cost Estimate	**Escalated Cost Estimate**
Capital Outlay Support	Due to this project's funding and programming complexities, please see Section 8 for a breakdown of project estimates, funding and programming.	
Capital Outlay Construction		
Capital Outlay Right-of-Way		
TOTAL COSTS		
Funding Source	**2016 STIP:** *20.XX.075.600 (RIP*)* *20.XX.025.700 (IIP*)* *Demonstration Funds (SAFETEA-LU*)* **2016 SHOPP:** *20.XX.201.010 (HSIP*)*	
Programmed Funding Year	*FY 2018/19 (Segment 2C, STIP)* *FY 2017/18 (Segment 2C, SHOPP)*	
Type of Facility	*4-lane expressway with frontage roads*	
Number of Structures	*2 retaining walls* *4 multicell, box culvert crossings*	
Primary SHOPP Project Output	*289 Collisions Reduced over Project Life (Segment 2C only)*	
Environmental Determination or Document	*CEQA: Environmental Impact Report (EIR)* *NEPA: Environmental Assessment (EA)*	
Legal Description	*In Lake County On Route 29 Near Lower Lake From 0.1 miles (0.2 KM) South Of Diener Drive To 0.6 miles (0.9 KM) North Of The State Route 175 Intersection*	
Project Development Category	*Category 1*	

*RIP: Regional Improvement Program
*IIP: Interregional Improvement Program
*SAFETEA-LU: Transportation Equity Act-21 and Safe, Accountable, Flexible, Efficient Transportation Equity Act: A legacy for Users
*HSIP: Highway Safety Improvement Program

2. RECOMMENDATION

A full Project Development Team (PDT) which included members of outside agencies such as the County of Lake and the Lake County/City Area Planning Council (APC), met on October 11, 2016 for the purpose of reaching a consensus on a preferred alternative and recommendation of project approval. At that time, the PDT agreed to recommend Alternative D as the preferred alternative because it would meet the purpose and need of the proposed project while avoiding and minimizing impacts to environmental resources. Over the course of the project development, the County of Lake and the Lake County/City APC have been consulted with respect to the recommended plan and these agencies views have been considered in the project development. These agencies are in general accord with the plan as presented.

Other future courses of action include:

- The Division of Design should recommend that the California Transportation Commission (CTC) adopt a route on the alignment of Alternative D as the SR 29 expressway. District 1 should negotiate and the Chief of the Division of Design should execute freeway agreements with Lake County using the superseding Freeway Agreement format.
- District 1 should also negotiate with Lake County for the County to accept portions of the Frontage Roads that will become public. These adoptions should occur after Caltrans acquires these lands from the existing owners. Transfer of title from State to County should occur through terms agreed to under the conditions of a standard form Relinquishment Agreement.
- Program/Project Management and Caltrans Headquarters should continue pursuing increased funding to meet the financial needs of the project as described in this Project Report. (See Section 8)
- Caltrans should proceed with the design phase for this project.

3. BACKGROUND

Project History

A Draft Project Report (DPR) was approved for this project on June 29, 2007. Included in that document is a complete project history, explanation of changes to three previously approved project development reports (Project Study Reports, PSR), and a record of engagements with the public; all of which precede the date of the approved DPR. Chapter 1.2.1 and 1.5 of the Final Environmental Impact Report/Environmental Assessment (FEIR/EA) included with this Project Report as Attachment E contains discussion on these aspects of the project history.

The DPR also included detailed descriptions and analysis for four build alternatives. In that document, these were referred to as Alternatives C1, C2, C3 and D. Signalization and interchange options for traffic handling at the intersection of SR 281/29/Red Hills Road were included as options to these alternatives. As Alternatives C1, C2 & C3 are not recommended for approval herein, full discussion on these alternatives' details and/or explanation of their elimination is deferred to the DPR or Chapters 1.5.1, 1.6 & 1.7 in the FEIR/EA (Attachment E). Details on the interchange options is also deferred because these were rejected in a Value Analysis Study, which is described later in this report (Section 6B).

The cross sections of all four alternatives are the same: 4-lanes, with 36 foot grassed medians as shown in Attachment C. The location of the alignment relative to the existing centerline is what separates the four alternatives. This is graphically shown in Attachment B. Briefly stated, C1 follows the existing centerline, C2 & C3 are 30' to the north or south of the existing centerline, respectively, while D meanders the landscape to avoid impacts. All four will be designed to a design speed of 68 mph.

Following the approval of the DPR on June 29, 2007, the Draft Environmental Impact Report/Environmental Assessment (DEIR/EA) was released to the public for review and comment. In conjunction with this release, a public hearing was held on August 8, 2007, for the purpose of soliciting input from the public and outside agencies. In consideration of the public and agency comments received at that time, Caltrans decided not to make findings pursuant to CEQA and NEPA and instead, decided to further evaluate project alternatives and cost saving measures.

As part of this further evaluation process and as required by FHWA, Caltrans commissioned a Value Analysis (VA) study in early 2008. The VA study generated 12 VA study alternatives spanning multiple areas of the project, both in design, construction and funding. At a joint Caltrans and Lake County/City APC staff meeting, six of the alternatives were accepted for inclusion into the project. The net savings from these VA alternatives was estimated to be $2,887,000 in 2008. Details on the VA Study are included in Section 6B.

One significant recommendation in the VA Study regarded segmentation of the larger project. To that end, engineering studies were performed to investigate potential phasing splits of the project. The goal of these studies was to evaluate not only the pros and cons of segmenting the 8-mile project, but also to evaluate whether splitting the project was feasible. Through the VA, it was recommended that the project be split into three segments with Segment 2C as being the segment to be constructed first as such a sequencing would have the best benefit to traffic operations.

In the years after completion of the VA Study, collaborative meetings were held between Caltrans and the utility companies that would be impacted by the project. These utility companies included PG&E (Transmission & Distribution), AT&T Legacy (Transcontinental Fiber Optic), AT&T (local service), and MediaCom (cable). The emphasis of these efforts were related to developing a utility corridor which would serve as a designated right of way for these relocated utilities.

A funding source in the form of the Highway Safety Improvement Program of the SHOPP was identified in 2013 for construction of Segment 2C. At this point, all the alternatives required modifications to implement changes resulting from the 2007 public hearing, comments received from the reviewing agencies on the 2007 Draft EIR/EA, the VA study, utility corridor refinement work, drainage system refinement work and other identified changes coming from the previous six years of activity. Also by 2013, ongoing environmental work as well as United States Army Corps of Engineers (USACE) jurisdictional changes impacted certain types of water resources, which the project had within the ESL. In addition, it had become clear that Alternative D had the least overall environmental impact of all the alternatives, especially relative to resources upon which a direct impact could not be tolerated by the resource agencies. Consequently it was decided that Alternate D would receive all required updates, as well as additional changes to reduce impacts. This alternative, once fully developed, was referred to as Alternative D and it was designated the Preferred Alternative for the project. It should be noted that the SR 29

mainline alignments and median width of all the alternatives had not changed from the alignments presented in the 2007 Draft EIR/EA.

Concurrently, it was decided that a partial recirculation of portions of the Draft EIR/EA was required due to the changes that had occurred, as well as the need to update the Natural Environment Study (NES) document. The 2007 DPR was amended in 2016 to authorize release of the Revised Partial Draft EIR/EA (RDEIR/EA). The RDEIR/EA document was subsequently recirculated from May 24, 2016 through July 7, 2016.

On June 8, 2016, a public hearing, open house forum style meeting was held at Lower Lake High School for the purposes of providing Caltrans the opportunity to update the public and local agencies on the 8-mile project's progress, as well as allowing the public and local agencies the opportunity to comment on the project. No change to the mainline engineering design of the Preferred Alternative, Alternative D, was required due to the circulation of the RDEIR/EA. However, in the future some modifications may be necessary as regulatory agency input is incorporated into the project as a result of permit process.

Community Interaction

Over the course of the project's development, agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including project development team (PDT) meetings, tribal and interagency coordination meetings/presentations, the development of a project website, and public meetings. In all, there have been three open houses/open forum meetings. Full detail on the open houses is provided in the FEIR/EA and each are summarized below.

In 2005 and 2006 and prior to the first open house, numerous on-site meetings were held with individual property owners to gather information for design of the frontage road system for the expressway alternatives. These owners controlled approximately 60% of the parcels that would be directly impacted by project construction. Additional on-site meetings with individual property owners and design staff were held at the owner's request to answer questions concerning this project. In many cases, project information packets were provided to owners that had specific questions related to how the project would impact planned and/or current use of their property.

The first public hearing, open house forum style meeting was held at Konocti Harbor Resort and Spa in Kelseyville on September 26, 2006. The purpose of the open house was to inform the public, local officials, and all interested parties of the current status of the project. Approximately 50 people, mostly property owners within the project area, attended the open house, and nine people commented (with one person commenting twice). Of the comments received, the prevailing concerns expressed in the comments were either on the proposed design including the alternatives, suggested changes to project limits, or concerns over proposed access. The second most common category of comment was tied to comments about safety, including concerns about accidents within the project area as well as accidents on other segments of SR 29.

The second public hearing, open house forum style meeting was again held at Konocti Harbor Resort and Spa in Kelseyville on August 8, 2007. The timing of this meeting was tied to the release of the Draft EIR/EA. Approximately 30 people attended the meeting, consisting mainly of property owners within the project limits. During the public hearing, a total of seven people entered formal statements with the court reporter and one person filled out a comment card. In response to the circulation of the Draft EIR/EA, an additional six comments were received by mail from various state and federal agencies and one from

a local governmental agency. Comments received from the hearing are included in Section 4.5 of the FEIR/EA (Attachment E). In general, these comments were related to ingress/egress from individual properties, safety concerns, and environmental resource protections.

The third public hearing, open house forum style meeting was held on June 8, 2016 at the Lower Lake High School. The purpose of the meeting was to update the public and local agencies and invite their comments on the project. Twenty participants attended the meeting. Comments from the meeting are included in the Final Environmental Document, which is included as Attachment E. In general, most of the comments received were from residential property owners that had concerns about how the project impacted their access, use of their land, project schedule, or amount of acquisition needed by the State. Some of the comments from local businesses were related to project impacts to their operations such as grape transport truck maneuvering on frontage roads.

Existing Facilities

SR 29, in District 1, traverses south-central Lake County from the Napa/Lake County line to its terminus at Route 20 near Upper Lake. Route 29 is a major all-weather route used by passenger and commercial vehicles to access communities in Lake County and Napa Valley. Functionally classified as a rural principal arterial from its junction with Route 53, PM 20.3, to the terminus at Route 20, PM 52.5, the route is a Federal Aid Primary Route. This portion of SR 29 combines with Routes 20 and 53 to form the west/east Principal Arterial Route from Route 101 to Interstate 5. It is also a terminal route for Surface Transportation Assistance Act (STAA) interstate trucks.

SR 29, from Lower Lake (PM 20.3) to South Lakeport (PM 40.9), is two-lane expressway or conventional highway with 12 foot wide lanes and 1-8 foot paved shoulders. The segment from PM 40.9 to PM 48.4 is a 4-lane freeway with a 36 foot median.

SR 29 from the community of Lower Lake to the community of Kelseyville is primarily a mix of open space scenic corridor with some low to moderate density residential development. Property adjacent to the project is primarily zoned as Rural Lands and Agriculture Districts, under the Lake County General Plan and Zoning Ordinance. This project segment of SR 29 traverses rolling to semi-mountainous terrain.

The proposed project limits begin approximately 0.1 miles east of the intersection with Diener Drive and proceeds west to about 0.5 miles west of the SR 175 intersection. The beginning end of the project limits matches into the ending of a 2.3 mile long passing lane section for northbound (NB) traffic climbing up Glasgow Grade (PM 21.5-23.8). For southbound (SB) traffic, this project transitions into a single lane going down Glasgow grade. At the end of project the project limits, this project transitions to and from existing single NB and SB lanes.

The project portion of SR 29 was originally a county road that was brought into the State Highway System in 1951. Limited geometric improvements were made to the road at that time. Since 1951, additional limited improvements have been made, but the facility has never been brought up to a consistently applied design speed[3] and the majority of the road follows the 1951 alignment. Consequently, nonstandard geometric features exist along the

[3] Design speed is defined as the "the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern."

route. There are limited passing opportunities, and long queues of cars follow slower-moving vehicles or trucks, creating congestion and unstable traffic flow.

Within the project area and except for about 0.5 miles on the west end which is an expressway, SR 29 is a 2-lane conventional highway with a posted speed limit of 55 mph. Lane widths are 12 feet wide. Paved shoulders vary between 1 and 8 feet wide. The existing horizontal alignment provides for a design speed of about 51 mph; horizontal curve radii range from 900 feet to 3500 feet. The existing vertical alignment includes a number of sustained grades greater than 5% and varies to less than 0.3%. The existing right of way within the project limits is 60 feet with some widening along curves and at the intersection of SR 29/281/Red Hills Road.

Within the project limits, the only geometric improvements to the highway in the last 15 years was a 2006 project that adjusted the vertical alignment from PM 27.4 to 28.0 (EA 01-41020). Another project (EA 01-47200) installed a signal at the intersection of SR 281/29/Red Hills Road in 2007.

4. PURPOSE AND NEED

4A. Problem, Deficiencies, Justification

- **Project Purpose**

The purpose of this project is to:

- Facilitate the efficient flow of goods and service through Lake County.
- Provide a modern transportation facility that will provide adequate capacity to accommodate anticipated traffic growth.
- Provide a facility with the potential for diverting through traffic (including through truck traffic) from north shore SR 20.
- Accommodate local planning goals as set forth in the 2010 Lake County RTP.
- Help achieve the goals of the Caltrans 2015 *Interregional Transportation Strategic Plan* (ITSP).
- Improve the safety and operation of SR 29.

- **Project Need**

The need to provide a safe, reliable and modern transportation facility along SR 29 has been long recognized. SR 29 is a Federal Aid Primary Route that together with SR 20 and SR 53 (around the south shore of Clear Lake) forms the Lake County portion of the SR 20 Principal Arterial Corridor from U.S. Highway 101 (US 101) to Interstate 5 (I-5). In 1988 the Lake County/City Area Planning Council (APC) and Caltrans joined in a cooperative effort to determine appropriate Route Concepts for state highway routes in Lake County and to establish highway development priorities. The Route Concept selected for this Principal Arterial Corridor was a four-lane freeway/expressway with a “C” concept level of service (LOS)[1].

[1] Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and convenience. LOS is measured on a graduated scale of A to F, in which A is unrestricted free-flow travel and F is gridlocked, impeded movement.

The development of basic industries in Lake County has been impeded by the difficulty of transporting goods in and out of the county. The *2010 Lake County RTP* goal for the State Highway System is to "Provide a safe, well-maintained and efficient State highway network that addresses regional and statewide mobility needs for people, goods and services." Policies the Lake County APC will use to achieve this goal include:

- Implement projects and strategies to encourage trucks and inter-regional traffic to use the Principle Arterial Corridor (includes portions of SR 20, 29, and all of 53) for travel through Lake County.
- Encourage improvements to State Routes 20 (where applicable), 53, and 29, that facilitate safe and efficient truck traffic.

While the 1998 ITSP objectives focus is on connecting all urban, urbanizing, and high-growth areas to the trunk system at expressway or freeway standards, the objectives of the 2015 ITSP focus on improving the interregional movement of people and freight in a safe and sustainable manner that supports the economy. The 2015 ITSP identifies 11 Strategic Interregional Corridors. These corridors are typically characterized by high volumes of freight movement and significant recreational tourism. These corridors have been identified as the most significant interregional travel corridors in California.

This project, as proposed by Caltrans and FHWA, would widen SR 29 to a four-lane divided expressway with access control. The project is approximately 8 miles in total length and is located between the communities of Lower Lake and Kelseyville.

The locations and concepts for the termini of this project are logical. The proposed project would start at the top of the Glasgow Grade (Diener Drive), about 3.3 miles west of the community of Lower Lake. The top of the Glasgow Grade marks the end of two lanes heading in the northbound direction, and congestion increases with this loss of the second lane. For southbound traffic, the 4-mile transition length between the SR 29/281/Red Hills Road intersection and Diener Drive would provide traffic a sufficient distance to disperse, allowing for an even flow of vehicles from the improved facility headed downhill to the unimproved facility east of Diener Drive. The proposed project would end just west of the SR 29/SR 175 intersection, which would address the "directional split" encountered at this location with traffic volumes increasing in the southbound direction caused by traffic turning onto southbound SR 29 from SR 175. This end point would also allow for the realignment of the SR 29/SR 175 intersection to meet current standards.

Lake County has experienced rapid growth in both population and vehicular travel in the last 20 years, and traffic forecasts indicate vehicular volumes on this section of SR 29 are expected to increase approximately 60 percent over the next 30 years. Currently, SR 29 within the project limits operates at LOS D or E. If no capacity-increasing improvements are made, there would be increased delay in the corridor. Additionally, the SR 29/281/Red Hills Road intersection, a high volume location in the corridor, currently operates at LOS C and is expected to drop to LOS D in 28 years with the No Build Alternative. Implementation of the proposed project with improvements to turning movements at the SR 29/281/Red Hills Road intersection would improve the LOS and decrease traffic queuing and delays in the corridor.

The proposed project is expected to significantly improve overall safety to motorists by providing a modern four-lane facility that meets current design standards. Improvements to the horizontal and vertical alignment, addition of lanes that would create safer passing

opportunities, removal of fixed objects, widening of shoulders, and the addition of a 36-foot, grassed median would provide safety benefits to motorists in terms of increased sight distance, enhanced recovery areas, separation of traffic, and minimized exposure to fixed objects. Additionally, the proposed project is expected to improve overall safety for bicyclists; providing widened shoulders that bicyclists can use, thus reducing modal conflicts.

A collision analysis in the project area between April 1, 2007, and March 31, 2012 showed 137 collisions, 68 of which resulted in injuries and 7 of which were fatal. The collision rate for the mainline section of SR 29 is 1.08 collisions per million vehicle miles (MVM) traveled versus the statewide average collision rate of 1.10 per MVM. An analysis conducted for the portion of SR 29 between PM 27.9 and PM 31.6, however, revealed that this segment has an actual collision rate of 1.45 collisions for every MVM traveled, which is 1.4 times the statewide average collision rate for similar roadway facilities. The fatal collision rate for this segment is 0.085 collisions per MVM which is 3.5 times greater than the statewide average rate of 0.023 collisions per MVM. Because this project would be built to the most current design standards, it is reasonable to assume that the collision rate would be at or below the statewide average, and that the collision rate would be reduced by almost 60 percent.

Finally, upgrading SR 29 to a four-lane expressway would potentially divert interregional traffic (including trucks) from the “Main Street” communities along the north shore (including Nice, Lucerne, Glenhaven, and Clearlake Oaks), where the safety of pedestrians and non-motorized traffic as well as traffic noise have been ongoing concerns. This 23-mile segment of SR 20 as of 2007 was designated a Pedestrian Safety Corridor as a result of a collaborative effort between Caltrans, the California Highway Patrol (CHP), and local businesses and residents. Ultimately, it is envisioned that through-traffic (including truck traffic) between US 101 and I-5 will use the SR 20 Principal Arterial Corridor (including this segment of SR 29) around the south shore of Clear Lake.

4B. Regional and System Planning

- **System Identification**

Characteristics for this portion of SR 29 are as follows:

Table 1. State Route 29 Characteristics

Functional Classification	Rural Principal Arterial
Eligible for Federal Funding	Yes
Freeway and Expressway System	Yes
Eligible for Scenic Highway Designation	Yes
Subsystem of Highways for Extra Legal Loads (SHELL)	No
STAA trucks allowed	Yes
Strategic Highway Network	No
National Highway System	Yes
Interregional Road System	Yes

- **State, Regional & Local Planning**

As was detailed in the DPR, this project supports the safety, mobility, and operational objectives and goals of numerous state, regional & local planning documents and policies. Among these are:

State Planning

Study of State Highway Concepts and Priorities in Lake County (Caltrans 1989)

District 1 System Management Plan (Caltrans 1992)

Interregional Transportation Strategic Plan (Caltrans, 1998)

Route Concept Report, Route 29 (Caltrans, 1989)

20/29/53 Comprehensive Corridor Study

Regional Planning

State Route 20 Corridor Study (Dow and Associates August 2000)

Lake County Regional Transportation Plan (RTP)

2010 Lake County Regional Bikeway Plan

Transportation Concept Report (Caltrans, 2013)

Interregional Transportation Strategic Plan (ITSP, Caltrans, 2015)

Local Planning

Lake County General Plan

Lower Lake Area Plan

Kelseyville Area Plan

Rivieras Area Plan

- **Transit Operator Planning**

There is one school bus stop within the project limits on Red Hills Road from Kelseyville Unified School District. The bus stop is approximately 900 feet south of the SR 29/Red Hills Road intersection and at the intersection of a public road.

Lake Transit Authority has Route 4 on SR 29 that travels from Lakeport south to Clearlake and back Service for transit riders will be continually perpetuated or reconfigured in communication with Lake Transit Authority.

Lake Transit Authority has an additional Route 4A at Kit's Corner shopping center. The route travels from Lakeport on Soda Bay Road to SR 281 to the Kit's Corner shopping center and then on SR 29 to the city of Clearlake.

4C. Traffic

- **Current and Forecasted Traffic**

Since the release of the DPR in 2007, the Caltrans Office of Travel Forecasting and Modeling has updated the previously provided design designations and traffic indexes. These projections were completed in March of 2010 and are provided in Table 2 below.

Table 2. Design Designation and Traffic Index (TI) for SR 29 Project Limits

County Highway Location	Lake 29 South of 281	Lake 29 North of 281	Lake SR 281 At Lake 29
Annual ADT			
Base Year 2008	8,600	8,900	6,200
Year 2015	11,000	11,400	7,940
Year 2025	14,400	15,000	10,400
Year 2035	17,900	18,500	12,900
Year 2055	24,800	25,600	17,900
Peak Hour			
Base Year 2008	850	930	590
Year 2015	1,090	1,190	750
Year 2025	1,430	1,560	990
Year 2035	1,770	1,920	1,230
Year 2055	2,460	2,660	1,700
Directional %	60%	60%	80%
DH Truck %	4.0%	4.0%	3.0%
10 Year TI	8.5	8.5	7.5
20 Year TI	9.5	9.5	8.0
40-Year TI	10.0	10.0	8.5

- **State Route 29**

Caltrans District 3 Office of Travel Forecasting and Modeling provided District 1 with a Traffic Analysis (TA, Attachment S) in August 2015 (updated January 2016 & October 2016). The analysis was based on traffic counts which were collected by the same in 2001, 2007 and 2014. The analysis also included data resources such as Caltrans Traffic System Network (TSN) reports, 2012 Traffic Volumes on California State Highways, and the 2012 Annual Average Daily Truck Traffic (AADTT) on the California State Highway System. These sources were used to develop the 2013 baseline traffic volumes in the TA as well as projected future volumes. Vehicle traveling speeds were collected by radar at two locations (PM 29.0 & 30.2) in February 2014 to develop a speed profile table for the corridor.

The 2001 counts were taken over several days, including a long weekend, and include mainline volumes, peak hour volumes, turn movements, 24-hour traffic classification, and recreational activities. The 2014 counts at the SR 29/281/Red Hills Road intersection were captured during PM and AM peak periods on March 4 and 11, 2014, respectively.

The 2001 counts were used to characterize the traffic composition as automobiles representing 86% of the total volume, while the remaining 14% was composed of buses, recreational vehicles, trucks, pick-ups with campers, and autos with trailers. Of the non-

automobiles, 38% were two-axle trucks, 23% were five-axle trucks, 14% were autos towing boats, and 2% were recreational vehicles.

Based on the data collected and other resources referenced, Table 3 was generated to summarize Level of Service (LOS) Performance Measures for the existing and forecasted conditions over 3 segments of SR 29. Note that through 2041, the trend indicates decreasing LOS from D to E and reduced average speeds as volumes and delay increase.

Table 3. No-Build Level of Service Analysis for SR 29 (Existing & Forecasted)

Existing 2013

Post Mile	23.8-27.89				27.89-31.05				31.05-31.6			
Description	Diener to SR281				SR281 to SR175				SR175 to Proj End			
	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]
AM Peak Hour Eastbound	318	53	19.1	D	245	51	39.5	E	245	54	2.0	D
AM Peak Hour Westbound	346	51	55.3		552	51	22.9		592	52	3.2	
PM Peak Hour Eastbound	403	52	22.0	D	522	49	34.9	E	567	51	3.8	D
PM Peak Hour Westbound	415	51	43.7		409	52	21.7		476	52	2.7	

No Build 2021

Post Mile	23.8-27.89				27.89-31.05				31.05-31.6			
Description	Diener to SR281				SR281 to SR175				SR175 to Proj End			
	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]
AM Peak Hour Eastbound	374	53	20.6	D	287	51	41.1	E	292	54	2.3	D
AM Peak Hour Westbound	414	51	58.1		661	51	25.9		706	51	5.6	
PM Peak Hour Eastbound	481	52	23.4	E	621	49	39.7	E	682	50	4.5	D
PM Peak Hour Westbound	491	50	49.5		477	51	24.6		551	52	3.1	

No Build 2041

Post Mile	23.8-27.89				27.89-31.05				31.05-31.6			
Description	Diener to SR281				SR281 to SR175				SR175 to Proj End			
	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]
AM Peak Hour Eastbound	528	52	23.0	E	394	50	45.3	E	394	53	2.7	E
AM Peak Hour Westbound	564	50	67.1		906	49	34.1		965	50	5.0	
PM Peak Hour Eastbound	638	52	23.9	E	839	47	53.7	E	857	49	5.4	E
PM Peak Hour Westbound	671	50	57.6		667	50	29.4		770	51	3.7	

[1]Speeds and delay from Synchro plus SimTraffic v8.

[2]LOS - Level of Service A through F from 2010 Highway Capacity Software.

August 11, 2015

The TA also presented the output of models which calculated impacts to the speed, delay and LOS performance measures for the build alternative using projected traffic volumes. The results of the model are included in Table 4. Note that through 2041, the trend indicates increased speed, and improved LOS as well as decreased delay compared to the no build alternative findings in Table 3.

Table 4. Build Alternative Level of Service Analysis for SR 29 (Forecasted)

Build 2021

Post Mile	23.8-27.89				27.89-31.05				31.05-31.6			
Description	Diener to SR281				SR281 to SR175				SR175 to Proj End			
	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]
AM Peak Hour Eastbound	371	64	11.4	A	283	62	22.7	A	285	65	1.1	A
AM Peak Hour Westbound	408	61	45.7	A	663	62	13.5	A	711	61	2.5	A
PM Peak Hour Eastbound	470	63	12.9	A	611	61	16.6	A	663	63	1.9	A
PM Peak Hour Westbound	488	61	33.1	A	479	63	12.9	A	555	62	2.0	A

Build 2041

Post Mile	23.8-27.89				27.89-31.05				31.05-31.6			
Description	Diener to SR281				SR281 to SR175				SR175 to Proj End			
	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]	Vol	Speed[1] (mph)	Delay[1] (sec/veh)	LOS[2]
AM Peak Hour Eastbound	511	63	13.2	A	389	62	22.7	A	392	59	1.5	A
AM Peak Hour Westbound	559	61	50.8	A	908	62	15.8	A	964	59	4.0	A
PM Peak Hour Eastbound	647	62	16.8	A	842	60	18.5	A	926	62	2.5	A
PM Peak Hour Westbound	673	60	41.3	A	656	61	15.9	A	761	60	3.1	A

[1]Speeds and delay from Synchro plus SimTraffic v8.

[2]LOS - Level of Service A through F from 2010 Highway Capacity Software.

July 30, 2015

- **<u>Intersection of SR 29/281/Red Hills Road</u>**

The primary point of entry to the Soda Bay area is from SR 281 (Soda Bay Road). This State route intersects SR 29 at PM 27.9 along with a county road to the south named Red Hills Road. The intersection is commonly referred to as Kits Corner by locals.

Traffic data and analysis that was contained in the 2007 DPR has been replaced due to changes to the intersection since that time. One such change, which was mentioned earlier, is the replacement of the stop signs that were in place prior to 2007 for SR 281 & Red Hills Road traffic entering the intersection. These signs were replaced with traffic signals after a fatal collision occurred at this location. Further, data and analysis within the 2007 DPR needed to be updated in this section because the project is no longer considering interchange options as those types of improvements were dropped from consideration after they were rejected in the VA Study by management (Section 6B).

Traffic counts at this intersection are included within Appendix A of the TA and were used in conjunction with other resources to project future volumes. This data was used to then model the existing and expected future operation of the existing signalized intersection under future traffic volumes, which are shown in Table 5 below. Also tabulated are the performance measures of the intersection model reflecting future volume with an intersection configuration correlating to the existing intersection shown in Attachment L. These are tabulated below in Table 5. Note increasing delay and decreasing LOS with no-build condition into the future and same trend under build condition. However, the build condition has better performance than no-build condition.

Table 5. No-Build & Build Level of Service for SR 29/281 Intersection (Existing & Forecasted)

Alternative	Delay[1] per Vehicle (sec) / LOS[2]							
	EB (SR 29)		WB (SR 29)		NB (Red Hills Road)		SB (SR 281)	
	sec	LOS	sec	LOS	sec	LOS	sec	LOS
2013 AM NoBuild	24.6	C	24.8	C	5.1	A	6.6	A
2013 PM NoBuild	25.8	C	24.1	C	12.8	B	10.4	B
2021 AM NoBuild	24.8	C	25.4	C	6.1	A	8.5	A
2021 PM NoBuild	31.2	C	28.9	C	16.1	B	13.5	B
2041 AM NoBuild	26.7	C	29.5	C	11.7	B	13.9	B
2041 PM NoBuild	42.8	D	34.0	C	29.0	C	22.2	C
2021 AM Build	15.0	B	21.4	B	7.3	A	7.9	A
2021 PM Build	15.6	B	19.8	B	15.6	A	11.0	B
2041 AM Build	15.0	B	24.0	C	10.4	B	11.4	B
2041 PM Build	18.2	B	24.6	C	22.9	C	15.8	B

[1]Delay from Synchro plus SimTraffic v8.

[2]LOS - Level of Service A through F from 2010 HCM Exhibits 18-4 and 19-1.

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During the AM Peak Hour, traffic counts at this intersection (Attachment L) show about 23% of the eastbound SR 29 traffic turns left onto SR 281, while about 12% of the westbound traffic turns right onto SR 281. About 2% or less of either direction of SR 29 traffic turns onto Red Hills Road.

During the PM Peak Hour, 42% of the eastbound SR 29 traffic turns left onto SR 281, while about 34% of the westbound traffic turns right onto SR 281. About 5% or less of either direction of SR 29 traffic turns onto Red Hills Road.

For SR 281 traffic during the AM Peak Hour, 64% of the traffic turns right onto westbound SR 29 and during the PM Peak Hour, 56% of the traffic on SR 281 turns right onto westbound SR 29, indicating a fairly steady directional split between the two peak hours.

- **Intersection of SR 29/SR 175**

The existing skewed, T-intersection at SR 29/SR 175 is unsignalized, but does have stop sign traffic control for SR 175 traffic entering SR 29. Through traffic on SR 29 passes through the intersection without stopping. Eastbound SR 29 traffic turning onto SR 175 uses a turnoff. Westbound SR 29 turning left onto SR 175 does not have a dedicated turning lane for this maneuver.

With the proposed project, the existing skewed intersection will be realigned to a standard 90-degree intersection. The new intersection configuration will also have a new connection on the north side of the new alignment for a frontage road connection. Although signalization is not proposed at the new intersection, widening to a four-lane expressway and providing turning lanes and deceleration/acceleration lanes will address differential speed conflicts between though traffic and traffic entering or leaving these routes. Traffic on SR 175 will continue to be stop controlled for traffic entering SR 29.

Traffic diagrams for this intersection are included within Appendix A of the TA and volumes shown therein were used in conjunction with other resources to project future volumes. This data was used to then model the existing and expected future operation of the intersection, which are shown in Table 6 below. Also tabulated are the performance measures of an intersection model reflecting future volumes at an intersection configuration correlating to

the existing improvements. These are tabulated below in Table 6. Note increasing delay and decreasing LOS under the no-build condition into the future and same trend under build condition. However, the build condition has better performance than no-build condition.

Table 6. No-Build & Build Level of Service for SR 29/175 Intersection (Existing & Forecasted)

Alternative	Delay[1] per Vehicle (sec) / LOS[2]					
	EB (SR 29)		WB (SR 29)		NB (SR 175)	
	sec	LOS	sec	LOS	sec	LOS
2013 AM NoBuild	0.9	A	3.3	A	7.5	A
2013 PM NoBuild	1.9	A	2.5	A	8.4	A
2021 AM NoBuild	1.1	A	3.8	A	10.2	B
2021 PM NoBuild	2.2	A	3.1	A	13.2	B
2041 AM NoBuild	1.2	A	5.6	A	22.1	C
2041 PM NoBuild	2.7	A	3.9	A	25.2	D
2021 AM Build	0.5	A	1.3	A	5.3	A
2021 PM Build	0.8	A	1.0	A	6.9	A
2041 AM Build	0.5	A	1.7	A	6.9	A
2041 PM Build	1.0	A	1.5	A	12.7	B

[1]Delay from Synchro plus SimTraffic v8.

[2]LOS - Level of Service A through F from 2010 HCM Exhibits 18-4 and 19-1.

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In the above table, the intersection performance measures indicate minimal delay for SR 29 traffic which operates under LOS A in both build and no-build scenarios. The table also shows that delay for SR 175 traffic entering SR 29 will continue to increase under the no-build scenario in to the future as traffic volumes grow, eventually conditions will deteriorate to a LOS of D in 2041. Under the build scenario, the LOS will be at level B in that year.

- **Collision Rates**

The Caltrans Office of Traffic Safety performed a collision analysis in the project area between April 1, 2007, and March 31, 2012. During this period, there were 137 collisions, 68 of which resulted in injuries and 7 of which were fatal. The collision rate for the mainline section of SR 29 is 1.08 collisions per million vehicle miles (MVM) traveled versus the statewide average collision rate of 1.10 per MVM.

Table 7. Collision Summary for SR 29 PM 23.4/31.6 from 04/01/07 to 03/31/12

PM Range	Total	Fatal	Injury	PDO	SV	Wet
PM 23.6/31.6	137	7	68	62	73	12

***PDO**-Property Damage Only* ***SV**-Single Vehicle* ***Wet**-Wet pavement from rainfall*

An analysis conducted for the portion of SR 29 between PM 27.9 and PM 31.6, however, revealed that this segment has an actual collision rate of 1.45 collisions for every MVM traveled, which is 1.4 times the statewide average collision rate for similar roadway facilities. The fatal collision rate for this segment is 0.085 collisions per MVM which is 3.5 times greater than the statewide average rate of 0.023 collisions per MVM.

An analysis for Segment 2C of SR 29 (PM 28.9 to 31.6) between April 1, 2007, and March 31, 2012 revealed that this segment has an actual collision rate of 1.40 collisions for every MVM traveled, which is 1.44 times the statewide average collision rate for similar roadway facilities. The fatal collision rate for this northern segment is 0.092 collisions per MVM which is 4.0 times greater than the statewide average rate of 0.023 collisions per MVM.

- **Intersection Collisions**

An intersection collision analysis was performed for the period between April 1, 2007 and March 31, 2012 for the five existing state and county roads that intersect SR 29 in the project limits. The collision summary (Table 8) and collision rates (Table 9) are provided below.

Table 8. Collision Summary: Intersections with SR 29 from 04/01/07 to 03/31/12

Post Mile (PM) Road Name	Total	Fatal	Injury	PDO	Broadside	Rear End
PM 23.7 Diener Dr.	2	0	0	2	0	1
PM 26.7 Konocti Camp	1	0	1	0	0	0
PM 27.9 SR 281	12	1	6	5	7	1
PM 30.2 Kelseyville Auto	2	0	1	1	0	0
PM 31.1 SR 175	7	0	3	4	2	4

***PDO**-Property Damage Only Collision Types – Broadside or Rear End Collisions*

Table 9. Collision Rates: Intersections with SR 29 from 04/01/07 to 03/31/12

	Actual			Statewide Average		
Post Mile (PM) Road Name	Fatals	Fat.+Injury	Total	Fatals	Fat.+Injury	Total
PM 23.7 Diener Dr.	0.00	0.00	0.13	0.003	0.07	0.16
PM 26.7 Konocti Camp	0.00	0.06	0.06	0.003	0.07	0.16
PM 27.9 SR 281	0.039	0.27	0.46	0.001	0.10	0.24
PM 30.2 Kelseyville Auto	0.00	0.06	0.13	0.002	0.06	0.12
PM 31.1 SR 175	0.00	0.15	0.36	0.003	0.07	0.16

Collisions rates are compared in per million vehicles (MV)

At the SR 281/Red Hills Road intersection, the collision rate is 0.46 collisions per MV. The statewide average collision rate for a similar intersection is 0.24 collisions per MV. The actual collision rate for this intersection is 1.9 times higher than the statewide average for a rural four–legged intersection with stop signs. These collisions account for 50 percent of all intersections collisions within the project limits. Primary collision type at the intersection is broadside.

The intersection of SR 29/SR 281 was converted from a four-legged intersection with stop signs for SR 281 & Red Hills Road traffic to a signalized intersection in 2007. This reduced the number of collision from 30 over the 5 year period preceding the signalization to 12 collisions over the five year period following the signalization upgrade.

5. ALTERNATIVES

As was described earlier, the DPR contained discussion and analysis for consideration of four build alternatives. In that document, these were referred to as Alternatives C1, C2, C3 and D. Signalization and interchange options for traffic handling at the intersection of SR 281/29/Red Hills Road were included as options to these alternatives. As Alternatives C1, C2 & C3 are not recommended for approval herein, and because interchanges were dropped from consideration after they were rejected in the VA Study by management, only limited and necessary discussion is included in this section on these non-viable

alternatives. Instead the focus of this section will be on the viable alternatives: the preferred alternative (Alternative D) and the no-build alternative (Alternative A).

5A. Non-Viable Alternatives

- **Alternatives C1, C2 & C3**

Although these three alternatives would meet the project purpose and need, the alternatives would not avoid sensitive environmental resources and would result in direct and indirect impacts to three state- and federally-listed endangered plants species. The three endangered plant species are found adjacent to SR 29, within the vernal pools located in Manning Flat and the vernal pools found north of the intersection of SR 29 and Konocti Camp. In addition, implementation of Alternative C1, C2, or C3 would result in increased impacts to cultural resources, additional biological resources, and businesses. In consideration of the anticipated impacts to the endangered plant species and with the availability of other viable alternatives (No-Build Alternative and Alternative D), Alternatives C1, C2, and C3 have been eliminated from further consideration. (Attachment E, Section 1.5.1)

5B. Viable Alternatives

- **Alternative D: Preferred Build Alternative**

Alternative D has been recommended as the preferred alternative for the Lake 29 Improvement Project because it meets the project purpose and need and also avoids or minimizes impacts to environmental resources. The following summarizes some of the basic design aspects of the alternative followed by more detailed discussion on aspects of the alternative. Exceptions to design standards are discussed at the end of this sub-section under the heading Non-Standard Features.

ROUTE 29

- 4-lane expressway (two lanes each direction)
- 36 foot minimum unpaved median
- 2 – 12 foot lanes in each direction
- 5 foot minimum inside and 10 foot outside paved shoulders
- Design speed is 68 mph
- Acceleration and Deceleration Lanes

ROUTES 175 and 281 (within the project limits)

- 2-lane conventional highway
- 12 foot lanes
- 8 & 4 foot paved shoulders, SR 281 & 175, respectively
- Design speed is 46 mph

FRONTAGE & LOCAL ROAD EXTENSIONS
(Public Frontage Roads, Red Hills Road, Konocti Camp Road, Diener Drive)

- 2-lane conventional facility
- 12 foot lanes
- 4 foot paved shoulders
- Design speed is 35 mph
- County Standards

FRONTAGE ROADS

(Private Road)

- 1 or 2 lanes
- 12 foot lanes
- County Standards

General Geometrics

Alternative D proposes to replace 8 miles of a 2-lane conventional highway that has non-standard shoulder widths and sharp alignment curvature for the prevailing speeds with a 4-lane expressway with near standard geometrics and access control. The alignment of the alternative was specifically designed to avoid sensitive environmental resources and to reduce project costs by minimizing large cuts, thus decreasing the amount of excess material. Both of these goals have been accomplished by adjusting the horizontal and vertical alignments.

The typical cross section (Attachment C) for Alternative D would consist of two 12-foot lanes, a paved 10-foot outside shoulder, a paved 5-foot inside shoulder, and a 46-foot median (36-foot grass median from EP to EP). This median width was chosen to provide adequate room for acceleration/deceleration lanes, maintenance activities, and to improve safety. The decision to use an Advisory Standard, 46-foot median (36’ unpaved, 10’ paved) was conceptually approved by HQ Traffic Safety and Division of Design (DOD) Geometricians and committed to when the VA Study rejected alternatives featuring reduced widths.

The proposed horizontal curve radii for the Alternative D alignment will vary from 1,969 feet to 6,562 feet. This minimum radius curve corresponds to a 68 mph facility. Although the standard maximum grade is 4% (for rural rolling terrain), short segments of Segment 2C will be greater than this, but less than 5%. Standard stopping and intersection decision sight distance will be provided throughout the project limits.

Grading & Earthwork

Due to the steepness of some of the terrain along the alignment and the desire to reduce both environmental impacts and right of way acquisition, tall cut slopes will be required. These cuts will have side slope rates up to 1.5:1. Some portions of the cut slopes will receive either benching or stepping treatments to assist in slope stability and to enhance slope revegetation. The newly constructed slopes will receive approximately 277 acres of erosion control material. Fill slopes will not be as steep with some locations compacted at 2:1, but in most cases will have a maximum slope of 4:1. Geotechnical Engineering and Landscape Architecture Units have weighed in on the cut/fill slope decision process and are in agreement.

In its non-segmented form, Alternative D was anticipated to have balanced earthwork with limited future adjustment to vertical profiles. After segmentation and with Segment 2C being the first of the segments to be constructed, the project will have 255,000 cubic yards of excess material in the first phase (2C) and a 164,000 cubic yard shortage in the future phases (2A & 2B). The S Bar S Quarry located on the east end of Segment 2C is one option for disposal of this excess. Previously, the DPR had considered using an alternate site for disposal, but it was later determined that site was not feasible due to high cost for disposal and need to repair/rehab the roadway width along a 1.7 mile long road to the site. Another option that will be explored during the design phase, is to store excess Segment

2C material on the hardship property located within the Segments 2A & 2B limits for future use.

Geotechnical Considerations

A Preliminary Geotechnical investigation of the project site was completed. This investigation determined that measures to mitigate settlement of new embankment fill will most likely be necessary in areas where the water table is high or perched water exists near the ground surface. Appropriate measures include controlling the rate of embankment construction, placing a surcharge load, and specifying a settlement period.

Hard rock outcroppings and boulders were observed at the project site. It is expected that use of light blasting, or chemical expanders, or a hoe ram will be required to complete excavation of these outcroppings and boulders (See Attachment I). Section 7F contains more detailed geotechnical discussion.

Structures

There are two retaining walls proposed along the new alignment. Both of these have been introduced into the scope since the DPR. The first wall will be located near Mannings Flat area. The purpose of the wall is to reduce the width of the fill area, thereby avoiding further encroachment into the sensitive habitat near this area. Details on the wall are in the attached Level Spreader Report (Attachment R). The second retaining wall would be located on the south side of the existing highway near Shaul Valley. The purpose of this structure would be to reduce the magnitude of a cut slope in this area to reduce impacts to environmental resources. Preliminary design of the structure indicates the second wall will be approximately 246’ long and 38’ high and will either be a soil nail or ground anchor type of structure. Structures Design has provided Advance Planning Study for this retaining wall (Attachment F).

Wildlife Crossings

Since the release of the DPR, a road kill study has been conducted and three areas within the project limits have been identified as areas where a wildlife crossing could be beneficial for wildlife protection and traffic safety. These locations are near Manning Flat, southeast of Shaul Valley, and near the intersection of SR 29/281. At the first two locations, the crossing is proposed to be a 12’ by 12’ precast concrete box culvert or a structural steel plate arch pipe, which would pass under the new highway and extend beyond the new highway prism; a distance of about 160’. Wingwalls are proposed to be constructed at each end of these structures and wildlife exclusion fencing will extend approximately 0.5 miles to either side as a means to channeling wildlife toward the crossing. Intermittent jump-outs are proposed to be provide trapped animals the opportunity to escape the exclusion zone in and adjacent to the roadway. A preliminary plan of a wildlife crossing is provided as Attachment P. Construction of a crossing at the third location is impractical due to drainage and cover conflicts.

Intersection Configurations

At the intersection of SR 29/281/Red Hill Road, the existing four-way signal and channelization will be upgraded to match the new 4-lane configuration of SR 29 as shown on Attachment L. The SR 281 and Red Hill Road legs of the intersection will also be upgraded to provide motorists dedicated turning lanes and additional through lanes. The existing signal heads, masts, poles and other signal systems components will be either

replaced or upgraded to conform to the new intersection channelization. The existing crosswalks will be perpetuated with the new configuration.

The alignment of Alternative D was modified at the SR 29/281/Red Hill Road to avoid impacting septic systems on the Kit's Corner property (northwest of the intersection). Impacts to these systems may have triggered acquisition of the businesses on the property. Alternative D was also narrowed via a gradual reduction in median width coming into and out of the intersection at this location to reduce the size of the intersection. This benefits the operation of the intersection by reducing pedestrian crossing time and improving turning maneuvers.

The T-intersection at SR 29/175 will be realigned so that SR 175 no longer intersects at a skew as it does today. The new configuration will also serve as a point of connection for a frontage road on the north side of the new alignment. Traffic from both SR 175 and the frontage road will be subject to stop sign traffic control prior to entering SR 29. Through traffic along SR 29 will proceed through the intersection. Left and right turn lanes will be provided for traffic leaving SR 29 and inside and outside accelerations lanes are proposed for vehicles entering SR 29. At other intersections where frontage roads connect to SR 29, similar intersection configurations will be developed. Gravel shoulders in one area of the intersection will be added to allow for STAA trucks to perform NB-SB change of direction maneuvers.

The new facility would replace 65 of the existing at-grade intersections along the route. Most of these existing access points only serve single parcels. The new intersection configurations would connect to frontage roads leading to multiple parcels, thereby reducing the number of total intersections. The exact configuration and location of these intersections depends on the type and volume of vehicles using them, sight distance considerations, and local topography. In most cases, adjacent intersections will be separated by the Advisory Standard required distance of 2,625 feet or greater.

Frontage Roads

The concept and design of the frontage road system was developed during the 2007 DPR efforts and, as was discussed in previous sections, involved property owners (residential and business) and County of Lake officials.

Portions of frontage roads within the State R/W will be designed to State standards and maintained by the State. Portions of the frontage roads serving more than one parcel will be classified as public roads and the State will relinquish ownership to the County of Lake after acquisition. In the future, these frontage roads will be maintained by the County of Lake. The width of the proposed county right of way and slope maintenance easements have been determined using 2005 Lake County Road Design and Construction Standards, which generally speaking, are more conservative than the criteria used by the CAL FIRE. Portions of frontage roads serving a single parcel will be considered private and will be maintained by the owner benefitting from the facility. A speed of 35 mph was selected as the design speed of the frontage roads.

After the 2007 DPR efforts, Caltrans met with local fire service agencies to discuss design aspects of the frontage roads. Following this meeting, a number of changes were made to add turnarounds and an emergency access point off SR 29 at Eagles Nest Lane.

Other changes to the frontage road system have also been incorporated into the design since 2007. Some of these changes were incorporated to reduce environmental impacts and lower costs of the system to the County and the project. The expansion of the PGE

substation property off of SR 281 also required frontage road changes. As land use changes in the future before construction of all planned frontage roads, there will likely be a need to modify these systems again.

Frontage roads and local road extensions are further discussed in Section 7B of this report (Route Matters).

Water Supply

Since the project is generally located in a rural undeveloped location, development of a water supply will be needed. Water will be used routinely throughout project construction for dust control, soil compaction, and various other construction activities. Water may be purchased from nearby towns and water districts, hauled, and temporarily stored for construction purposes. A well, located on a State property purchased for this project may have capacity to provide water during construction. The water delivery production rate for this well was measured when the well was installed (data in project binder). The capacity of the well to provide the necessary volume of water without impacting neighboring wells will need to be studied in the future project phases.

Pavement Section

The District Materials Lab superseded previous Materials Recommendation memos when a Supplemental Materials Recommendation was provided on September 29, 2016 (Attachment K). The memo, which was provided for the purpose of developing the design of the Segment 2C Safety project, contained 20 & 40 year structural section recommendations for both the main highway (SR 29 & 175) and the frontage roads within the limits of Segment 2C. Although the memo only applies to Segment 2C, recommendations contained therein were used to estimate quantities and develop the costs for whole 8-mile project. In the future, the Materials Lab will need to provide an update to this memo that addresses recommendations specific to the other segments. Structural sections of the County maintained roads will be reviewed by the County for their acceptance.

Design requested that the aforementioned Supplemental Materials Recommendation consider use of a nascent method of analyzing the pavement structural section as briefly described in Section 606.3 of the HDM. This method is referred to as the Mechanistic Empirical (ME) design process which has been tested and implemented on a limited basis for projects utilizing design life greater than 20 years and with traffic index (TI) of 15.0 or greater. With concurrence of the Office of Asphalt Pavement, the ME design process was approved for use on this project's 40 year design in light of the relatively low 40 year traffic index value of 10.0. The 20-year structural section in the Supplemental Materials Recommendation was based on the empirical design process and resulted in a thicker section than the 40-year using ME design process.

After the DPR was approved in 2007, a Life Cycle Cost Analysis (LCCA) was performed for the purpose of determining whether a 20 or a 40 year structural section provided the State with the best value over time. The LCCA took into account initial construction costs, future maintenance costs and potential costs to the user (motorists and the movement of goods). LCCA are required for new construction projects with Annual Average Daily Traffic (AADT) with less that 150,000 (HDM 612.2). LCCA are also required for any project with a pavement cost component (HDM 619). The result of the 2010 LCCA, which was based on the 2010 Materials Recommendations using the empirical method, was that the best value over time will be realized with a 40 year structural section. Based on inspection of the 20 &

40-year structural sections in the 2016 Supplemental Materials Recommendation, similar results would follow if LCCA was computed again.

Traffic Handling

Recommendations of the Traffic Management Plan Data Sheet have been incorporated. Due to multiple traffic stages that will affect access to businesses and residences, an update to the Traffic Management Plan is anticipated. This plan will be developed during the design phase of the project. Traffic management is further described in Section 7 of this report (Traffic Management Plan).

Electrical Systems

The scope of work within the DPR included safety lighting (intersection lighting) at all intersections. Due to environmental concerns, this item has been pared down to only include lighting at the SR 29/281/Red Hill Road intersection location where the existing lighting will be upgraded with the signalization work. Impacted traffic count stations will be replaced and existing emergency call boxes will be coordinated with the local Service Authority for Freeways and Expressways (SAFE). Some intelligent traffic infrastructure will be added.

Right of Way

State right of way (R/W) width will vary throughout as the R/W line will be set to capture the area necessary to contain highway improvement features such as cut/fill slopes, drainage, landscaping, fencing etc. The new right of way will be in the form of limited access control to SR 29 and the above mentioned intersections will be the only locations where access to SR 29 will be allowed. In addition to the animal exclusion fencing near wildlife crossings, right of way fencing will be used to maintain limited access control.

In addition to the State right of way for the expressway and the aforementioned frontage roads, the state will acquire right of way easements for the relocation of Pacific Gas and Electric (PG&E), MediaCom, and AT&T utilities, which all have facilities in conflict with the project.

Temporary construction and permanent easements will be also be needed for various other purposes as well.

The project's right of way needs are discussed in more detail in Section 6D of this report.

Highway Planting

Highway planting for aesthetic enhancements and permanent erosion control are proposed. Permanent erosion control will consist of hydro seeding with a mixture of seed, fertilizer, stabilizing emulsion fiber, and water. The eliminated at-grade road approaches will be re-contoured and vegetated. Visual impact aspects of the project are described Attachment E.

Drainage

Drainage along the new route will be collected at locations where existing watercourses cross the new alignment. Runoff will also be collected where the accumulated and concentrated runoff is either exceeding allowable spread or is at a sag location. Collected runoff from these locations will pass through inlet structures (headwalls, drop inlets etc) and will then be conveyed though culverts to locations where the runoff can be discharged through outlet treatments designed to minimize erosion.

Brow ditches are included in the design as a means to intercepting runoff prior to this storm water spreading over and eroding cut slopes. Collected runoff in these ditches will be conveyed to points where the flow can be discharged without risk of erosion. The attached Storm Water Data Report (SWDR) includes more details on drainage aspects of the project (Attachment M).

Alternative D will construct a storm drain in the median where necessary with a grass median and ditch line. This alternative proposes storm water attenuation basins adjacent to the roadway to address storm water runoff associated with the increase in impervious roadway area. One basin is proposed adjacent to the southeast corner of Manning Flat, approximately 2,300 feet southeast of Manning Creek. Its purpose is to maintain the existing hydrology of the area and prevent increase in erosion at Manning Flat. Another basin is proposed adjacent to the proposed new frontage road intersection, which services the Kelseyville Auto Salvage et al. Its purpose is to maintain the existing hydrology in the general area of inundation, keeping the increased storm water runoff from the new roadway from impacting the adjacent business and residence in the area.

Since the release of the DPR, a special drainage feature called a level spreader has been proposed for minimizing impacts to a sensitive area near Mannings Flat. A level spreader is a commonly used, engineered device that simply creates sheet flow drainage characteristics from a source of concentrated flow. Essentially, the spreader acts like an outlet weir to evenly distribute concentrated inflow as the water spills over the outflow control feature. For the Lake 29 Improvement Project, the proposed level spreader would be constructed of concrete as construction tolerances and flow characteristics are more controlled with concrete compared to other materials. A level spreader analysis report was prepared for the project and is included as Attachment R.

Park and Ride

There are no Park and Ride Areas within the project limits. Due to the rural setting of this project, it is not proposed to construct any new park and ride facilities as part of this project.

Staging

Due to the whole 8-mile project being segmented into three separate construction stages, there will be different equipment and storage yard areas for each of the three segments. One location that was identified in the DPR is the property adjacent to the S Bar S Quarry. This area could serve as a staging location for Segments 2C & 2B. Other opportunities appear to be favorable and will be explored during future project development efforts.

Non-Standard Features

Alternative D will require both mandatory and advisory design exceptions. The design standard exceptions listed below have been discussed with the Division of Design's Design Coordinator or Design Reviewer during development of the DPR. Due to the segmentation of the 8 mile project, fact sheets for the following exceptions to design standards will be prepared at the time the segmented portions are funded and when these segmented projects are in a later project phase, such as PS&E.

Mandatory Design Exceptions

1.) The standard maximum profile grade for freeways and expressways in rolling terrain is 4%. Segment 2C of Alternative D has at least two short segments where the grade will exceed this threshold and be less than 5%. (HDM 204.3)

2.) At the south project limit where the transition from 2-lane to 4-lane occurs near Diener Drive, the existing roadway vertical curve provides stopping sight distance for 48 mph; design speed for this project is 55 mph at this location. (HDM 201.1)

Advisory Design Exceptions

1.) The standard minimum width for a rural median along an expressway is 62 feet. Except at transition areas and at intersections, Alternative D proposes a 46 foot median (36' unpaved, 10' paved) along the entirety of the 4-lane portions of the 8 mile project. (HDM 305.1)

2.) Alternative D requires a design exception for slope ratio for use of 2:1 embankment slopes. The Highway Design Manual requires advisory design exceptions for side slope rates within the clear recovery zone steeper than 4:1. (HDM 309.1 (1))

3.) When a lane is to be dropped, it should be done by tapering over a distance equal to WV, where W = Width of lane to be dropped and V = Design Speed. The length of the second NB lane drop for NB SR 281 at the reconfigured signalized intersection is less than the length required. (HDM 206.3 (1))

4.) Access openings should not be closer than one-half mile to an adjacent public road intersection or to another private access opening that is wider than 30 feet. There is one segment between frontage roads "SH" and "SV" where two openings are within 0.42 mile of each other. Frontage road SVO is also within 0.5 miles of SR 281/Red Hills Road. (HDM 205.1 (1))

- **Alternative A: No Build**

The No Build Alternative fails to address the project purpose and need, and it provides none of the proposed project benefits cited for the preferred project alternative. The following goals are not achieved:

- Facilitate the efficient flow of goods and service through Lake County.
- Provide a modern transportation facility that will provide adequate capacity to accommodate anticipated traffic growth.
- Provide a facility with the potential for diverting through-traffic (including through truck traffic) from north shore SR 20.
- Accommodate local planning goals as set forth in the *2010 Lake County Regional Transportation Plan* (*RTP*).
- Help achieve the goals of the Caltrans 2015 Interregional Transportation Strategic Plan (ITSP)
- Improve the safety and operation of SR 29

The No Build Alternative constructs no capital improvements to the existing facilities. Caltrans would continue to operate and maintain the facilities as they are today. There would be periodic rehabilitation, and there could be safety or operational improvements to the existing facility. However, there would be no new highway lanes and no intersection reconfiguration. Existing state right of way would remain as it currently exists.

With no capital improvements, there is no capital cost for this alternative. There would be continued costs associated with maintenance, periodic rehabilitation, and any safety and operational improvements to the existing facility.

6. CONSIDERATIONS REQUIRING DISCUSSION

6A. Hazardous Waste

An Initial Site Assessment (ISA) and several subsequent Supplemental Initial Site Assessments have been completed by either Caltrans Office of Environmental Engineering or consulting firm(s). Hazardous waste databases and agency records were researched for the project limits. No definite hazardous sites were identified. Only potential hazardous issues exist within the project limits. The following concerns have been identified, though none are expected to hinder this project.

There remains the low potential for naturally occurring asbestos (NOA) to be within the project area. As of this date and after preliminary geotechnical review of the site, NOA has not been confirmed at the site. If NOA is found, proper handling or removal methods can be specified in the contract specifications and implemented during construction operations.

The preferred alternative alignment intersects properties requiring removal of one or more buildings. All structures slated for removal will require an asbestos-containing-material (ACM) survey and a lead-based paint survey prior to demolition. The probability of encountering asbestos containing materials or lead-based paints in the older buildings is high. If found, abatement procedures are common practice for demolition activities.

At least two parcels within the project limits, Kit's Corner service station and the Amber Knolls property at the intersection of Red Hill Road, may contain underground storage tanks (UST). Because both of these parcels have some proposed right of way acquisition for the project needs, subsurface investigations on these parcels will be required to determine whether UST are present and/or whether or not there is any soil contamination. If contamination is present, an exemption to acquire a contaminated parcel will be required, which would take 6 to 15 months.

There is potential that the PG&E substation may contain and emit poly-chlorinated biphenyls (PCB's) associated with high voltage insulation equipment. Currently it is planned to adjust earthwork catch points and right of way lines to avoid the PG&E substation.

The preferred alternative proposes right of way take from the Kelseyville Auto Salvage property. County inspections of this facility indicate that the business is in compliance with Lake County guidelines and have not indicated any hazardous releases. The only remaining concern is the possibility of hydrocarbon surface staining resulting from auto salvage practices. Should surface soils contain spilled petroleum products, minor treatment will be necessary.

Aerial Deposited Lead (ADL) has been identified throughout the project limits. Subsequent investigations in future design phases will be required to confirm the need for any special handling and/or reuse of some soils within the project limit.

A Preliminary Site Investigation (PSI) and potentially a Detailed Site Investigation (DSI) will need to be conducted for Total Petroleum Hydrocarbons (TPH), NOA, ADL, metals within the project limits. The proposed PSI will be conducted primarily within existing right of way. The DSI will be conducted primarily within proposed right of way. The ideal time for site investigation is during the design phase after an alternative is selected, but prior to purchase of right of way.

6B. Value Analysis

After the DPR was approved, an FHWA required Value Analysis Study (VA) was initiated in early 2008. The VA study generated 12 VA study alternatives spanning multiple subject areas of the project, such as design, construction and funding. At a joint Caltrans and Lake County/City APC staff meeting, six of the alternatives were accepted for inclusion into the project. The net savings from these alternatives was estimated to be $2,887,000 (2008). A brief description for each of the recommended alternatives is as follows:

- **VA #2.1:** Segment the Project into Three Fundable Project Phases (2C,2B & 2A)
- **VA #4.0:** Consider Soil Shrinkage Factors in the Project Estimate to Reduce Disposal Costs
- **VA #6.0:** Construct Fill Slopes at 1:4 (4:1 English) Slope in lieu of 1:2 (2:1 English) within the Environmental Study Limits
- **VA #7.0:** Construct Side Slopes at 1:1.5 (1.5:1 English) in lieu of 1:4 (4:1 English) on Cut Slopes Lower than 3.0 Meters (9.8 feet)
- **VA #8.0:** Purchase Small Parcels in lieu of Constructing Frontage Roads
- **VA #9.0:** Reclassify Select Frontage Roads as Private Roads in lieu of Present Classification of Public Roads

The VA #2.1 recommendation regarded segmentation of the larger project for the purpose of more readily obtaining funding. The downside to splitting the project into segments is that the whole project would be more costly. Although VA #2.1 would cost more in the long run, the team recommended the alternative because the project would be more palatable from a funding perspective. To that end, engineering studies were performed to investigate potential phasing splits of the project. The goal of these studies was to evaluate not only the pros and cons of segmenting the 8-mile project, but also to evaluate whether splitting the project was feasible. Segment 2C was recommended to be built first. All of the other recommendations had positive cost savings attributed to them.

Rejected VA alternatives and the reasoning for rejection are as follows:

- **VA #1.1:** Construct a Spread Diamond Interchange at SR 281

  Caltrans management rejected this VA alternative to construct an interchange at the SR 29/SR 281 Intersection because the project's purpose and need can be fulfilled by an at-grade intersection. Therefore, the environmental effects of the proposed interchange (though modest) would likely prevent it from being chosen as the Least Environmentally Damaging Practicable Alternative (LEDPA) and its additional cost would increase the difficulty of funding and delivery of this project.

- **VA #1.2:** Construct a Partial Cloverleaf Interchange with Roundabouts at SR 281

  This alternative is rejected for the same reason as VA Alternative I. I.

- **VA #2.2:** Segment the Project into Two Fundable Project Phases (1B first, 1A second)

  Reject in favor of VA Alternative 2.1

- **VA #3.0:** Reduce Median Width from 46 feet (36’ unpaved, 10’ paved) to Approximately 35 feet (25’ unpaved, 10’ paved)

  Caltrans management rejected the VA alternative to reduce median width and retained the 46 feet median width because the narrower median offered modest construction savings that will be outweighed by life-cycle safety and maintenance costs. Narrow medians also increases stage construction and acceleration and deceleration lane design issues.

- **VA #5.0:** Adjust the Roadway Profile to Reduce Earthwork

  This alternative is rejected because the costs cannot be validated at this time and there is not enough detail to realistically quantify the cost impacts of this VA alternative. Also, this activity would be part of a normal design process and was not considered an alternative to the original design concept. ·

- **VA #10.0:** Acquire Lower Lake Road Parcel to Avoid Continuation/Improvement of an Undesired Shortcut between Two State Roadways

  This VA alternative is rejected because the road parcel is under the jurisdiction of Lake County. Caltrans could not implement this alternative.

6C. Resource Conservation

In constructing this expressway, Caltrans will be providing a portion of the ultimate and preferred alternate route around Clearlake. The goal of this route is to provide a means for the more efficient movement of goods and services around the area. Meeting this goal in the future will lead to less fuel consumption with traffic flowing more efficiently at constant speed without platooning behind slower traffic or accelerating to pass, thereby reducing consumption of non-renewable resources.

As of January 1, 2013, Public Resources Code requires Caltrans to use 11.58 pounds of crumb rubber modifier per metric ton of total asphalt paving material. This material is derived from scrap tires, which statewide are expected to be generated at a rate of more than 43,000,000 scrap tires per year by 2020. By using this material in the asphalt mix, the rubber in the tires is recycled rather than disposed of in landfills or illegal dumps. Thereby, use of this recycled material conserves landfill capacity, avoids environmental harm from illegal dumping, and provides a pavement less susceptible to rutting and cracking. Each ton of rubberized hot mix asphalt will include the rubber from one recycled tire. For this project, a total of almost 250,000 tires will be recycled.

Consideration should be given during the next phases of the project development for reuse of the existing traffic signs along the route and the signals located at the intersection of SR 29/281/Red Hill Road. Barring reuse, the materials should be recycled as a means to reducing demand on the raw materials from non-renewable sources.

The project has taken into consideration and implemented features in the design to reduce impacts to natural resources of the area, such as steepening the cut slopes to avoid a larger project footprint, which would have resulted in a greater impact to oak woodlands and manzanita habitat. Additionally, the alignment of the preferred alternative has been designed to avoid impacts to cultural resources, sensitive plant areas, and wetlands.

While some of the obliterated asphalt material may be used in the aggregate base of the new pavement sections, the remainder will become the property of the contractor. Typically, contractor's either sell this material for reuse as fill, base material, or gravel road surfacing. The material may also be recycled as a percentage of new asphalt batch.

6D. Right of Way Issues

- **<u>Right of Way Required</u>**

The preferred alternative will require acquisition of right of way, permanent easements, and temporary easements. Existing residences, businesses, barns, signs, agriculture, and public and private utilities will be affected. Public portions of frontage roads will be relinquished to the County of Lake, while portions of frontage roads will remain in title with the current owner.

To date, there have been three hardship acquisitions processed in this project area. All three have resulted in the State acquiring property from owners with legitimate cases where unusual personal circumstances of an owner are aggravated by a proposed transportation facility and cannot be solved by the owner without acquisition by the State.

Efforts have been made in the design to reduce project impacts to known private septic systems and water wells. However, it is expected that some relocation of septic systems and wells will be necessary. If relocation is not possible, the impacted property may need to be purchased in its entirety.

Alternative D will require the acquisition of two residences and a substantial garage/shop owned by the California Department of Forestry and Fire Protection (CDF). The structures are located on a satellite parcel of the Konocti Conservation Camp adjacent to SR 29 and are used for upper level camp staff.

While there are no known difficult acquisitions with uncooperative owners at this time, ownership changes have and will continue to occur over time, as will land use changes that may result in conflicts with the project. Further, some conversations with owners at the Open Forum Meeting in June of 2016 contained inquiries into the acquisition process, hardship policy/process, and general preferences for revisions to the project based on present and planned land use. These conversations indicate there will be an ongoing need to monitor these potential risks.

Costs for the above described acquisitions have been estimated and captured by Right of Way through development of a Data Sheet, which has been included as Attachment H. The Data Sheet is an updated version and supersedes the version from the DPR. Right of way costs have risen significantly since the DPR on account of increased State share of responsibility for some utility relocations, greater mitigation costs, inflation, and higher appraisal values.

- **Relocation Impact Studies**

The Caltrans Right of Way Office prepared a Relocation Impact Memo for the project. The memo determined there is no significant impact to owners, tenants, businesses or persons in possession of real property to be acquired who would qualify for relocation assistance benefits or entitlements under the Uniform Relocation Assistance and Real Property Act of 1970.

The memo also describes that a field review was used to determine the potential impacts on residential and nonresidential units. There is one residential property where personal property move will be required. Two full take residential properties have tenants that require relocation. Two businesses may be eligible for relocation assistance. One business is a vacant commercial building and the other is a parking area for individuals to sell cars. Finally, two residential and one business property are full take hardship acquisitions.

- **Utilities**

Several utilities are in conflict with the project improvements. Among these are AT&T (local service), AT&T (Legacy Transcontinental fiberoptic), PG&E (transmission lines), and PG&E (distribution lines). MediaCom (cable), Callayomi Water, Lake County Special Districts (water/sewer, effluent pipeline), and PGE (gas) require verification only.

Since the DPR, Caltrans has worked with impacted utility companies to develop conceptual design criteria for utility corridors. Utility corridors are designated strips of land where the utilities in conflict with the project will be relocated. These corridors will mostly be located

on private lands, which will be encumbered by utility easements. Ideally, the corridors will provide for the relocated PGE and AT&T service lines. AT&T fiber optic may be relocated in the corridor as well. Portions of the PG&E Hopland-Lower Lake and Konocti-Eagle Jct 60-kV transmission lines which will relocated from within the project area will be relocated outside of these corridors. Caltrans will obtain the right of way for these corridors from the current property owners on behalf of the utility companies.

All utility relocation work will require environmental study and permits. Caltrans has and will continue to coordinate with the utility companies in order to develop a final relocation plan that will both minimize environmental impacts and ensure proper relocation and function of facilities and services. Relocation of PGE's transmission line would require special permitting from the California Public Utility Commission (PUC). See Section 2.5.2.2 of the FEIR/EA for more detail on environmental aspects of the utility relocation plans.

At the time of DPR development, utility relocation cost sharing was believed to be a 50/50 split for all utilities in conflict. Since then, different ratios of cost sharing have come into light based on historical precedence. These changes have resulted in significant additional costs to the State, which are reflected in the updated and attached Data Sheet.

6E. Environmental Compliance

The proposed project is a joint project by Caltrans and FHWA and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA, and Caltrans as assigned by the FHWA, is lead agency under NEPA.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the significance of the project as a whole, quite often a "lower level" document is prepared for NEPA. One of the most commonly seen joint document types is an Environmental Impact Report/Environmental Assessment (EIR/EA).

The Final Environmental Impact Report/Environmental Assessment (FEIR/EA) has been prepared in accordance with Caltrans environmental procedures, as well as state and federal environmental regulations. The attached FEIR/EA is the appropriate document for the proposal (Attachment E).

Following receipt of public comments on the Draft EIR/EA and the Revised Partial Draft EIR/EA and circulation of the FEIR/EA, Caltrans is required to take actions regarding the environmental document. If the decision is made to approve the project, a Notice of Determination (NOD) will be published for compliance with CEQA, and Caltrans will decide whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) and Record of Decision (ROD) for compliance with NEPA. A Notice of Availability (NOA) of the FONSI would be sent to the affected units of federal, state, and local government, and to the State Clearinghouse in accordance with Executive Order 12372.

- **Areas of Potential Controversy**

CEQA Guidelines (Section 15123) and NEPA Regulations (40 Code of Federal Regulations [CFR] 1502.12) require identification of areas of controversy known to the lead agency including issues raised by other agencies and the public.

Community Impacts

Alternative D would require both residential and business relocations.

Noise

Residents within the project area have expressed concern about potential increases to noise levels.

Endangered Plants

Early coordination with the United States Fish and Wildlife Service (USFWS) has revealed that the presence of three endangered plant species located within the project vicinity is an area of potential controversy.

- Burke's goldfields (Lasthenia burkei) is a federal and state listed endangered species and a California Native Plant Society (CNPS) List 1B species. Several populations of Burke's goldfields were identified within the project area.
- Lake County stonecrop (Parvisedum leiocarpum) is an annual herb that is a federal and state listed endangered species and a CNPS List 1B species. Several populations of Lake County stonecrop were identified within the project area.
- Few-flowered navarretia (Navarretia leucocephala ssp. pauciflora) is federally listed as endangered, state listed as threatened, and is a CNPS List 1B species. Several populations of few-flowered navarretia were found within the project area.

Caltrans has, to date, made substantial efforts to avoid potential direct and/or indirect effects to these plant species.

Wetlands and Other Waters of the U.S.

Within the Environmental Study Limits (ESL) for this project, wetland types include freshwater marsh, seasonal wetland, and vernal pool. Alternative D would result in impacts to wetlands.

- **Permits**

The following permits, reviews, and approvals will be required for project construction.

- Section 401 Water Quality Certification
- Section 404 Nationwide Permit
- Porter-Cologne Water Quality Control Act Waste Discharge Requirements issued by the RWQCB
- California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreement
- USFWS consultation under Section 7 of the Federal Endangered Species Act
- Formal concurrence from the State Historic Preservation Officer (SHPO) with Caltrans findings in regard to cultural resources
- Lake County Air Quality Management District permits (National Emission Standards for Hazardous Air Pollutants [NESHAP]) required for structures demolition.
- National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit
- Statewide Construction General Permit

- **Wetlands**

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 USC Section 1344) is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. At the state level, wetlands and waters are regulated primarily by CDFG and the RWQCBs.

The project Environmental Study Limit (ESL) lies within three closed watersheds and one open watershed. These are detailed in Attachment E. All wetlands and “other waters” located within 99% of the ESL are considered waters of the State. The remaining area is located within a watershed considered waters of the U.S.

Wetland habitat types within the ESL were identified as being freshwater marsh, seasonal wetland, vernal pool, and irrigated pasture. “Other waters” within the ESL include ephemeral, intermittent, and perennial watercourses. “Other waters” are considered sensitive natural communities because they provide habitat and lifecycle needs for wildlife. The habitat quality for “other waters” is moderate to low within the ESL.

The proposed project is expected to result in permanent impacts to approximately 12 acres of wetlands and about 2 acres of “other waters”.

Temporary and permanent direct impacts to wetlands and “other waters” are expected to occur due to project activities, including excavation of cut slopes, placing of fill material, grading activities, and the extension and replacement of culverts. These project activities would result in both the fill of wetlands and “other waters’ and the removal of associated vegetation.

Drainage system improvements are proposed throughout the project area. Some reconfiguration of existing watercourses would be required as a result of flood level requirements, including widening of the Thurston Creek channel under SR 29 and again under SR 281.

Indirect impacts caused by construction activities that often occur later in time may include: alteration of hydrology; erosion; increased sedimentation; and introduction of pesticides, predators, and weedy nonnative vegetation.

Caltrans would implement permanent design features as well as temporary and permanent Best Management Practices (BMPs).

The new expressway would also maintain flow into and out of other identified wetlands and “other waters” and maintain floodway elevations along Thurston Creek such that the quality of “other waters” and remaining wetland areas would be maintained. Thus, though there would be loss of habitat at the inlet and outlet of culverts and some wetlands and “other waters” would be filled, the remaining quality and function of “other waters” and wetland features within the ESL would not be greatly altered.

Mitigation for the permanent loss of wetlands (excluding vernal pools) of the U.S. and the State (under USACE and Central Valley Regional Water Quality Control Board (RWQCB) jurisdiction) is proposed to include offsite mitigation through the purchase of mitigation credits at a wetland mitigation bank approved by the USACE. Mitigation credits would be purchased at a 1:1 ratio to ensure there is no net loss to wetlands.

Caltrans would contribute funds to the USACE and RWQCB approved in-lieu fee programs for permanent impacts to “other waters” and vernal pool habitats. The in-lieu fee programs would be used to compensate for these impacts because there are no known mitigation banks in the project area that offer “other waters” or vernal pool habitat mitigation credits.

- **Floodplain**

The Alternative D footprint has areas within the limits of the 100-year flood limits. The Flood Insurance Rate Maps (FIRM dated September 5, 2005), which are prepared in order to summarize the Flood Hazard Data Information, show the Thurston Creek floodplain crosses SR 281 at PM 16.93 and SR-29 at PM 27.23 & PM 27.33. Based on the existing roadway elevations, the 100-year flood will theoretically overtop the existing roadway, yet there has not been history of overtopping of either SR 29 or SR 281 at these locations.

As the design proceeds, Design staff will work with Hydraulics to remove the potential of water overtopping the road by adding capacity, elevation, and drainage improvements if needed. Any further changes to the horizontal or vertical alignment of the proposed roadway template are expected to be minor.

For the SR 29/281/Red Hills Road intersection, signalization of the intersection will not introduce more fill within the 100-year floodplain (on the north side of Route 29)

The embankments, culverts and structures in the project will be designed in such a way as to not increase the elevation of water in the floodway by more than 1 foot. Therefore, no significant impacts or increases in the Base Flood Elevation are expected due to the construction of the preferred alternative.

Natural and beneficial floodplain values in the project area include, but are not limited to fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge. No adverse impacts to floodplains or natural and beneficial floodplain values would be associated with the proposed project. In addition, the proposed project would not result in incompatible floodplain development. As such, mitigation measures are not needed.

- **Other Environmental Concerns/ Issues**

Other environmental concerns/issues are extensively detailed in the attached FEIR/EA and are listed below.

Land Use
Growth
Farmlands
Community Impacts
Utilities
Emergency Services
Traffic and Transportation
Visual/Aesthetics
Vegetation Management
Cultural Resources
Water Quality and Storm Water Runoff
Geology, Soils, Seismic, Topography,
Hazardous Waste and Materials
Air Quality
Noise
Natural Communities
Special-Status Plant & Animal Species
Threatened and Endangered Species
Cumulative Impacts

6F. Air Quality Conformity

The USEPA and California Air Resources Board currently classify the Lake County Air Basin as being in attainment for all regulated criteria pollutants, meaning that the air pollutant concentrations in the air basin achieve the national and state ambient air quality standards. Due to this attainment status, conformity to the federal Clean Air Act does not need to be demonstrated for transportation projects in the air basin, and the Lake County Air Quality Management District is not required to prepare or implement a plan to achieve emissions reductions to comply with the California Clean Air Act.

To minimize temporary construction-related emission impacts, BMPs will be implemented, as applicable, and the Contractor will be required to comply with Caltrans Standard Specifications, which include Section 7-1.01F, “Air Pollution Control,” and Section 10, “Dust Control.” Section 7-1.01F also requires the Contractor to comply with all existing rules, regulations, ordinances, and statutes of the Lake County Air Quality Management District pertaining to each construction activity.

An investigation for NOA will be completed for the preferred alternative. If present, or if discovered during construction, remediation activities in accordance with all applicable local, state, and federal regulations will be implemented.

The preferred alternative will require acquisition of properties with structures that will need to be demolished. Caltrans will complete an asbestos-containing material survey prior to demolition activities. Caltrans will obtain NESHAP permits from the Lake County Air Quality Management District, which are required for demolition. Asbestos inspections for the NESHAP permit will be conducted by Cal/OSHA–certified inspectors. Any regulated asbestos-containing materials identified during the survey will be noted on the NESHAP permit. Caltrans will have all regulated asbestos-containing materials abated by licensed asbestos contractors prior to demolition.

No substantial impacts to air quality would result from implementation of the proposed project, and no further mitigation is required beyond the avoidance and minimization measures discussed more thoroughly in the FEIR/EA.

6G. Title VI Considerations

This project is likely to provide minor, positive impacts for low mobility groups such as youth, handicapped, aged, and economically disadvantaged. Wider shoulders are being provided on SR 29, SR 281, and Red Hills Road. Curb ramps and sidewalks at the SR 29/281/Red Hills Road intersection will be included in the scope of work. See various sections of the FEIR/EA for specific Title VI discussion and Appendix C of the same for the current Caltrans Title VI Policy Statement.

7. OTHER CONSIDERATIONS AS APPROPRIATE

7A. Public Hearing Process

Since approval of the DPR in 2007, a public hearing was held at the Lower Lake High School gymnasium in the fall of 2007 and early summer of 2016. The meetings were conducted in as public hearing, open house forum style meetings where attendees were able to visit display stations, discuss the proposed project and the Revised Partial Draft EIR/EA with Caltrans’ project staff, and enter formal comments into public record. Attendees were directed to make formal statements to a certified court reporter present at the meeting. Comment cards were also made available. Approximately 20 people attended the meeting, consisting mainly of property owners within the project limits.

7B. Route Matters

- **Freeway Agreement**

A Freeway Agreement will need to be executed with the County Agencies. The new agreement will identify the new frontage roads and local road extensions that will become the property of the County. It will address access control to the facility. Information governing the maintenance responsibilities of the State and County within these project limits will be included in the Freeway Agreements. Freeway Agreements are executed following approval of the Project Report and Environmental Document (PA&ED).

- **Relinquishments**

Portions of the existing SR 29 alignment will serve as frontage roads for the new alignment. According to Section 27 of the California Streets and Highway Code, the State of California shall relinquish to any county or city any portion of any state highway within the county or city that has been removed from the state highway system. Relinquishments are made by a resolution of the California Transportation Commission (CTC).

- **Cooperative Agreements**

The existing cooperative agreement between the State and the County of Lake for electrical power service and maintenance of the signal at the intersection SR 29/281/Red Hills Road will be perpetuated.

7C. Permits

The Contractor will be required to obtain an encroachment permit from the County of Lake for any contract work involving County facilities. Caltrans will be required to obtain permits from various regulatory agencies as described in Section 6E (Environmental Issues) of this report.

7D. Traffic Management Plan (TMP)

This project will impact SR 29, SR 281 and SR 175 and local traffic around the intersection of SR 29/SR 281 during construction. Most of the interference will likely occur during earthwork (particularly transporting embankment), at road crossings during bridge construction and during the final connections of the new facilities to the existing highway.

District 1 Traffic Operations developed a Transportation Management Plan (TMP) dated February 23, 2007 (Attachment J). The TMP makes several general recommendations such as keeping emergency services, county, city and local agencies informed of lane closures schedules, placing a minimum of one PCMS in advance of construction from all highway approaches, maintaining access to side roads and residents at all times, constructing a signal system for final connections and adding advanced flashing beacons for traffic at night.

The TMP states one-way reversible lane closures will not be allowed between 7:00 am and 8:00 pm. Therefore, night work may be required if two 12-foot lanes (plus 4-foot shoulder, one in each direction) cannot be maintained with temporary detours in the daylight. Full closures of the road are allowed in the daylight hours for no more than five minutes for movement onto or across the highway by construction equipment.

It is anticipated that Design staff will work continuously with Traffic Operations staff and/or a constructability review committee to develop stage construction plans, traffic handling

plans, an updated TMP and a formal Traffic Management Plan to minimize traffic impacts. This work will be completed in the Design Phase of this project.

7E. Construction Staging

The preferred alternative is in close proximity to the existing highway. Stage construction and traffic handling plans will be required to construct the preferred alternative, including the mainline expressway, frontage roads, intersection signalization, wildlife crossings, retaining walls, box culverts on SR 281, etc. Preliminary conceptual stage construction and traffic handling plans for the preferred alternative have been developed.

It is currently planned to construct the proposed SR 29 shoulder using the traveled way structural section so that traffic can run on the shoulder pavement for an extended period of time as required by the conceptual stage construction plans. Due to the large change in profile grade from the existing highway to the new 4-lane facility at some locations, it will be necessary to not construct the ultimate design width of the new roadway during the first stages of construction. Temporary cut and fill slopes for stage construction and traffic handling can be constructed at a slope ratio of 1:1. Conceptual haul road locations have been determined. Temporary drainage facilities have been incorporated in the stages of construction. After one direction of the proposed SR 29 is completed to the design width, it will be possible to construct the remaining roadway to completion. Final stage construction and traffic handing plans will be developed during the design phase of the project.

7F. Geotechnical Issues

The project site is located within the Clear Lake volcanic fields. Types of rock found in the project area include dacite, andesite, obsidian, basalt, tuff and other pyroclastic rock, and rhyolite. Alluvium (sedimentary material deposited by flowing water) is found primarily in low-lying areas such as Manning Flat and Shaul Valley.

According to the Soil Conservation Service, the project area traverses about 10 different soil types, ranging from clayey loam to gravelly sandy loam. The permeability values of these soils range from low to very high. Within the wetland areas, the majority of the underlying soils are expected to consist of silts and sands with some clay.

The proposed project area is in a region of numerous faults that are zoned as active faults by the State of California, with many faults trending toward and two faults crossing the project corridor. Therefore, the potential for surface rupture due to fault movement in the project area is considered to be likely during the lifetime of the project. Strong earthquake ground shaking is likely the most important seismic hazard that can be expected in this area. Based on the Caltrans California Seismic Hazard Map, the main fault in the project area is the Konocti Bay fault and the peak bedrock acceleration at the project area is estimated to be 0.6g (acceleration equivalent to 60 percent of the force of gravity).

Based on published geological mapping of soil types, field observations and groundwater observations, potential for liquefaction may exist along portions of the project corridor. Potentially liquefiable materials will either be removed or engineered to reduce their liquefaction potential, or the engineering design will incorporate deep foundations that extend beyond soils with the potential for liquefaction.

Wetland areas with soft or loose silts and sands may be subject to subsidence. Measures to minimize subsidence issues will be needed in these areas and will be determined by future subsurface investigations.

Soils with high shrink-swell potential were only found at Manning Flat, in the eastern section of the project area. Expansive soils may need to be over-excavated and replaced with non-expansive fill or treated with appropriate soil amendments to reduce the potential for shrinking and swelling.

According to several borings collected in the area, the true groundwater table is deeper than 20 feet, but in some areas, there is a perched water table as shallow as about 3 feet below the ground surface.

Over the course of project development to date, Design has made several requests of Geotechnical Services to provide recommendations on project aspects of geotechnical nature. Most of these spanned between 2003 and 2008. A summary of the recommendations made over that span, as well as memos provided after the DPR are included herein as Attachment I. Many of the recommendations over those years were not based on geotechnical subsurface investigations or laboratory analysis. Rather, the recommendations were based on field observations, geologic publications and engineering judgement. Nearly all of the recommendations came with the caveat that follow up investigations would be needed in the future and that a Geotechnical Design Report (GDR) should be requested at the appropriate time. The last recommendation memo (2008) provided recommendations in response to cost saving slope recommendation findings of the VA Study. Specifically, the two options to using a cut slope ratio of 1.5:1 and one option on using a fill slope ratio of 4:1.

7G. Storm Water Management and Proposed Drainage Facilities

- **Storm Water Management**

This project is located within the jurisdiction of the Central Valley Regional Water Quality Control Board (CV-RWQCB)—one of nine regions under the State Water Resources Control Board (SWRCB). Other agencies that have jurisdiction over water resources in the project area include the East Lake Resource Conservation District, the Lake County Water Resources Division, and the California Department of Water Resources (DWR)-Northern District. The CV-RWQCB has not designated any beneficial uses in the Basin Plan (RWQCB 1998) for Thurston Lake or other surface waters connected to the project area.

Proposed storm water runoff management is in conformance with the statewide National Pollution Discharge Elimination System (NPDES) permit requirements as set forth by SWRCB and managed locally by the CV-RWQCB. The 1999 Caltrans Statewide MS4 requirements apply to this project. Major features of storm water permanent Design Pollution Prevention and Treatment BMPs are as follows: Culverts, energy dissipating devices, ditches, and peak attenuation/water quality basins will be positioned to maintain existing hydrology; top of cut ditches to intercept run-on flow; apply slope rounding to blend cut and fill slopes into the original ground promoting sheet flow; biofiltration strips and swales, infiltration and detention devices, and traction sand traps to treat contaminants during water quality volume and flow storm events (85th percentile storms). The Caltrans Storm Water Quality Handbook – Project Planning and Design Guide will used in the design phase to help determine the selection of specific temporary BMPs. See the Storm Water Data Report (Attachment M) for greater detail.

The terrain surrounding the project is mostly mountainous with interspersed small closed valleys, basins, and flats. Starting at the beginning of the project there are three main drainage basins separated by low ridges: Thurston Creek and Lake, an unnamed basin adjacent to Kelseyville Auto Salvage, and Shaul Valley. The Thurston basin collects

approximately 75 percent of the project area runoff. Thurston Lake itself lies outside the project limits and is separated from Clear Lake by a volcanic ridge. See the Drainage Report for further hydrologic information.

- **Proposed Drainage Facilities**

Proposed drainage facilities will be designed to perpetuate existing drainage patterns. Existing cross culverts will be replaced with longer and larger diameter pipes when required. New culverts will be strategically placed to direct runoff to existing channels and/or to attenuation basins. Attenuation basins are proposed where feasible to control on-site discharge flow rates and prevent hydraulic changes downstream of the new facility. Small storm drain systems are proposed in the median and along the edge of pavement to dewater the roadway. The storm drain systems will typically connect to, or outlet directly upstream of, a cross culvert. Underdrains are proposed within the new cut slope sections to help alleviate subsurface water from entering the new structural sections of SR 29 and frontage roads. Temporary culverts are expected to be used during stage construction. Alternate pipe culverts are recommended at some locations due to pH and resistivity test results of site collected water samples (See Attachment K). A detailed analysis of these systems will be performed in the design phase.

At Mannings Flat, a level spreader is proposed for the purpose of perpetuating sheet flow conditions for the benefit and protection of protected plant species in that area. Level spreaders are commonly used, engineered devices that simply creates sheet flow drainage characteristics from a source of concentrated flow. Essentially, the spreader acts like an outlet weir to evenly distribute concentrated inflow as the water spills over the outflow control feature. For the Lake 29 Improvement Project, the proposed level spreader would be constructed of concrete as construction tolerances and flow characteristics are more controlled with concrete compared to other materials. A level spreader analysis report was prepared for the project and is included as Attachment R.

Thurston Creek will be encroached on by the new SR 29 embankment to avoid nearby endangered plants. Rock slope protection is proposed along the embankment-creek interface. Downstream the existing large reinforced concrete box culvert carrying Thurston Creek under SR 281 will be improved from a double-cell box culvert to a quintuple-cell box culvert to improve peak flow management (Attachment F).

Paul and Consuela Smith (APN 001-022-80, 81) have requested the inundation area, which forms during the winter season, be perpetuated in the new highway design. Hydraulic engineers met the Smiths onsite and determined a new location for the inundation area on the properties. The relocated inundation area takes advantage of the area currently dedicated to Lake County for the property's current access road.

7H. Complete Streets

Caltrans' Complete Streets Directive promotes a transportation system that safely accommodates bicyclists, pedestrians and transit users. This project would construct a 4-lane expressway in a rural area. The adjacent land use is scattered rural residential, recreational and undeveloped land (open space). Traffic planning studies indicate few non-motorized vehicles (in particular, bicycles), or pedestrians are interregional through trips. However, bicyclists will be permitted on the expressway and the 10 foot wide outside shoulders will serve as shared facilities for bicyclists. An ADA standard pedestrian sidewalk will be constructed along Red Hills Road and along SR 281 leading to the shopping center and the crosswalks at that location will be perpetuated.

The proposed improvements account for the needs of everyone using the road, and the project funding, planning, design, maintenance, and operations are in alignment with the goals of the Caltrans Complete Streets policy. All modes of transportation have been included in the proposed design to the extent feasible.

There is one school bus stop within the project limits on Red Hills Road from Kelseyville Unified School District. The bus stop is approximately 900 feet south of the SR 29/Red Hills Road intersection and at the intersection of a public road. The stop will be maintained with minimal disruptions throughout the construction of the expressway by working with educational transportation management staff.

Lake Transit Authority has a route on SR 29 that travels from Lakeport south to Clearlake and back with a timed transfer point at Kit's Comer shopping center at the SR 29/SR 281 intersection. Service for transit riders will be continually perpetuated or reconfigured in communication with Lake Transit Authority.

7I. Green House Gas Emissions and Climate Change

Section 3.4 of the FEIR/EA (Attachment E) provides a detailed discussion on State and Federal regulatory settings and policies regarding greenhouse gas (GHG) emissions and climate change. Tied to these regulations, the Department of Transportation has developed a Climate Action Program which firstly, recognizes the connection between GHG and the transportation system and secondly, strategizes to reduce GHG by making the system more efficient by reducing congestion and vehicle time delays.

Section 3.4 also contains analysis of project impacts to GHG emissions and climate change. Specifically, as part of the Climate Change study in the FEIR/EA, a model was created to calculate CO2 emissions for several scenarios. These scenarios are summarized in the table below.

Table 10. Lake 29 Improvement Project CO2 Total Emissions (US Tons per Day)

Pollutant	2013 Existing	2021 No Build	2021 Build (Alternative D)	2041 No Build	2041 Build (Alternative D)
CO2	3.588075	4.2420709	4.2532975	5.9325415	5.8050418

The data in the table shows that for the year 2021, CO2 emissions for Alternative D are 0.26% higher than the No Build alternative. However, by 2041, CO2 emissions for Alternative D are 2.15% lower than the No Build alternative. Therefore, it is anticipated that the proposed Build alternative would contribute to a 2.15% reduction in GHG emission by 2041 within the project limits when compared to the 2041 no build.

Construction emissions can also contribute to GHG generation. These emissions would be produced at different levels throughout the construction phases depending on the specific construction activity. The frequency and occurrence of their generation can be reduced through innovations in plans and specifications, and by implementing traffic management practices during construction phases. Over the project’s design period, innovations such as longer pavement lives, improved traffic management plans, and changes in materials, can reduce the GHG emissions produced by increasing the intervals between maintenance and rehabilitation events.

Other GHG emission reducing features of the project described in the FEIR/EA include:

- Implement Intelligent Transportation Systems (ITS) to help manage the efficiency of the existing highway system
- Incorporate landscaping to reduce surface warming and decrease CO2.
- Install energy-efficient lighting, such as LED traffic signals and intersection lighting
- Enforce Caltrans Standard Specifications related to air quality restrictions during construction

As GHG emissions and Climate Change regulations and policies are evolving matters that will influence the project in the future, continued monitoring of these sources of impact to the project cost, scope and schedule is recommended.

8. FUNDING, PROGRAMMING, SCHEDULE AND ESTIMATE

8A. Funding

It has been determined that this project is eligible for Federal-aid funding.

8B. Programming

The project is currently programmed with three Expenditure Authorizations (EA): 01-2981U, 01-29821 and 01-29811. These are discussed below and then shown in the table afterward. Programming Sheets for the three projects are included as Attachment N.

This project began in 1988 as two State Transportation Improvement Program (STIP) projects from PM 23.6 to PM 31.6 that were combined in 1999 for environmental study purposes under EA 01-2981U. In December 2013 a Project Study Report (PSR) (EA 01-29811) was prepared to address an elevated number of fatal and injury traffic accidents within a three mile segment (approximately PM 28.5/31.6) of Route 29. The STIP project EA 01-2981U covers an eight mile corridor, as well as the segment from PM 28.5 to PM 31.6, which was identified for the safety improvements in the December 2013 PSR. After several meetings and problem solving sessions with stakeholders and analysis of various options, it was decided to program SHOPP HSIP funding in combination with the STIP funding to construct Segment 2C (PM 28.5/31.6) of the expressway project (01-2981U).

Concurrently, additional funding was programmed in 2014 in a EA in the STIP (EA 01-29821) to be combined with the SHOPP funding for the construction of Segment 2C (PM 28.5/31.6). The funding currently programmed in the 2016 SHOPP and the 2016 STIP will be used for construction of Segment 2C (PM 28.5/31.6). The following table shows the total funding for each of the EA's.

PROGRAMMED SUPPORT & CAPITAL COSTS BY EA

	EA 2981U (STIP) Segments 2A, 2B & 2C	EA 29821 (STIP) Segment 2C	EA 29811 (SHOPP) Segment 2C	
Component	**Cost (x1000)**			**Total**
Support:				
PA & ED	11,370	-	4,000	15,370
PS&E	-	1,500	2,500	4,000
Right of Way	288	300	700	1,288
Construction	-	2,000	2,000	4,000
Capital:				
Right of Way	2,128	2,000	3,000	7,128
Construction	-	22,027	34,000	56,027
Total:	13,786	27,827	46,200	

Funding programmed in EA 01-2981U is provided from the Regional Improvement Program (RIP) 20.XX.075.600, the Interregional Improvement Program (IIP) 20.XX.025.700, and Demonstration Funds from the Transportation Equity Act-21 and Safe, Accountable, Flexible, Efficient Transportation Equity Act: A legacy for Users (SAFETEA-LU), as shown on the 01-2981U Programming Sheet.

Funding programmed in EA 01-29821 in the STIP is provided from the Regional Improvement Program (RIP) 20.XX.075.600 and the Interregional Improvement Program (IIP) 20.XX.025.700 as shown on the 01-29821 Programming Sheet.

The funding currently programmed in the 2016 SHOPP and the 2016 STIP will be used for construction of Segment 2C (PM 28.5/31.6), which is only a portion of the eight mile long project. It is anticipated that the funding from the STIP and SHOPP will be combined at the time of allocation, and that Segment 2C (PM 28.5/31.6) will be constructed under EA 01-2982U. Currently, funding has not been allocated to continue with the final design and construction of Segments 2A & 2B.

The programming sheets to construct Segment 2C are attached. The combined programmed support cost ratio is 28.4%.

8D. Estimate

Attachment G provides detailed cost estimates for the 8 mile long project and Segment 2C. Costs contained within the estimates are current values (not escalated) and reflect data trends from recent bid openings.

The following tables shows the current and escalated cost estimates for Segment 2C:

SUPPORT	Segment 2C (PM 28.5/31.6) Estimate Totals (1.5% esc)
	(x1000)
PA & ED	15,423
PS&E	5,456
Right of Way	2,337
Construction	9,708

CAPITAL	Segment 2C (PM 28.5/31.6)	
	Current Cost Estimate (2016)	Escalated Cost Estimate (2019) (3.5% Cap)
	(x1000)	(x1000)
Right of Way	13,305	14,416
Construction	63,143	67,641

A Project Change Request (PCR) is in development to align the project schedule. The PCR would only effect the SHOPP EA (01-29811). The SHOPP schedule needs to be moved out by one year from FY 2017/18 to FY 2018/19 because the STIP funding and schedule was delayed by the CTC to accommodate a statewide budget shortfall in summer of 2016.

An unfunded need for construction of Segment 2C has been identified. This need is the difference between what is programmed and what is currently estimated for support, R/W and roadway items. All options to the current design to reduce costs will be estimated and analyzed and alternative sources of funding will need to be further investigated. If sufficient additional funding can't be secured, some non-safety improvements proposed within the Segment 2C project limits may need to be eliminated or the project may need to be shortened.

The amount of additional Support needed to construct the remaining portions of the expressway (Segments 2A & 2B) is unclear. Assuming they were constructed together, some economy of scale could be realized in support costs and the estimates in the table below reflect a proportionate reduction for a PS&E with a combined 2A & 2B. Because no funding is foreseen in the near future for PS&E of Segments 2A & 2B, PA & ED costs are included in the estimate in anticipation that some updating to the ED or the other aspects addressed in this PR may be necessary at the time a funding source is identified. At this time, it is unclear when funding will become available.

The table below shows the estimates for design and construction of Segments 2A & 2B:

	Segments 2A & 2B (PM 23.6/28.5)
	Current Cost Estimate (2016)
	(x1000)
Support:	
PA & ED	5,000
PS&E	8,700
Right of Way	3,700
Construction	15,500
Capital:	
Right of Way	20,548
Construction	113,600

8C. Schedule

At this time, support, right of way and construction funding is only programmed through project completion (MS 800) for Segment 2C. Therefore, Segment 2C is the only segment with a schedule beyond PA&ED (MS 200). The current schedule to be proposed in the PCR for Segment 2C is presented in the table below and within Attachment N.

Table 11. Segment 2C Schedule

Segment 2C 01-29811 SHOPP Project 01-29821 STIP Project			
Milestone (MS)	MS Description	MS Date **(01-29821)**	MS Date **(01-29811)**
M000	ID NEED	-	10/25/2013
M010	APPROVE PID	-	1/17/2014
M015	PROG PROJ	7/1/1998	1/17/2014
M020	BEGIN ENVIRO	7/1/2001	
M040	BEGIN PROJ	7/1/2001	
M120	CIRC DPR & DED EXT	5/24/2016	
M200	PA & ED	12/1/2016	
M221	BRIDGE SITE DATA RECEIVED	2/24/2016	
M224	R/W REQTS	8/29/2016	
M225	REGULAR R/W	12/1/2016	
M275	GENERAL PLANS	4/2/2017	
M377	PS&E TO DOE	10/1/2018	
M378	DRAFT STRUC PS&E	7/15/2018	
M380	PROJ PS&E	12/1/2018	
M410	R/W CERT	12/15/2018	
M460	RTL	1/15/2019	
M480	HQ ADVERT	4/15/2019	
M495	AWARD	7/20/2019	
M500	APPROVE CONTRACT	8/3/2019	
M600	CONTRACT ACCEPT	12/1/2022	
M700	FINAL REPORT	12/1/2023	
M800	END PROJ	12/1/2024	

9. RISKS

A Risk Register and Risk Register Certification Form have been included as Attachment O. All risks with high probability on the register have been retired. The remaining active risks on the register have low to moderate probability of occurrence.

Active risks with a high Risk Assessment: Time Score (over 12 and in red) include:

- Costs have increased above programmed amount which could delay delivery. Project Management will work with program managers to gain support and/or possibly pursue a PCR.
- Discovery of unforeseen impacts to sensitive species during preconstruction surveys. The PDT accepted this risk.
- The 1600 Permit may be delayed as a result of disagreement between CDFW & Caltrans. The PDT will mitigate this risk by early engagement with CDFW and by elevating issues that can't be resolved at lower levels.

Active risks with a high Risk Assessment: Cost Score (over 12 and in red) include:

- Design is based on assumption that the geology will support 1.5:1 slopes. Future geotechnical investigations will verify these are feasible. If not feasible, additional r/w and redesign will be necessary. The PDT will mitigate this risk by working with Geotech and Landscape Architecture to identify vulnerable areas and design stepped slopes.

10. EXTERNAL AGENCY COORDINATION

Federal Highway Administration (FHWA)

With this project being eligible for federal-aid, the project is subject to the terms of the latest Stewardship and Oversight Agreement on Project Assumption and Program Oversight agreement between the Federal Highway Administration, California Division and Caltrans (May 28, 2015). Under that agreement, the State (Caltrans) may assume the responsibilities of the Secretary of the U.S. Department of Transportation as allowed in Section 106 of Title 23, United States Code (Section 106), for design, plans, specifications, estimates, contract awards, and inspections with respect to the projects unless the Secretary determines that the assumption is not appropriate. To date, the project has not been identified as either a *"Project of Division Interest" or a "Project of Corporate Interest."* to the FHWA and therefore, Caltrans will assume all responsibilities as permitted in the agreement.

After project approval, the Project Report will be provided to Caltrans' FHWA Liaison for coordinating funding obligations and approval of the Project Agreement with the FHWA.

Responsible Agencies under CEQA:

- California Department of Fish and Wildlife (CDFW)
- California Transportation Commission (CTC)
- California State Office of Historic Preservation
- Central Valley Regional Water Quality Control Board (CVRWQCB)

Trustee Agencies under CEQA:

- California Department of Fish and Wildlife

Cooperating Agencies (federal):

- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)

Lake 29 Technical Advisory Committee Agencies

- Caltrans
- Lake County Community Development Department
- Consultant, Dow and Associates
- City of Clearlake
- City of Lakeport
- California Highway Patrol
- Lakeport Community Development Department
- County of Lake
- Lake County Transit Authority

External Partners/Stakeholders

- Scotts Valley Band of Pomo
- Lower Lake Rancheria Koi Nation
- CDFW
- Lake County/City APC
- USFWS
- Lake County Air Quality Management District
- USEPA
- California Department of Toxic Substances Control
- Big Valley Rancheria of Pomo Indians
- Lake County Board of Supervisors
- USACE

11. PROJECT REVIEWS

Over the project history, several geometric reviews have been conducted by John Roccanova and Heidi Sykes (Division of Design, Geometric Reviewers), as well as Jim Deluca and John Steele (Division of Design, Design Coordinators), regarding roadway geometrics. These reviews included discussions on horizontal and vertical alignment, profile grade, acceleration and deceleration lanes, turning pockets, embankment side slope ratios, roundabouts and interchange geometrics. Discussion of the proposed exceptions to advisory and mandatory design standards has occurred and they are in general agreement.

As was mentioned previously, the VA Study recommended segmenting the construction of the 8 mile project. Segmenting of the project lends to development of a separate fact sheets for advisory and mandatory design standards at the time those segments are programmed for construction. Design staff will continue to work with Geometric Reviewers regarding geometric standards at the northbound SR 29 left turn pocket at Diener Drive,

embankment side slope ratios, and any other design standard related aspects of the project.

Heidi Quintrell, North Region Constructability Engineer, performed initial review of the conceptual stage construction traffic handling plans (c. 2007). Alan Escarda, Area Construction Engineer, provided a constructability review in 2012.

Current storm water design and project requirements have been reviewed by Sheila Sadkowski, North Region Design and Engineering Services Storm Water Coordinator.

This project will be further reviewed for Safety and Constructability during the internal circulation of the Project Report.

12. PROJECT PERSONNEL

Division of Design, Design Coordinator	Jim Deluca	Retired
Division of Design, Geometric Reviewer	Heidi Sykes	(916) 825-2600
Division of Design, Design Coordinator	John Steele	Retired
Division of Design, Geometric Reviewer	John Rocconova	Retired
Project Designer	Edward Cramer	(707) 445-6558
Project Designer	Brian Simon	(707) 445-6648
Chief, Design Branch E1	Mark Sobota	(707) 441-5729
Engineering Geologist	Tagg Nordstrom	(707) 445-7884
Chief, D1 Geotechnical Engineering	Charlie Narwold	(707) 445-6036
Project Manager and PDT Leader	Jaime Matteoli	(707) 441-2097
Associate Environmental Planner	Emiliano Pro	(530) 225-3515
Chief, Environmental Planning, S1	Chris Quiney	(530) 225-3174
Chief, R/W Appraisal	Robert Close	(707) 745-6582
Chief, District 1 Traffic Safety	David Morgan	(707) 445-6376
Chief, District 1 Traffic Operations	Kevin Church	(707) 445-6377

13. ATTACHMENTS

Attachment A: Project Location Map
Attachment B: Project Alternatives Map
Attachment C: Typical Cross Sections
Attachment D: Layout of Alignments
Attachment E: Final Environmental Document (attached as separate document)
Attachment F: Structures Advanced Planning Study
Attachment G: Cost Estimates
Attachment H: Right of Way Data Sheets
Attachment I: Preliminary Geotechnical Report
Attachment J: Transportation Management Plan
Attachment K: Preliminary Materials Recommendation
Attachment L: Signal Configuration
Attachment M: Storm Water Data Report
Attachment N: Programming Sheets
Attachment O: Risk Management Plan
Attachment P: Wildlife Crossing Plans
Attachment Q: Preliminary Drainage Report
Attachment R: Level Spreader Report
Attachment S: Traffic Analysis