Appendix A

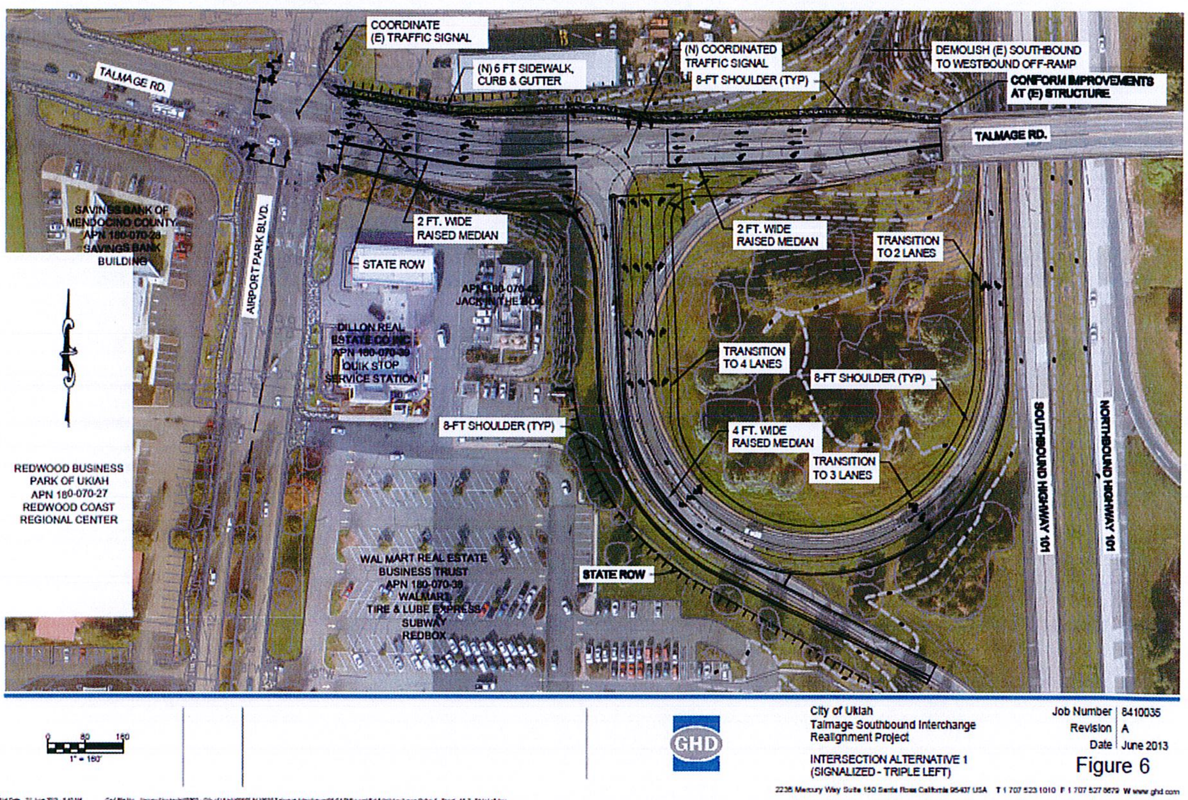
Draft Mitigated Negative Declaration and Notice of Preparation

City of Ukiah

California Environmental Quality Act

Talmage Road / Southbound U.S. 101 On-Off Ramp Realignment Project

Initial Environmental Study and Mitigated Negative Declaration



Department of Planning and Community Development
July, 2013

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INTRODUCTION

The City of Ukiah (City) proposes to modify and reconstruct the southbound portion of the U.S. 101 interchange at Talmage Road (State Route 222) in Ukiah, California, to provide additional capacity in order to address future impacts associated with projected growth in the Redwood Business Park and regional growth (project). Projects which are anticipated to contribute to increased traffic volume on Airport Park Boulevard and Talmage Road are identified in previous environmental documents. The purpose of the project is to alleviate congestion, and improve traffic operations and safety for the southbound on- and off-ramps and the Talmage Road Corridor. The Project includes improvements to the southbound on- and off-ramps to realign them and provide additional lanes and capacity, and improvements to Talmage Road within the State right-of-way in the City of Ukiah. Two interchange alternatives and four intersection alternatives were evaluated, and are described in greater detail later in this technical memorandum. The preferred alternative for the project involves a partial cloverleaf interchange configuration with a new signalized intersection at the southbound ramp terminus with Talmage Road. The new signalized intersection at Talmage Road and the southbound on/off ramps is proposed to be interconnected and coordinated with the existing signalized intersection at Talmage Road and Airport Park Boulevard. Other proposed improvements include new sidewalks, signing and striping, medians, and safety lighting. The project area generally extends from the intersection of Talmage Road and Waugh Lane in the west to the intersection of Talmage Road and Hastings Frontage Road in the east, and from the U.S. 101 southbound off ramp diverge in the north to the U.S. 101 southbound on ramp merge in the south.

The proposed project is the result of a collaborative process between the City, its consulting team, and the California Department of Transportation, District 1. A substantial amount of traffic information and modeling was generated, which after detailed review by all parties, resulted in the proposed project moving forward.

This Initial Environmental Study was undertaken to determine what potential environmental impacts could result from construction of the project. Even though the project would correct existing and future traffic impacts, other potential impacts were identified that could result from actual construction activities. These included biological, noise, hydrological, aesthetics, and others. The proposed project is described in detail below, as are the project objectives and the environmental setting of the project area.

Supporting this document is a number of recently completed technical studies. These include a noise assessment, natural environment (biological) study, air quality assessment, hazardous substance study, archaeological survey, historic properties inventory, geotechnical report, and traffic impact analysis. In addition, a number of recently prepared environmental documents were used to gather information for this Initial Environmental Study. Most notably, staff examined and used information from the FEIR for the Wal-Mart expansion project, prepared by the consulting firm ESA and certified by the City Council on January 18, 2012. Additionally the Draft EIR for the Costco project, dated January, 2013 was examined and used to gather additional data and information. All of the studies listed above are incorporated into this document by reference.

The findings contained within this Initial Environmental Study will be used in support of the preparation of a Mitigated Negative Declaration for the project.

BACKGROUND INFORMATION

Project Name: Talmage Road / Southbound U.S. 101 On-Off Ramp Realignment Project

Project Location: The project area is located at the western side of the Talmage Road/U.S. Highway 101 interchange situated in the southeast portion of the City.

Project Applicant: The City of Ukiah Department of Public Works is the project proponent.
300 Seminary Avenue
Ukiah, CA 95482

Staff Contact: Project: Rick Seanor, Deputy Director of Public Works / rseanor@cityofukiah.com (707) 463-6296

CEQA: Charley Stump, Director of Planning and Community Development / cstump@cityofukiah.com (707) 463-6219

Initial Study Preparation: Staff – Department of Planning and Community Development

Date of initial Study Completion: July 22, 2013

Date 30-day Public Comment Period Closes: July 26, 2013 through August 27, 2013

Purpose of Initial Environmental Study: This Initial Environmental Study has been prepared in conformance with the California Environmental Quality Act of 1970 (CEQA) and the State CEQA Guidelines to evaluate the environmental effects of implementation of the proposed project. The purpose of the Study is not to recommend approval or denial of a project, but to provide decision-makers, public agencies, and the general public with objective information regarding the range of the potential environmental effects that could result from implementation of the project. The environmental review process is specifically designed to objectively evaluate and disclose potentially significant direct and indirect impacts of a proposed project; to identify alternatives that could reduce or eliminate a project's significant effects while continuing to achieve the major objectives of the project; and to identify potentially feasible mitigation measures that reduce or avoid the significant effects of a project.

Initial Study and Mitigated Negative Declaration Process:

This draft Initial Environmental Study and Mitigated Negative Declaration are being circulated for public review and comment for a period of 30 days. During this period, the general public, organizations, and agencies can submit comments to the lead agency on the draft Initial Environmental Study and Mitigated Negative Declaration's accuracy and completeness.

Because the project will require review and approval by the State Department of Transportation (CalTrans), the Initial Environmental Study and proposed Mitigated Negative Declaration were sent to the State Clearinghouse for distribution to State Agencies and a 30-day review and comment period.

Upon completion of the public review period, comments on the draft Initial Environmental Study and Mitigated Negative Declaration will be reviewed and responses to those comments will be prepared. Before the City can consider approval of the proposed project, it must first find that the Mitigated Negative Declaration is complete, accurate and adequate, and in compliance with CEQA. The City Council must make this finding using its independent judgment.

Upon publication of this Initial Environmental Study and Mitigated Negative Declaration, the City of Ukiah provided public notice of the document's availability for public review and invited comment from the general public, agencies, organizations, and other interested parties. Copies of the Initial Environmental Study and Mitigated Negative Declaration can be found at the following locations:

City of Ukiah
Planning and Community Development Department
Front Counter
300 Seminary Avenue
Ukiah, CA 95482

City of Ukiah Website: www.cityofukiah.com

The public review and comment period is +30 days from July 26, 2013 through August 27, 2013. All written public comments on the draft Mitigated Negative Declaration must be received no later than 5:00 p.m. on August 27, 2013. All written comments or questions regarding the draft Mitigated Negative Declaration should be addressed to:

Charley Stump, Director
Planning and Community Development
300 Seminary Avenue
Ukiah, CA 95482
cstump@cityofukiah.com

Lead Agency:

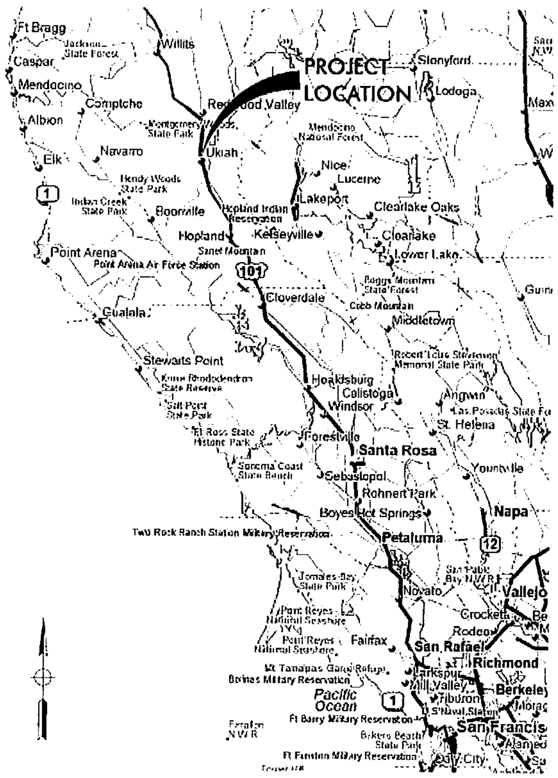
Lead Agency: In conformance with Sections 15050 and 15367 of the State CEQA Guidelines, the City of Ukiah is the "lead agency" for the proposed project, defined as the "public agency which has the principal responsibility for carrying out or disapproving a project." The City of Ukiah, as lead agency, is responsible for scoping the analysis, preparing the Initial Environmental Study and Mitigated Negative Declaration, and responding to comments received on the draft Mitigated Negative Declaration.

Responsible Agency: Responsible agencies are state and local public agencies other than the lead agency that have authority to carry out or approve a project or that are required to approve a portion of the project for which a lead agency is preparing or has prepared an Initial Environmental Study/Mitigated Negative Declaration. For the Talmage Road/Southbound U.S. 101 Interchange Realignment project, CalTrans is a Responsible Agency.

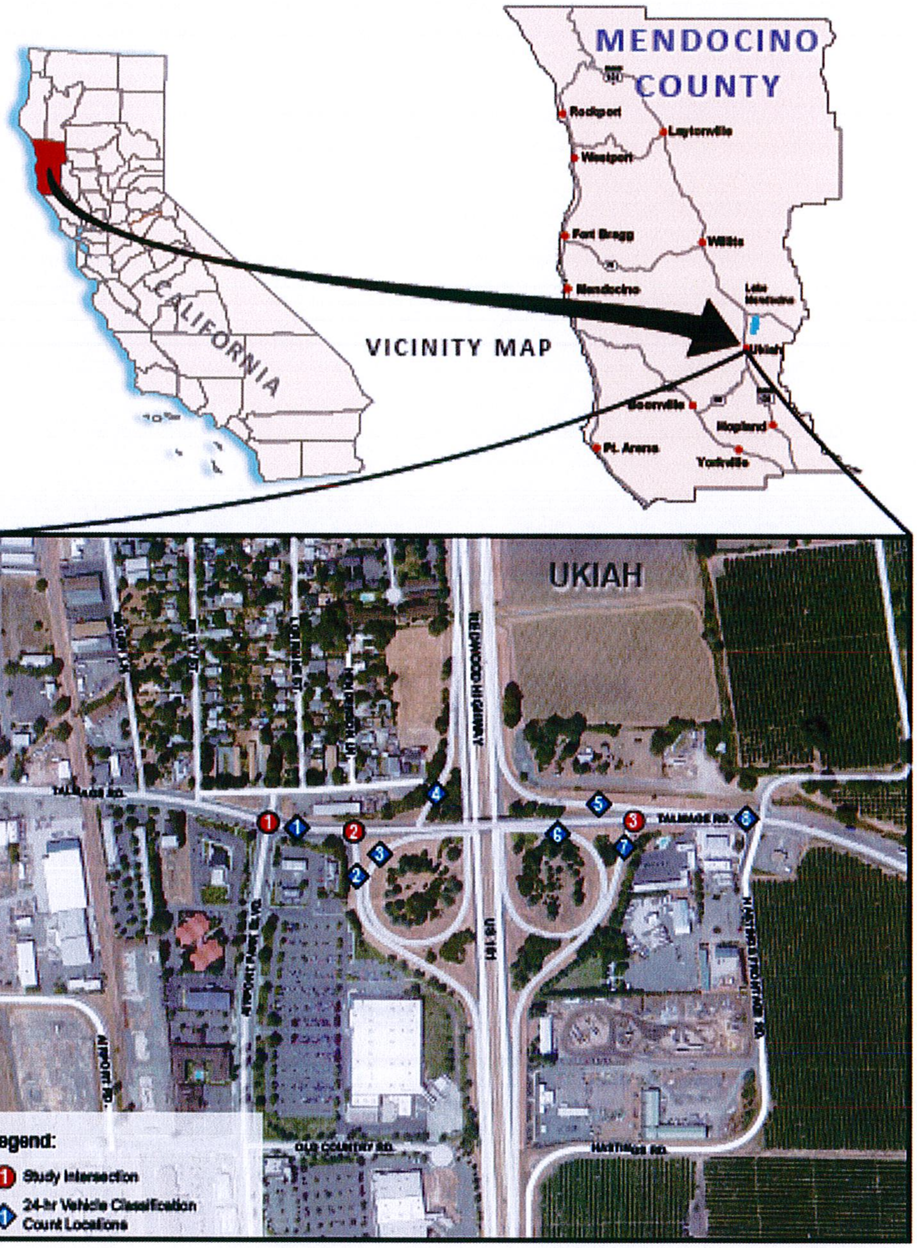
Trustee Agencies: Trustee agencies under CEQA are public agencies with legal jurisdiction over natural resources that are held in trust for the people of California and that would could potentially be affected by a project, whether or not the agencies have authority to approve or implement the project. For the Talmage Road/Southbound U.S. 101 Interchange Realignment project, there are no Trustee Agencies.

PROJECT LOCATION

The project area is located in the southeastern portion of the City just north of the Airport Industrial Park/Redwood Business Park. The specific site is situated on the western portion of the Talmage Road/U.S. Highway 101 interchange.



Project Site Location - Region



Project Site Location - City of Ukiah

Highway 101 / Talmage Road Interchange

PROJECT SETTING

According to the State CEQA Guidelines, an Initial Study must include a description of the existing physical environmental conditions in the vicinity of the project to provide the "baseline condition" against which project-related impacts are compared. The baseline condition for the proposed project is the physical condition that existed when the City Council approved the contract with GHD to prepare the construction drawings for the project.

The inland urban section of Mendocino County, where the project is located, consists of the cities of Ukiah and Willits as well as a large number of unincorporated communities along the main transportation corridors. U.S. 101 is the main (in some areas exclusive) north/south roadway and Highway 20 is the main east/west connector. The Northwestern Pacific Railroad runs roughly parallel to U.S. 101 and connects Willits and Ukiah. Currently U.S. 101 serves as the "main street" for Hopland and Willits however bypasses for both areas are in the planning stages. U.S. 101 varies between a divided highway, freeway and 2-lane roadway in this area.

The environmental setting of the project site can be characterized as densely urban because it is the location of the major street interchange between U.S. Highway 101 and Talmage Road, which is classified as a local arterial street in the City General Plan. Topographically, the project site is flat except for the interchange elevations. Elevations range between approximately 594 feet above sea level along US 101 and 597 feet above sea level along the Talmage Road overpass.

Surrounding land uses include commercial to the south and west, Highway 101 to the east, and a mix of residential types +100 feet to the north/northwest.

PROJECT DESCRIPTION

The City of Ukiah (City) proposes to modify and reconstruct the southbound portion of the U.S. 101 interchange at Talmage Road (State Route 222) in Ukiah, California, to provide additional capacity in order to address future impacts associated with regional growth and projected growth in the Airport Industrial Park, which is comprised of the Redwood Business Park and Airport Business Park. Projects which are anticipated to contribute to increased traffic volume on Airport Park Boulevard and Talmage Road are identified in previous recent environmental documents such as the Wal-Mart Expansion FEIR (2011) and Costco DEIR (2013).

The purpose of the project is to alleviate congestion, and improve traffic operations and safety for the southbound on- and off-ramps and the Talmage Road Corridor. The Project includes improvements to the southbound on- and off-ramps to realign them and provide additional lanes and capacity, and improvements to Talmage Road within the State right-of-way in the City of Ukiah. Two interchange alternatives and four intersection alternatives were evaluated, and are described in greater detail later in the technical memorandum and traffic impact study (GHD 2013) incorporated by reference herein.

The preferred alternative (examined in this environmental document) for the project involves a partial cloverleaf interchange configuration with a new signalized intersection at the southbound ramp terminus with Talmage Road. There will be three (3) left turn lanes onto westbound Talmage Road and one (1) eastbound lane. Two dedicated left turns would be provided into the Airport Industrial Park. The existing southbound off-ramp would be removed. The new signalized intersection at Talmage Road and the southbound on/off ramp are proposed to be interconnected and coordinated with the existing signalized intersection at Talmage Road and Airport Park Boulevard. Other proposed improvements include new sidewalks, signing and striping, medians, and safety lighting. The project area generally extends from the intersection of Talmage Road and Waugh Lane in the west to the intersection of Talmage Road and Hastings Frontage Road in the east, and from the U.S. 101 southbound off ramp diverge in the north to the U.S. 101 southbound on ramp merge in the south. All improvements would occur within previously disturbed land within existing City or State road rights-of-way.

Construction activities would primarily occur during normal business hours and would involve traffic control. Talmage Road and the southbound on and off-ramps would remain functional during construction activities.

There are a number of trees within the existing off-ramp loop, but none would be altered or removed as a result of the project. All trees would be carefully protected from construction activities.


NORTHBOUND HIGHWAY 101
SOUTHBOUND HIGHWAY 101
DEMOLISH (E) SOUTHBOUND TO WESTBOUND OFF-RAMP
CONFORM IMPROVEMENTS AT (E) STRUCTURE
TALMAGE RD.
TRANSITION TO 2 LANES
8-FT SHOULDER (TYP)
TRANSITION TO 3 LANES
(N) COORDINATED TRAFFIC SIGNAL
8-FT SHOULDER (TYP)
2 FT. WIDE RAISED MEDIAN
TRANSITION TO 4 LANES
4 FT. WIDE RAISED MEDIAN
STATE ROW
(N) 6 FT SIDEWALK, CURB & GUTTER
8-FT SHOULDER (TYP)
COORDINATE (E) TRAFFIC SIGNAL
2 FT. WIDE RAISED MEDIAN
STATE ROW
DILLON REAL ESTATE CO INC
QUIK STOP SERVICE STATION
WAL MART REAL ESTATE BUSINESS TRUST
WALMART
TIRE & LUBE EXPRESS
SUBWAY
REDBOX
AIRPORT PARK BLVD.
TALMAGE RD.
SAVINGS BANK OF MENDOCINO COUNTY
SAVINGS BANK BUILDING
REDWOOD BUSINESS PARK OF UKIAH
APN 180-070-27
REDWOOD COAST REGIONAL CENTER
City of Ukiah
Talmage Southbound Interchange Realignment Project
INTERSECTION ALTERNATIVE 1
(SIGNALIZED - TRIPLE LEFT)
Job Number | 8410035
Revision | A
Date | June 2013
Figure 6

PROJECT OBJECTIVES

1. To correct existing traffic congestion at the Talmage Road/Highway 101 interchange, specifically the southbound on and off-ramps.
2. To improve the Talmage Road/Highway 101 interchange so that it successfully accommodates vehicle and pedestrian traffic resulting from build-out of the Airport Industrial Park (Redwood Business Park and Airport Business Park).
3. To improve the Talmage Road gateway into the City of Ukiah.
4. To improve pedestrian facilities along Talmage Road at its intersection with U.S. Highway 101.
5. To limit site disruption and avoid the removal of existing trees.
6. To limit disruption to the flow and circulation of traffic during construction activities.

TECHNICAL STUDIES

The following technical studies were prepared for the project:

1. Talmage Road Improvement Project Draft Environmental Noise Assessment, Illingworth & Rodkin, Inc., January 24, 2013.
2. Natural Environment Study Minimal Impact Talmage Road/US 101 Interchange, Wildlife Research Associates, January 18, 2013.
3. Talmage Road Improvement Project Draft Environmental Air Quality Assessment, Illingworth & Rodkin, Inc., February 21, 2013.
4. Aerially Deposited Lead and Soil Impacts from Hydrocarbons – Talmage Interchange, GHD, Inc., January 30, 2013.
5. Limited Materials Report and Preliminary Geotechnical Report: Transportation Improvements for U.S. 101/Talmage Road Southbound Interchange Realignment Project in Ukiah – Rau & Associates, May, 2013.
6. Talmage Road Southbound Interchange Project Traffic Impact Study and Technical Memorandum – GHD, Inc., June 21, 2013
7. Archeological Survey Report, ASC March, 2013
8. U.S. Highway 101 / Talmage Road Interchange Project Historic Proeprty Survey Report, Anthropological Studies Center, Sonoma State University, March, 2013

SUMMARY OF POTENTIAL IMPACTS

The environmental factors checked below would be potentially affected by this project, as indicated by the checklist and corresponding discussion on the following pages.

☒ Aesthetics	☒ Global Climate Change	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology / Soils
☒ Hazards & Hazardous Materials	☒ Hydrology / Water Quality	☒ Land Use / Planning
☒ Mineral Resources	☒ Noise	☒ Population / Housing
☒ Public Services	☒ Recreation	☒ Transportation / Traffic
☒ Utilities / Service Systems	☒ Mandatory Findings of Significance	

This Initial Environmental Study concludes that the proposed project would have potentially significant adverse impacts on air quality, biological Resources, Geology/Soils, and traffic. However, reasonable and feasible mitigated measures have been identified to avoid or reduce these impacts to levels of insignificance.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure
Air Quality – Particulate (dust) matter	1. The project proponents shall implement all Mendocino County Air Quality Management District requirements for preventing particulate matter (dust) from becoming airborne, including, but not limited to: a) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust. b) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. c) The screening of all open-outdoor sandblasting and similar operations. d) The use of water or chemicals for the control of dust during the demolition of existing buildings or structures.
Biological – Plant and Animal Communities	2. Work will not be conducted during the rainy season (defined as October 15-April 15).
Biological – Plant and Animal Communities	3. Pre-construction surveys for special-status species (i.e., birds) by a qualified biologist shall be conducted at the appropriate times prior to construction activities to determine presence/absence at the site. If no special-status species are found, no further action is required. If individual nesting birds are found, a buffer zone around the species or nest shall be required at a sufficient distance to prevent "take" of individuals until after the nesting season, as determined by a qualified biologist and based on site specific conditions.
Biological – Plant and Animal Communities	4. If the pre-construction survey discover special-status species (i.e., birds), grading or removal of shrub vegetation shall be conducted outside the nesting season,

	which occurs between approximately February 15 and August 15, depending on species.
Biological – Plant and Animal Communities	5. To delineate the buffer zone around a nesting tree (to protect the nest(s) and tree), orange construction fencing placed at the specified radius (as determined by a qualified biologist) from the base of the tree within which no machinery or workers shall intrude.
Geology and Soils	6. All recommendations contained in the Limited Materials and Preliminary Geotechnical Report prepared by Rau and Associates, dated May, 2013 shall be followed and/or incorporated into the project.
Traffic	7. an evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 for signalization should occur once traffic volumes reach existing (2012) with an applied growth factor of 1.25 to 1.30.

Checklist and Environmental Analysis

I. AESTHETICS **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Setting: The City is situated within the Ukiah Valley and includes background views to wooded or chaparral covered mountains. The project site is the Talmage Road/Highway 101 interchange and is a General Plan "gateway" located in the southeastern portion of the City. According to the City's General Plan, "gateway" is a term used to describe the "first impression" that a resident or visitor has of the Ukiah Valley. Per the City's General Plan, Talmage Road is one of six main gateways identified as a "second gateway level", which is an entrance into the city itself.

The project site is developed with roadways and street infrastructure. The surrounding area is densely developed with residential, heavy commercial, retail commercial and agricultural land uses. The site contains a number of trees within the interchange loop, as well as various grasses and shrubs.

Potential Impacts (Items a, b, c and d): The proposed interchange improvement project would modernize the southbound Highway 101 on and off-ramps, add substantial vehicle storage capacity to the facility, and improve both pedestrian and bicycle facilities. No trees would be removed and no structures would be built except for the erection of a traffic signal and new roadway signage. Elimination of the existing southbound off-ramp and the widening of the existing loop off-ramp and the erection of the traffic signal and signage would not adversely impact any scenic vista, damage scenic resources, degrade visual character or create new light and glare for the following reasons:

- While the site is classified as a "gateway" into the City, it is not designated as an official scenic vista or important natural/scenic resource.
- The site is already significantly developed with roadway infrastructure.
- No structures would be built that would alter any views of the western hills or agricultural/open space lands.

Mitigation Measures: None Required.

Impact Significance After Mitigation: N/A

2. AGRICULTURE AND FORESTRY RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
d) Result in the loss of forestry land or conversion of forestry land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use, or conversion of forest land to non-forest use?	☐	☐	☐	☒

Setting: The project area is characterized by dense urban development. While orchards and vineyards are located to the northeast and southeast on the opposite side of Highway 101, none exist within or adjacent to the project area.

Potential Impacts (Items a, b, c, d and e): Because no agricultural or forestry resources exist on or adjacent to the project site, none would be affected or impacted in any way if the existing southbound on and off ramps of the interchange are realigned.

Mitigation Measures: None required.

Impact Significance After Mitigation: N/A

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Setting:

The project area is located in the North Coast Air Basin. The inland portion, like the rest of Mendocino County, is non-attainment for the state PM_{10} standard. The primary sources of PM_{10} are wood combustion emissions, fugitive dust from construction projects, automobile emissions and industry. Some of the automobile emissions are the result of "pass-though" traffic on U.S. 101 because of its nature as a major transportation corridor in the state. The Mendocino County Air Quality Management District (MCAQMD) has full monitoring stations (NOx, Ozone, CO and PM_{10}) in both Ukiah and Willits. A $PM_{2.5}$ monitor has been established in Ukiah. Ukiah has had PM_{10} exceedences in the past. Winter cold-air inversions are common in the valleys from November to February.

<u>Topography</u>

The Ukiah Valley is located in the south-central portion of Mendocino County. The Valley lies within the coastal mountain range, approximately 30 miles east of the Pacific Ocean, at about 630 feet in elevation. The Valley lies at about 39 degrees north latitude and 123 degrees west longitude. The Valley runs north-south for about 9 miles, with a maximum width of about 3 miles. The Russian River enters the Valley at the north end, and runs south along the Valley floor.

<u>Climate</u>

The climate of the Mendocino County is considered Mediterranean and is transitional between that of the coast and that of the interior of California. The climate is characterized by warm dry summers and cool damp winters. During summer, high temperatures of 90 to 100 degrees Fahrenheit (F) are common, while nighttime temperatures range in the 50s and 60s. High temperatures in the 50s and 60s are common during wintertime. Freezing or near-freezing temperatures are common on clear late fall and winter nights. Rainfall occurs mostly during the winter, with an average of 38 inches. December and January are typically the wettest months with an average of seven to eight inches falling during each of these months. Winds are primarily from the northwest direction, especially during the summer. Winds can flow from the south under certain synoptic weather conditions, such as when Pacific low pressure systems affect Northern California, and during the warm weather spells where low-level cooler marine air penetrates in the area through the Russian River Valley. For the most part, winds are light in the Ukiah Valley, which calm wind conditions present up to 50 percent of the time. Most calm wind conditions occur during late fall or early winter.

Meteorology

The Ukiah Valley frequently experiences temperature inversions where warm air aloft traps cold air near the surface. Two types of temperature inversions affect the region: elevated inversions caused by subsidence (sinking air caused by strong high pressure systems) and/or marine air penetration and ground-based inversions where nighttime cold air sinks into the Valley below from surrounding ridges. Inversions limit vertical mixing creating a very stable layer of air near the earth's surface. During late fall and winter, the ground-based inversions are usually present on clear cold nights. In the morning, these ground-based inversions may be weakened and eventually eliminated by solar heating; however, extreme inversions may last several days or weeks. These stagnant periods allow locally produced air emissions to occasionally build up to unhealthy levels.

Existing Air Quality

Criteria Air Pollutants

Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Seven air pollutants have been identified by the United States Environmental Protection Agency (EPA) as being of concern nationwide: CO; O3; NO2; PM10; PM2.5; sulfur dioxide (SO2); and lead (Pb). These pollutants are collectively referred to as criteria pollutants. The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably.

Most criteria pollutants are directly emitted. O3, however, is a secondary pollutant that is formed in the atmosphere by chemical reactions between NOX and VOCs, most commonly referred to as reactive organic gases (ROG). According to the most recent emissions inventory data for Mendocino County, mobile sources are the largest contributors of both ROG and NOX.

Criteria air pollutants are classified in each air basin, county, or in some cases, within a specific urbanized area. The classification is determined by comparing actual monitoring data with state and federal standards. If a pollutant concentration is lower than the standard, the area is classified as attainment for that pollutant. If an area exceeds the standard, the area is classified as nonattainment for that pollutant. If there is not enough data available to determine whether the standard has been exceeded in an area, the area is designated unclassified.

Carbon Monoxide

Carbon monoxide (CO) is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. CO emissions from wood-burning stoves and fireplaces can be measurable contributors. The major immediate health effect of CO is that it competes with oxygen in the blood stream and can cause death by asphyxiation. However, concentrations of CO in urban environments are usually only a fraction of those levels where asphyxiation can occur. Peak CO levels occur typically during winter months, due to a combination of stagnant weather conditions and higher emission rates, such as ground-level radiation inversions. Mendocino County is in attainment of the federal CO standard.

Ozone

Ozone (O3) is the principal component of smog, and is formed in the atmosphere through a series of reactions involving ROG and NOX in the presence of sunlight. ROG and NOX are called precursors of O3. NOX includes various combinations of nitrogen and oxygen, including NO, NO2, etc. O3 is a principal cause of lung and eye irritation in the urban environment. Significant O3 concentrations are normally produced only in the summer, when atmospheric inversions are greatest and temperatures are high. ROG and NOX emissions are critical in O3 formation. Control strategies for O3 have focused on reducing emissions from vehicles, industrial processes using solvents and coatings, and consumer products.

Emissions of the ozone precursors ROG and NOX have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. During the last 20 years the maximum amount of ROG and NOX over an 8-hour period decreased by 17 percent. The NCAB did not participate in the Early Action Compact (EAC) and is no longer subject to the 1-hour ozone standard, and is therefore subject to the new 8- hour ozone standard. Mendocino County is currently in attainment of the federal 8-hour ozone standard.

Nitrogen Dioxide

Nitrogen dioxide (NO2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO2. The combined emissions of NO and NO2 are referred to as NOX and are reported as equivalent NO2. Because NO2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO2 concentration in a particular geographical area may not be representative of the local sources of NOX emissions (EPA, 2011). There are currently no attainment designations for the federal nitrogen dioxide standard.

Respirable Particulate Matter (PM10)

PM includes both liquid and solid particles of a wide range of sizes and composition. While some PM10 comes from automobile exhaust, the principal source in Mendocino County is dust from construction, and from the action of vehicle wheels on paved and unpaved roads. In other areas, agriculture, wind-blown sand, and fireplaces can be important sources. PM10 can cause increased respiratory disease, lung damage, and premature death. Control of PM10 is through the control of dust at construction-sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads. Mendocino County is in attainment of the federal PM10 standards.

Fine Particulate Matter

Fine particulate matter (PM2.5) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM2.5 emissions have remained relatively steady over the last 20 years and are projected to increase slightly through 2020. Emissions of PM2.5 are generally dominated by the same sources as emissions of PM10 (ARB, 2009). Mendocino County is in attainment of the federal PM2.5 standards.

Sulfur Dioxide

Sulfur dioxide (SO2) is produced when sulfur-containing fuel is burned. Health and welfare impacts attributed to SO2 are due to the highly irritant effects of sulfate aerosols, such as sulfuric acid, which is produced from SO2.

Natural gas contains trace amounts of sulfur, while fuel oils contain larger amounts. SO2 can increase the occurrence of lung disease and cause breathing problems for asthmatics. It reacts in the atmosphere to form acid rain, which is destructive to lakes, streams, vegetation, and crops, as well as to buildings, materials, and works of art. All areas in the state are considered either attainment or unclassified for sulfur dioxide. Mendocino County is in attainment of the federal SO2 standard.

Lead (Pb)

Lead is a stable compound, which persists and accumulates both in the environment and in animals. The lead used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere. However, lead emissions have significantly decreased due to the near elimination of the use of leaded gasoline.

Monitoring Station Data and Attainment Area Designations Concentrations of emissions from criteria air pollutants are used to indicate the quality of the ambient air. The air quality within Mendocino County is generally good. The MCAQMD is designated at attainment for all state and federal ambient air quality standards with the exception of the state standard for PM10. Sampling for PM10 is conducted every six days. In 1999, there were two exceedances of the PM10 standard in Ukiah. These exceedances were thought to be caused by severe smoke inundations due to wildfires north and east of Mendocino County.

The MCAQMD maintains a network of five air quality monitoring stations within its jurisdiction. The two nearest air monitoring stations to the potential project sites are maintained in the city of Ukiah at 306 East Gobbi Street and the county library (105 N. Main Street). These air monitoring stations monitor ozone (O3), nitrogen oxides (NOX), carbon monoxide (CO), particulate matter less than 10 microns (PM10), and particulate matter less than 2.5 microns (PM2.5). The Table below summarizes the air quality data from 2008-2010:

	2008	2009	2010
8-hour OZONE (O_3)[1]			
Maximum concentration (1-hr/8-hr avg, ppm)	0.090/0.072	0.094/0.063	0.097/0.051
Number of days state standard exceeded (1-hr/8-hr)	0/1	0/0	1/0
Number of days national standard exceeded (8-hr)	Not applicable/0	Not applicable/0	Not applicable/0
Nitrogen Dioxide (NO_x)[1]			
Maximum concentration (ppm)	0.110	0.094	*
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	Not applicable	Not applicable	Not applicable
CARBON MONOXIDE (CO)[1]			
Maximum concentration (ppm)	3.38	*	*
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
FINE PARTICULATE MATTER ($PM_{2.5}$)[2]			
Maximum concentration ($\mu g/m^3$)	31.6	25.9	22.0
Number of days state standard exceeded	Not applicable	Not applicable	Not applicable
Number of days national standard exceeded	Not applicable	Not applicable	Not applicable
RESPIRABLE PARTICULATE MATTER (PM_{10})[2]			
Maximum concentration ($\mu g/m^3$)	222.3	*	*
Number of days state standard exceeded	Not applicable	Not applicable	Not applicable
Number of days national standard exceeded	Not applicable	Not applicable	Not applicable

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million
[1] Measurements from the Ukiah – East Gobbi Street station (Source: ARB, 2011c).
[2] Measurements from the Ukiah – County Library (101 N. Main Street).
* There was insufficient data to determine the value.

Source: Draft EIR - New Ukiah Courthouse, October, 2012

Toxic Air Contaminants

In addition to the criteria air pollutants, another group of airborne substances called TACs are known to be highly hazardous to health, even in small quantities. TACs are airborne substances capable of causing short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects (injury or illness). TACs are classified as non-criteria pollutants, because no air quality standards have been established for them. The effects of these substances are very diverse and their health impacts tend to be local rather than regional.

TACs can be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Natural source emissions include windblown dust and wildfires. Farms, construction-sites, and residential areas can also contribute to toxic air emissions. The State ARB has also identified diesel particulate matter (DPM) as a TAC. The ARB has determined that any source that poses a risk to the general population that is equal to or greater than 10 people out of 1 million contracting cancer as excessive. When estimating this risk, it is assumed that an individual is exposed to the maximum concentration of any given TAC continuously for 70 years. The ARB has conducted studies to determine the total cancer inhalation risk to individuals due to outdoor toxic pollutant levels. According to the map prepared by ARB showing the estimated inhalation cancer risk for TACs in the State of California (State), the proposed project site is located in an area with an existing estimated risk that is less than 50 cancer cases per one million people. This represents the lifetime risk that between 0 and 50 people in one million may contract cancer from inhalation of toxic compounds at current (2010) ambient concentrations. While TACs are produced by many different sources, the largest contributor to inhalation cancer risk in California is DPM.

Emission Sources and Concentrations

MCAQMD has identified several types of emission sources, which need to be considered when evaluating the impacts of a project under CEQA. For many development projects, motor vehicle trips are the principal source of air pollution; projects in this category, such as shopping centers, office buildings, arenas, and residential developments, are often referred to as indirect sources. Such sources do not directly emit significant amounts of air pollutants from on-site activities but cause emissions from motor vehicles traveling to and from the development over its planning lifetime. Most development projects also generate what are known as area source emissions. Area source emissions are relatively small quantities of air pollutants when considered individually, but cumulatively may represent significant emissions. Water heaters, fireplaces, lawn maintenance equipment, and application of paints and lacquers are examples of area source emissions.

Certain projects may directly generate stationary or point source emissions from operations. Examples of facilities with point sources include manufacturing plants, quarries, and print shops. Project-related demolition and construction emission impacts are also a significant contributor to regional air pollution. On- and off-road construction vehicles, along with on-site portable equipment (such as generators and air compressors) generate exhaust emissions. Construction vehicles and equipment operation can also cause unacceptable levels of entrained dust (PM10). Even though they are temporary, in some cases construction emissions may be quantitatively greater on a daily basis than emissions from the operation of the development once it is built.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors are residences approximately 100 feet northwest from the existing southbound off ramp.

Greenhouse Gases

Global temperatures are affected by naturally occurring and anthropogenic (generated by humankind) atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. Gases that trap heat in the atmosphere are called greenhouse gases (GHG). Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed at the surface. The earth emits this radiation back toward space as infrared radiation. Greenhouse gases, which are mostly transparent to incoming solar radiation, are effective in absorbing infrared radiation and redirecting some of this back to the earth's surface. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This is known as the greenhouse effect. The greenhouse effect helps maintain a habitable climate. Emissions of GHGs from human activities, such as electricity production, motor vehicle use and agriculture, are elevating the concentration of

GHGs in the atmosphere, and are reported to have led to a trend of unnatural warming of the earth's natural climate, known as global warming or global climate change. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred because it implies that there are other consequences to the global climate in addition to rising temperatures. Other than water vapor, the primary GHGs contributing to global climate change include the following gases:

- Carbon dioxide (CO_2), primarily a byproduct of fuel combustion;
- Nitrous oxide (N_2O), a byproduct of fuel combustion; also associated with agricultural operations such as the fertilization of crops;
- Methane (CH_4), commonly created by off-gassing from agricultural practices (e.g. livestock), wastewater treatment and landfill operations;
- Chlorofluorocarbons (CFCs) were used as refrigerants, propellants and cleaning solvents, but their production has been mostly prohibited by international treaty;
- Hydrofluorocarbons (HFCs) are now widely used as a substitute for chlorofluorocarbons in refrigeration and cooling; and
- Perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6) emissions are commonly created by industries such as aluminum production and semiconductor manufacturing.

Air Pollutant Attainment Status

The North Coast Air Basin is designated as either unclassified/attainment or unclassified for all federally listed pollutants. For the state listed pollutants the North Coast Air Basin is listed as attainment or unclassified for all with the exception of being listed as non-attainment for PM_{10}.

To address this, the MCAQMD has adopted a Particulate Matter (PM) Attainment Plan. The plan includes a description of local air quality, the sources of local PM emissions, and recommended control measures to reduce future PM levels.

Potential Impacts (Items a, b, c, d and e):

An Air Quality Assessment for the project was prepared by Illingworth & Rodkin, Inc., dated February 21, 2013 and is incorporated herein by reference. The following discussion of potential air quality impacts resulting from the project is excerpted from the Illingworth & Rodkin, Inc. *Assessment*:

<u>Significance Criteria</u>: The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of environmental air quality impacts attributable to a proposed project. Appendix G of the CEQA Guidelines states that a project would normally be considered to result in a significant impact if the project:

III. Air Quality:

a) Conflicts with or obstructs implementation of the applicable air quality plan.
b) Violates any air quality standard or contributed substantially to an existing or projected air quality violation.
c) Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
d) Exposes sensitive receptors to substantial pollutant concentrations.

e) Creates objectionable odors affecting a substantial number of people.

VII. Greenhouse Gas Emissions:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The MCAQMD has adopted the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines for addressing air quality impacts. These thresholds include construction and operational related emissions. The following table shows the thresholds that would apply to this project:

Adopted Air Quality CEQA Thresholds of Significance – June 2, 2010

Project-Level	Construction-Related	Operational-Related
Criteria Air Pollutants and Precursors	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**
ROx	None	180
NOx	None	42
PM_{10}	82 (exhaust only)	82
$PM_{2.5}$	54 (exhaust only)	54
PM_{10}/ $PM_{2.5}$ (Fugitive Dust)	Best Management Practices	Same as above
Local CO	None	125 Tpy
GHG	None	1,100MT of CO2e/yr

For the purposes of this analysis, the following criteria were used to evaluate air quality impacts resulting from the project:

Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The MCAQMD has adopted a Particulate matter Attainment Plan[1] which established control measures for particulate matter. The implementation of MCAQMD Rule 1-430 would meet the recommended requirements outlined in the plan to reduce the PM emissions from the construction of the project. Rule 1-430 prohibits the handling, transportation, or open storage of materials, or the conduct of other activities in such a manner that allows or may allow unnecessary amounts of particulate matter to become airborne except under the following circumstances:

a) Reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including, but not limited to, the following provisions:
    1) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.
    2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.
    3) The screening of all open-outdoor sandblasting and similar operations.
    4) The use of water or chemicals for the control of dust during the demolition of existing buildings or structures.

b) The following airborne dust control measures shall be required during all construction operations, the grading of roads, or the clearing of land
    1) All visibly dry disturbed soil road surfaces shall be watered to minimize fugitive dust emissions.
    2) All unpaved surfaces, unless otherwise treated with suitable chemicals or oils, shall have a posted speed limit of 10 miles per hour.
    3) Earth or other material that has been transported by trucking or earth moving equipment, erosion by water, or other means onto paved streets shall be promptly removed.
    4) Asphalt, oil, water or suitable chemicals shall be applied on materials stockpiles, and other surfaces that can give rise to airborne dusts.
    5) All earthmoving activities shall cease when sustained winds exceed 15 miles per hour.
    6) The operator shall take reasonable precautions to prevent the entry of unauthorized vehicles onto the site during non-work hours.
    7) The operator shall keep a daily log of activities to control fugitive dust.

c) During recreational activities adequate dust control shall be maintained to prevent dust from migrating off the property where the activity is occurring.

Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less-than-Significant Impact. The project is not anticipated to increase traffic or have any effect on traffic speed that would substantially affect local air pollutant emissions. The project would realign and remove portions of the off-ramp opposite of the closest residences, which would move some of the traffic (i.e., emission sources) further from the residences. This would result

[1] Particulate Matter attainment Plan, Mendocino County Air Quality Management District of the California North Coast Air basin, January 2005

in similar or slightly lower localized air pollutant concentrations. Project construction would result in emissions of dust that could affect ambient respirable and fine particulate matter (i.e., PM_{10} and $PM_{2.5}$) concentrations. The project would incorporate measures to reduce visible emissions and dust control measures, as required by MCAQMD Rules 1-410 and 1-430 (see Appendix A). These include requiring emission controls on construction equipment and spraying water on exposed surfaces to minimize dust.

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less-than-Significant Impact. The project would not change traffic conditions such that there would be a measureable or modeled increase in air pollutants from project operation. As described above, project construction would result in temporary emissions of air pollutants. The project would incorporate dust control measures to minimize fugitive dust emissions that affect ambient PM_{10} and $PM_{2.5}$ concentrations. The Road Construction Emission Model, Version 6.3.2, indicates that construction emissions of ozone precursors (i.e., reactive organic gases and nitrogen oxides) and exhaust particulate matter would be well below emission thresholds proposed by the MCAQMD. Inputs to the model include model defaults for a 0.25-mile roadway segment and 1 acre of disturbed land. The PM_{10} and $PM_{2.5}$ emissions assume a 50% control of fugitive dust from watering and associated dust control measures. The results of the modeling are shown in the Table below:

Road Construction Emission Model Results

Emission Estimates for -> Talmage Rd Interchange **Project Phases**	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**Total PM_{10} (lbs/day)**	**Total $PM_{2.5}$ (lbs/day)**	**CO_2 (lbs/day)**
Grubbing/Land Clearing	3.2	14.1	28.1	2.1	1.2	3,157.5
Grading/Excavation	3.6	17.2	29.6	2.4	1.5	3,568.7
Drainage/Utilities/Sub-Grade	3.2	13.9	25.5	2.3	1.4	2,928.2
Paving	1.9	7.8	11.4	1.0	0.9	1,147.8
Maximum (pounds/day)	3.6	17.2	29.6	2.4	1.5	3,568.7
Total (tons/construction project)	0.2	1.0	1.7	0.1	0.1	197.3
MCAQMD Threshold Of Significance (pounds/day)	180	125	42	82	54	None

Expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant Impact. The project would not change traffic conditions such that there would be a measureable or modeled increase in air pollutant or toxic air contaminants (TACs) emissions from project operation. As described above, project construction would result in temporary emissions of air pollutants. There would also be temporary emissions of TACs in the form of construction equipment exhaust emissions of diesel particulate matter. The primary concern with exposure to diesel particulate matter is cancer risk. BAAQMD assesses cancer risk in terms of contracting cancer over a 70-year exposure period (i.e., lifetime exposure). However, the magnitude and nature of this project is such that only a few pieces of equipment would be required for construction and the construction duration would be relatively short. Project construction activity involving the use of heavy-duty construction equipment would last less than 6 months, and therefore, would not have an adverse long-term impact on nearby sensitive receptors (i.e., nearby residences).

Create objectionable odors affecting a substantial number of people?

No Impact. Objectionable odors are typically associated with wastewater treatment plants, sanitary landfills, feedlots and dairies, and industrial facilities. No such facilities or any other sources of offensive odors have been identified in proximity to the project site. Project operation or construction would not create odors that would be objectionable to a substantial number of people.

GHG Analysis

Less than Significant Impact. GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be reduced to some degree by longer intervals between maintenance and rehabilitation events. Currently MCAQMD has adopted the BAAQMD significance thresholds, with some modifications, that apply to construction projects.

Based on the calculations from the Road Construction Emissions Model, the maximum daily CO_2 emissions would be 3,569 lbs/day and the total emissions from the construction of the project would be 197.3 tons. The completed project would reduce delay and improve traffic flow through the Talmage Road intersection, possibly reducing CO_2 emissions from operation.

The relocation of the south bound off ramp would help relieve congestion in the peak hour traffic periods during the day. With the construction of the project the vehicle-miles-travelled (VMT) would remain the same as the No-Build scenario. The speed during the peak and off peak hours would remain the same. The combination of these would have an overall neutral effect on the GHG emissions generated in the project area when compared with the No-Build scenario. Table 6 shows the GHG expressed in tons per day of CO_2. The net difference between the Build and No-Build scenarios is so small that they are not reflected in the calculations when shown in terms of tons per day. Operational emissions were calculated using CT-EMFAC, A computer model to Estimate Transportation Emissions. CT-EMFAC was developed by UC Davis for Caltrans.

CO_2 Emissions in Tons per Day

Scenario	Year		
	2011	2020	2032
Existing	11	--	--
No-Build	--	12	10
Build	--	12	10

Due to the traffic remaining the same with or without the project, the daily CO_2 emissions are not expected to change as a result of the project. The CO_2 emissions numbers are only useful for a comparison between alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions would be because CO_2 emissions are dependent on other factors that are not part of the model such as the fuel mix[2] , rate of acceleration, and the aerodynamics and efficiency of the vehicles.

Mitigation Measures:

8. The project proponents shall implement all Mendocino County Air Quality Management District requirements for preventing particulate matter (dust) from becoming airborne, including, but not limited to:

    a. Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.

    b. Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.

    c. The screening of all open-outdoor sandblasting and similar operations.

    d. The use of water or chemicals for the control of dust during the demolition of existing buildings or structures.

Impact Significance after Mitigation: N/A

[2] EMFAC model emission rates are only for direct engine-out CO_2 emissions not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components

4. BIOLOGICAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Regional Setting

Ukiah is located within the Russian River Valley in southern Mendocino County, California, north of the greater San Francisco Bay Area and west of the Central Valley. The Russian River Valley lies within the northern portion of the Coast Ranges province of California. The northern Coast Ranges trend northwestward, parallel to the major structural features of the region. The mountain range that lies west of the Russian River Valley and extends to the coast is commonly called the Mendocino Range and ranges in elevation between 1,400 and 3,000 feet. The highlands located east of the Russian River in the vicinity of Ukiah are known as the Mayacamas Mountains and range in elevation between 3,000 and 4,000 feet above mean sea level (amsl).

The Ukiah Valley is a subarea of the Russian River Valley. The Ukiah Valley is approximately 22 miles long, averages approximately three miles wide, and occupies an area approximately 65 square miles in size. The altitude of the valley floor ranges from approximately 500 feet at the southern end to approximately 700 feet in the northern end. The valley floor at Ukiah is approximately 600 feet above sea level.

Three primary creeks flow from west to east through the City: Orrs Creek, Gibson Creek and Doolin Creek.

Project Setting

The site is an urbanized highway interchange, but has an open area and a number of trees "inside" and on the southern border of the interchange loop area. Accordingly, the site does have some plant/animal habitat value.

Natural Environment (Biological) Study

A Natural Environment (Biological) Study was prepared for the project to determine if special-status plant/animal communities/species occur within the propose project area. The Study, which is incorporated herein by reference was prepared by Wildlife Research Associates, dated January 18, 2013 and concluded the following:

1. No special-status communities or plant species were observed within the project area.

2. Eleven wildlife species have been reported in the area; however, no suitable habitat for any of these reported species was found to occur within the project area.

3. The trees within the proposed project area are potential nesting habitat for a variety of bird species. No special-status bird species were observed during the 2012 fall field surveys. Although no trees will be removed as part of the project, other nesting habitat, such as blackberry bushes, will be removed for the project.

Potential Impacts (Items a, b, c, d, e and f)

No riparian areas or wetlands exist on or near the project site, therefore none would be affected by the project. No special-status communities or plant species were observed within the project area during field investigations, therefore none would be affected by the proposed project. The site is a freeway interchange and field review reveals no fish or wildlife migratory corridors on or near the site, therefore none would be affected by the project. The City does not have an adopted habitat conservation plan for the project site or surrounding area, therefore none apply to the project site.

While no trees would be removed as a result of the project, grading operations will alter soil structure and remove bushes that contribute to plant and animal habitats. Additionally, grading operations could potentially harm existing trees if conducted too close to the root and drip zones of the trees. Accordingly, Mitigation Measures are appropriate to protect plant and animal specials.

Mitigation Measures

2. Work will not be conducted during the rainy season (defined as October 15-April 15).

3. Pre-construction surveys for special-status species (i.e., birds) by a qualified biologist shall be conducted at the appropriate times prior to construction activities to determine presence/absence at the site. If no special-status species are found, no further action is required. If individual nesting birds are found, a buffer zone around the species or nest shall be required at a sufficient distance to prevent "take" of individuals until after the nesting season, as determined by a qualified biologist and based on site specific conditions.

4. If the pre-construction survey discover special-status species (i.e., birds), grading or removal of shrub vegetation shall be conducted outside the nesting season, which occurs between approximately February 15 and August 15, depending on species.

5. To delineate the buffer zone around a nesting tree (to protect the nest(s) and tree), orange construction fencing placed at the specified radius (as determined by a qualified biologist) from the base of the tree within which no machinery or workers shall intrude.

Impact Significance after Mitigation: Less than significant

5. CULTURAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to 15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Prehistoric Setting: Archaeologically, the Ukiah Valley lies within the Russian River Valley sub-region of the North Coast Ranges. The City of Ukiah and the surrounding area have had a long cultural history and are known to have been occupied by Native American groups for thousands of years prior to settlement by non-Native peoples. Recent work in Northern California at Clear Lake near Borax Lake indicates that the region was initially colonized at the end of the Pleistocene and associated with the "Western Clovis Tradition," dating around 13,500 years ago. Obsidian data in that area indicates use may have begun as early as 16,000-20,000 years ago, although such findings have not been absolutely confirmed. The Russian River Valley is thought to have been first occupied sometime during the Paleo Indian period (10,000 – 6,000 B.C.) by speakers of the Yukian languages. Cultural constituents of the Yukian habitation include widestem points and share common elements with Borax Lake Pattern assemblages. Hokan speakers are believed to have come into the Clear Lake area, radiating out to the surrounding Russian River Valley, by the Middle Archaic (circa 3,000 B.C.). Cultural constituents of Hokan occupation are characterized by Mendocino Aspect assemblages marked by milling slabs and hand stones, as well as by nonfluted, concave base, and lanceolate projectile points, although it is suggested that the Mendocino Aspect is a localized manifestation of the Borax Lake Pattern.

Ethnographic Context: At the time of European-American contact, the project area was occupied by both the Northern and Central Pomo, both considered to be speakers of the Hokan language family. The Northern and Central Pomo were the groups that occupied the Ukiah Valley at the time of European-American contact, Ukiah being an Anglicized version of the Pomo word."Yokaya," meaning "south valley."

Many families would aggregate into small groups variously referred to as tribes, villages, village-communities, or tribelets. Each group was autonomous and owned a tract of land that was recognized by neighboring communities. The extent and nature of these land claims was based on both the surrounding terrain and ecology, determined by the need to assure access to an adequate food supply for each group. The differences in carrying capacity of different environments and regions led to differential spacing between villages. The Northern Pomo inhabited the California coast from the Navarro River north to Fort Bragg and inland in an irregular pattern from Horse Mountain, south to the northwestern shore of Clear Lake, and east into the Ukiah Valley. The Central Pomo inhabited the California coast from the Navarro River south to the Gualala River and inland to the Russian River and Ukiah Valley. Central Pomo has generally been subdivided into three dialects: Boya—being a primarily coastal dialect, and Yokaya and Shanel - being interior dialects. Both the Northern and Central Pomo had a seasonal pattern of exploiting coastal and estuary resources during the summer months, subsisting primarily on shellfish, surf fish, and sea vegetables, some of which were preserved for winter consumption. During the fall and winter months they would move inland and rely on faunal resources such as deer and elk. Primary interior floral resources were acorns, buckeye, and other nuts as well as various berries, seeds, and roots.

Historic Setting: Rancho Yokaya was one of several Spanish land grants. It was 35,541 acres and extended through the Ukiah Valley, being approximately one mile east/west and 18 miles north/south. The Yokaya land grant was made to Cayetano Juárez in 1845 by the then California governor, Pio Pio. Juárez filed his petition as claimant to the grant in 1852, after the land had been accessioned into the United States. His petition was rejected in 1854 and then appealed to the District Court of the United States. Settlers began arriving in the area in the 1850s in spite of the pending appeal. The grant was finally patented to Juárez by the United States Land Commission in 1866.

In 1850, by an act of the California Legislature, present-day Mendocino County became part of Sonoma County. Ukiah was founded in 1856 by Samuel Lowry. He was Ukiah's first settler and built a log cabin at the southwest corner of E. Perkins Street and N. Main Street. Lowry sold the cabin to A. T. Perkins in 1857. Perkins moved his family to the Ukiah homestead from Wheatland, California. Perkins soon established a store, and a settlement began to grow. The state legislature formed Mendocino County in 1859 and Ukiah was chosen for the county seat at that time. Ukiah has remained the county seat of Mendocino County ever since.

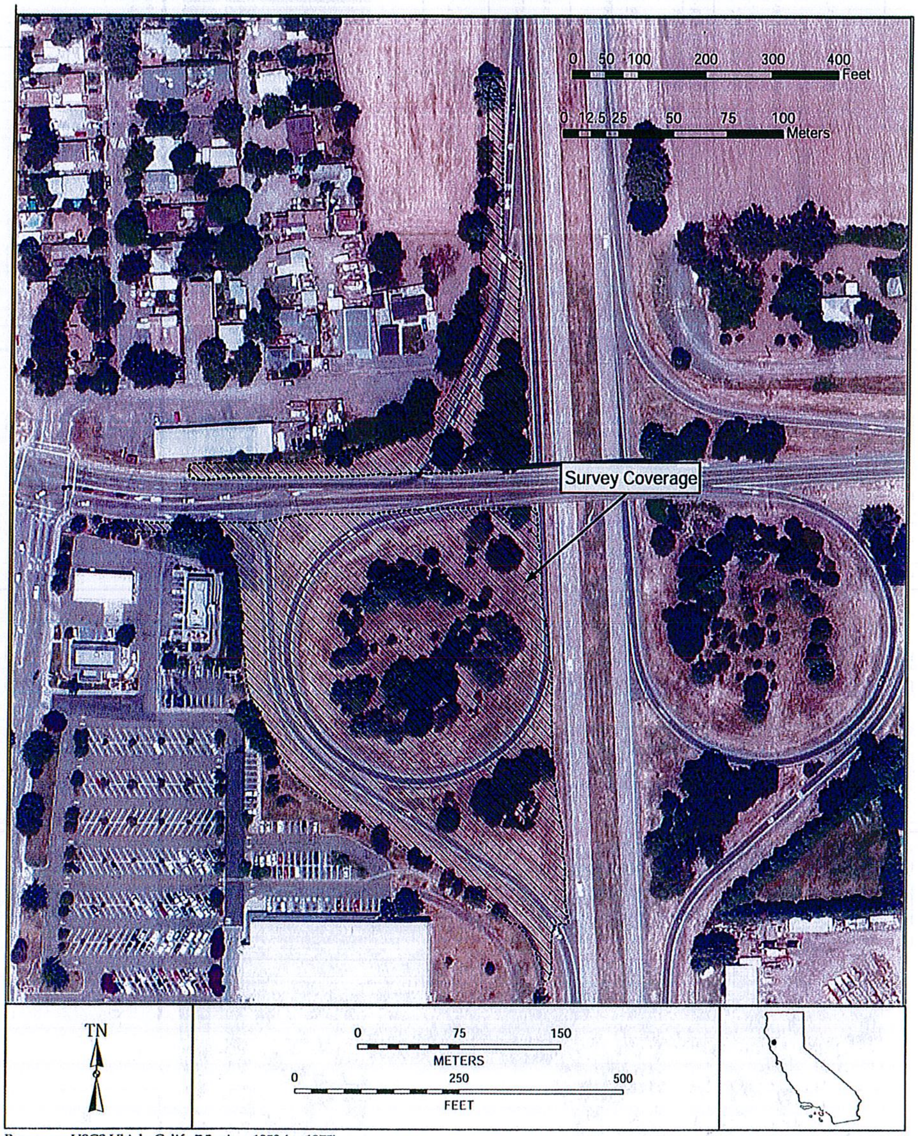
In 1860, for a cost of $9,000, the first courthouse was constructed in Ukiah at 100 North State Street where the current courthouse annex still stands. That year also witnessed the establishment of Ukiah's first newspaper, the Mendocino Herald. One of the earliest known roads in Mendocino County was constructed in order to promote efficient travel between Ukiah and the San Francisco Bay Area. A stage line between Petaluma and San Francisco was in operation by 1863. By 1880, this trip could be made in a single day. The road followed the present route of California State Highway 101. The Gschwend Toll Road from Boonville to Ukiah was established in 1868. In 1869, the road was extended west from Boonville to Point Arena, thereby connecting Ukiah and Anderson Valley to the Mendocino coast. A stage began running tri-weekly between Lakeport and Ukiah in the 1870s. H. W. Knowles, followed by James H. Burke, planted the first hops in Mendocino County in 1859. By the 1880s, hops were an important contribution to the local economy. In 1940, Mendocino County produced 18 percent (1.6 million pounds) of California's total hop production. In 1950, Mendocino County's 1,200 acres of hops produced almost one million dollars in revenue. By the 1960s, the bottom had fallen out of the market and agricultural production then shifted to grapes, pears, and prunes.

The Cloverdale and Ukiah Railroad was incorporated in 1886 to extend the San Francisco and Northern Pacific Railroad north to Ukiah. Service to Ukiah commenced in 1889. The completion of rail service to Ukiah caused land prices to soar. The price of a city lot rose from $30 to $150. Drug stores, saloons, doctor's and law offices, and livery and feed stables were established around the courthouse to support the burgeoning population, which reached 2,000 soon after the completion of the railroad. The San Francisco and Northern Pacific Railroad merged with the Northwestern Pacific Railroad in 1907. The Ukiah Depot was designed by Southern Pacific, but built by the Northwestern Pacific Railroad in 1929. Redwood lumbering became an important economic activity in Mendocino County in the 1940s. The Lumber Rush of 1949 saw Ukiah's population grow to 6,000.

Potential Impacts (Items a, b, c and d)

The City of Ukiah Architectural and Historical Inventory/Survey Report Update, (1999) reveals no known significant historic buildings in the project area.

A Historic Property Survey Report was prepared for the project by the Anthropological Studies Center at Sonoma State University in March of 2013. This Report in incorporated by reference into this Initial Environmental Study. The report included consultation with Native American Tribes, the Native American Heritage Association, Local historical resources, the Caltrans Historic Highway Bridge Inventory and various State of California historic resource information sources. The Survey Area is depicted below:



Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

The Report concluded that there were no historic or cultural resources within the project construction area (Area of Potential Effect).

Additionally, an Archaeological Survey Report was prepared for the project by the Anthropological Studies Center at Sonoma State University in March, 2013. This Report is incorporated by reference into this Initial Environmental Study.

The purpose of the Report was to identify and record all prehistoric and historic-era archaeological resources within the proposed project footprint. The authors of the Report found no archaeological sites within the project footprint and that there were no previously recorded sites within the study area.

If previously unidentified cultural resources are encountered during construction, it is Caltrans' policy and requirement of their encroachment permits that work be halted in that area until a qualified archaeologist can assess the significance of the find.

Staff is able to conclude that based on the technical studies prepared for the proposal, the project would not cause a substantial adverse change in the significance of an historic or archaeological resource; nor would the project directly or indirectly destroy a unique paleontological or geologic resource. Finally, based on the information listed above, it is concluded that the project would not disturb any human remains.

Mitigation Measures: None Required

Impact Significance After Mitigation: N/A

6. GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☒
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒

6. GEOLOGY AND SOILS Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

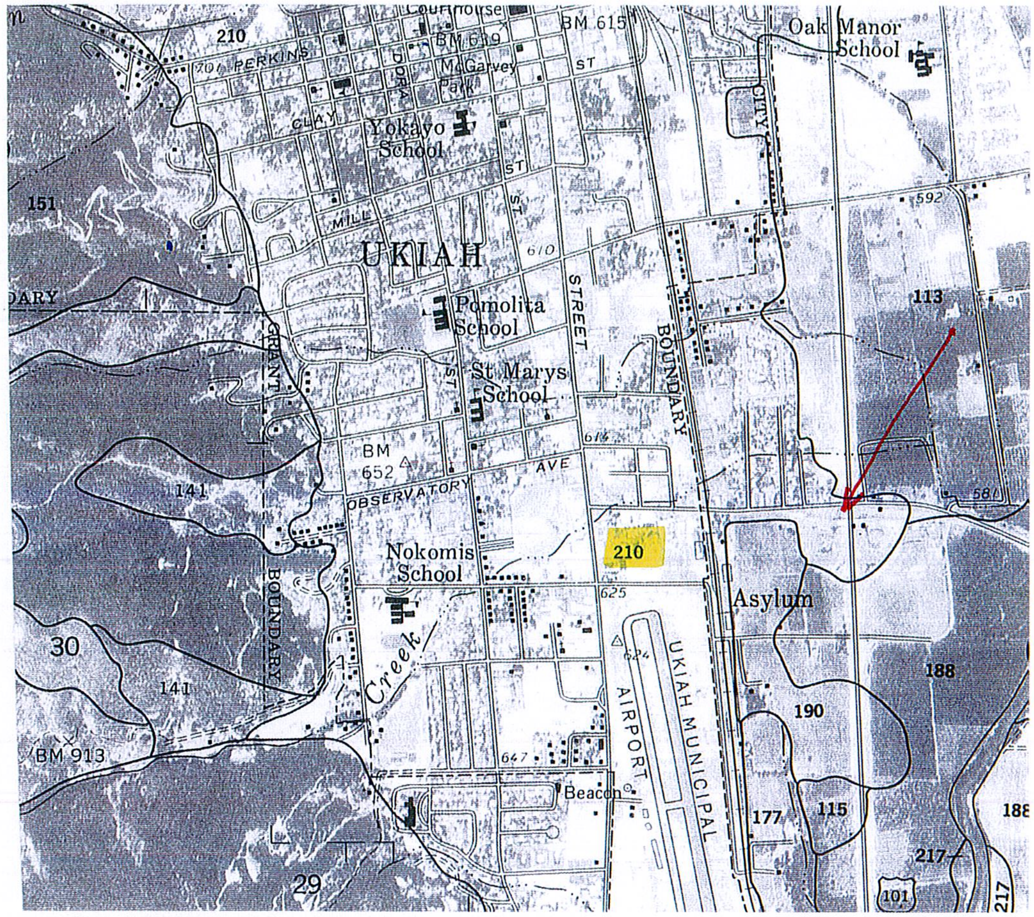
Setting: The City of Ukiah is located within the Russian River Valley, which is within the northern portion of the Coast Ranges of California, which trend to the northwest. The mountain range that lies west of the Russian River Valley and extends to the Pacific Coast is commonly called the Mendocino Range.

The Ukiah Valley is a subarea of the Russian River Valley. The Ukiah Valley is approximately 22 miles long, averages 3 miles wide, and occupies an area approximately 65 square miles. The altitude of the valley floor ranges from approximately 500 feet at the southern end to approximately 700 feet in the northern end. The valley floor at the City of Ukiah is approximately 600 feet above sea level.

According to the USDA (United States Agricultural Department) Soil Survey, the project site soil is predominately identified as "Urban Land." It is surrounded though by three different soil units; the land northeast of the Talmage interchange is identified as "Cole Loam" (map unit 113), southwest of the interchange underlying Airport Park Boulevard is identified as "Russian Loam, gravelly substratum" (190); and southeast of the interchange is identified as "Russian Loam" (188.) Each of these soil complexes is characterized as having slopes ranging from 0-2 percent and originating from parent material comprised of alluvium derived from sedimentary rock. The two Russian loam formations are characterized as being "well drained," while the Cole loam formation is characterized as "somewhat poorly drained."

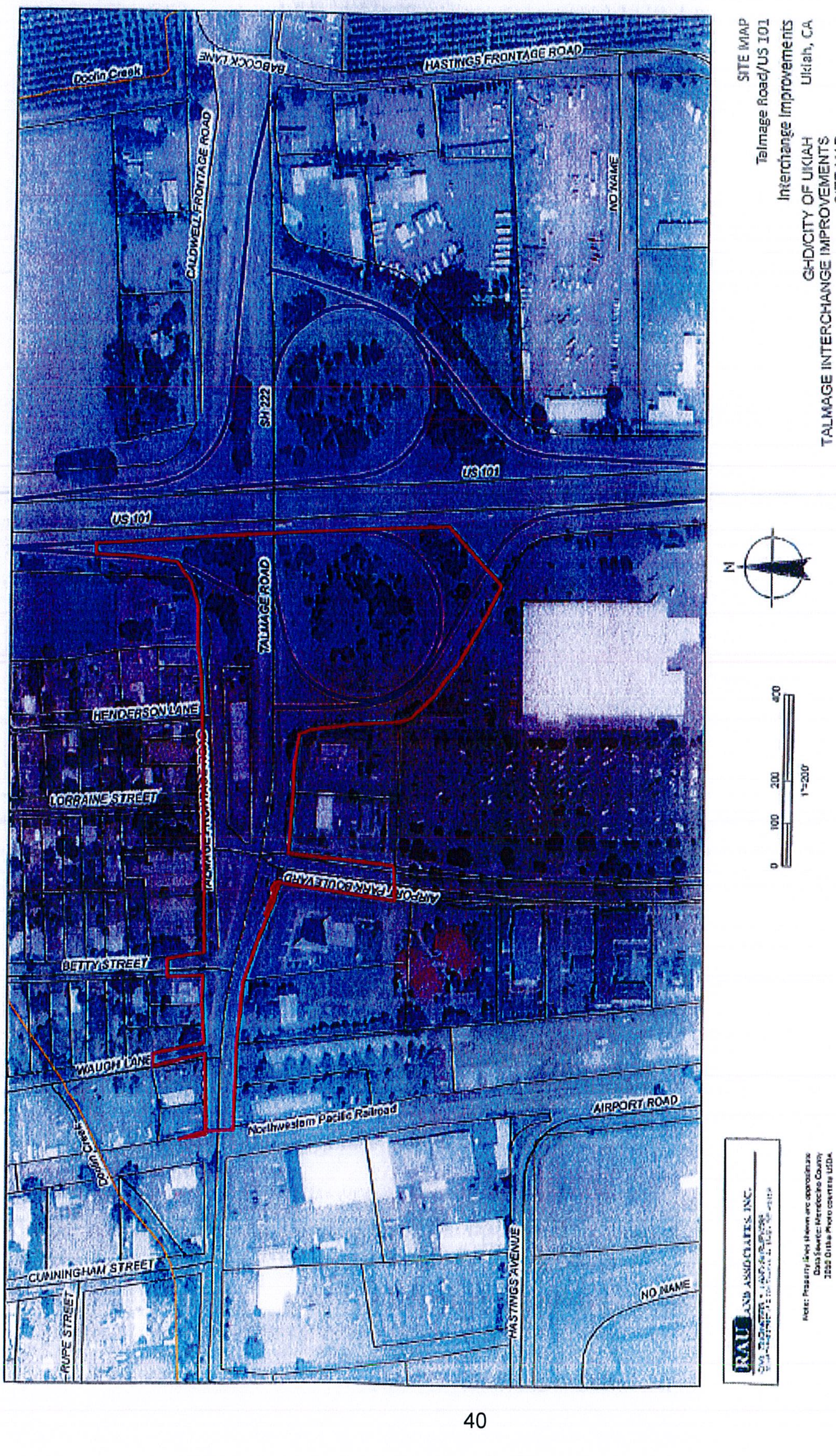
The Cole loam formation has a typical profile of loam from 0-15 inches underlain by silty clay down to 60 inches. The Russian loam has a profile consisting of loam from 0-38 inches and stratified very fine sandy to silt loam down to 60 inches. The Russian loam with gravelly substratum consists of loam from 0-30 inches underlain by stratified gravelly coarse sand to sandy loam form 30-51 inches and stratified gravelly coarse sand to gravelly sandy loam form 51-60 inches. These three formations are predominately low plasticity silt and clay (ML, CL) with the exception of the large amount of gravel contained in the lower portion of the Russian loam with gravelly substratum.

Potential Impacts (Items a, b, c, d and e): A Limited Materials Report and Preliminary Geotechnical Report was prepared for the project in May, 2013 by Rau & Associates. That report is incorporated into this Initial Environmental Study document by reference. The purpose of this geotechnical investigation was to provide recommendations for subgrade treatment and structural sections for a widening of a segment of the Southbound off-ramp from US Highway 101 to Talmage Road, to provide recommendations for subgrade treatment and structural sections for widening a segment of Talmage Road, and to evaluate the site soils for potential corrosive effects to reinforced concrete foundations for traffic signals at the intersection of the Southbound off-ramp and Talmage Road, and at the intersection of Airport Park Boulevard and Talmage Road.



USDA Soil Survey Map – 210: "Urban Land"

The scope of the Study included a review of available geotechnical maps, literature, and date for the area, sampling of near surface soils from 7 boring locations for R-values, remolded shear, and corrosion potential, discussion with the project team, and a written report with recommendations for the structural section and for corrosion potential.


Doolin Creek
BABCOCK LANE
HASTINGS FRONTAGE ROAD
CALDWELL FRONTAGE ROAD
NO NAME
SR 222
US 101
US 101
TALMAGE ROAD
HENDERSON LANE
LORRAINE STREET
BETTY STREET
WAUGH LANE
AIRPORT PARK BOULEVARD
Northwestern Pacific Railroad
AIRPORT ROAD
Doolin Creek
CUNNINGHAM STREET
RUPE STREET
HASTINGS AVENUE
NO NAME
N
0 100 200 400
1"=200'
SITE MAP
Talmage Road/US 101
Interchange Improvements
Ukiah, CA
GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS
SITE MAP
RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482
DATE
JOB NO.
R09153
APPENDIX
A 2 of 4

The Rau Study concluded that the project area was suitable for the proposed construction, subject to certain constraints as discussed below:

Pavement. Support is available for the expected heavy truck traffic over the next 20 years, provided that the soils are reprocessed and re-compacted to support a structural section of adequate thickness, in accordance with the recommendations of this report.

The site soils at subgrade level of recommended structural section are interpreted as having low potential for expansion, based upon the results of the R-Value testing which was conducted, as well as the results of laboratory testing contained in a number of geotechnical reports in the area (References 15, 17,and 18).

Groundwater Levels High seasonal groundwater was below the level of any proposed subgrade elements to support the structural section, ranging from about 4 feet below the surface to about 9 feet below the surface as found in numerous borings during the wet period of various years (References 15, 17 and 19). It is not anticipated that the groundwater level will rise high enough to saturate the subgrade and thereby weaken the soils supporting the structural section.

Fills and Weak Soil Layers There are weak/unconsolidated soil layers underlying the existing compacted fills upon which the current paved structural section is situated. The construction of widened fills to increase the number of traffic lanes will have to take those surface soils into account. Likewise, structures, such as low retaining walls and pier supports for signals and lighting, will have to be planned with the knowledge that weak/unconsolidated surface soils exist.

The Study included a number of recommendations for reprocessing of certain subgrade soils and fill soils, grading / site preparation, pavement structural sections, pier foundations for signals or street lights, retaining wall foundations, and drainage.

Based on the results of the Geotechnical and Soils Investigation, it is concluded that the soils are suitable for the proposed construction and would not pose a threat to human life, cause excessive erosion, be unduly expandable, be unstable, cause landslides, or fail to support the project provided all recommendations contained in the *Geotechnical Report* are implemented.

Mitigation Measures:

1. All recommendations contained in the Limited Materials and Preliminary Geotechnical Report prepared by Rau and Associates, dated May, 2013 shall be implemented and/or incorporated into the project.

Impact Significance After Mitigation: N/A

HAZARDS & HAZARDOUS MATERIALS **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Setting: Ukiah is generally regarded as a healthy City with relatively clean air and water. While there are some known toxic "spots" resulting from the past storage of hazardous materials underground, the City is not regarded as having a highly contaminated environment.

Under Title 22 of the California Code of Regulations (CCR), a hazardous material is defined as a substance or combination of substances that may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating illness, or may pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, disposed of, or otherwise managed (CCR, Title 22, Chapter 11, Article 2, Section 66261.10). Hazardous wastes are hazardous substances that no longer have practical use, such as materials that have been discarded, discharged, spilled, or contaminated or are being stored until they can be properly disposed. According to Title 22 of the CCR, hazardous materials and hazardous wastes are classified according to four properties: toxic, ignitable, corrosive, and reactive (CCR, Title 22, Chapter 11, Article 3), which are further defined below.

- Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability or death. Toxic substances can cause eye or skin irritation, disorientation, headache, nausea, allergic reactions, acute poisoning, chronic illness, and other adverse health effects, depending on the level of exposure. Carcinogens (substances known to cause cancer) are a special class of toxic substances. Examples of toxic substances include most heavy metals, pesticides, and benzene (a carcinogenic component of gasoline).

- Ignitable substances, such as gasoline, hexane, and natural gas, are hazardous because of their flammable properties.

- Corrosive substances, such as sulfuric acid (battery acid) and lye, can damage other materials or cause severe burns upon contact.

- Reactive substances, such as explosives, pressurized canisters, and pure sodium metal (which reacts violently when exposed to water), may cause explosions or generate gases or fumes.

- Soil that is excavated from a site containing hazardous materials is a hazardous waste if it exceeds specific CCR Title 22 criteria. Remediation (cleanup) of hazardous wastes found at a project site is generally required if those materials are excavated. Cleanup requirements are determined on a case-by-case basis by the agency with lead jurisdiction over the project.

Potential Impacts (Items a, b, c, d, e, f, g and h):

A Study of Potential Aerially Deposited Lead and Petroleum Hydrocarbons was prepared for the project by GHD, Inc., dated January 30, 2013. This Study is incorporated by reference into this Initial Environmental Study. The Study involved taking soil samples from geotechnical borings along Talmage Road to determine if any petroleum hydrocarbons were present on the site. The Study also involved soil samples from the unpaved section of the southbound U.S. Highway 101 off-ramp and cloverleaf to determine the levels of aerial deposited lead on the site as a result of vehicle exhaust.

The Study found no petroleum hydrocarbons from the soil samples taken from the site. Aerially deposited lead was detected, but in concentrations well below the threshold of concern established by the State Department of Toxic and Substance Control. In fact the concentrations were low enough to meet the standard allowing reuse of the soils within the CalTrans right-of-way.

Based on the technical information prepared for the project, it is concluded that the project would not cause or create the impacts or exceed the thresholds listed in items a-h above.

Mitigation Measures: None Required

Impact Significance After Mitigation: N/A

8. HYDROLOGY AND WATER QUALITY **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? (Source: FEMA)	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒

8. HYDROLOGY AND WATER QUALITY **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Regional Setting: The City of Ukiah is located within the Russian River Watershed. The Russian River is approximately 110 miles long and originates in central Mendocino County, approximately 15 miles north of the City of Ukiah in Redwood and Potter Valley. The east and west forks combine to form the Russian River within the Ukiah Valley. Several streams are tributary to the Russian River within the Ukiah Valley including: York, Hensley, Ackerman, Mill, Howell, Morrison, Parsons, Robinson, Orrs, Howard, Gibson, and Doolin Creeks.

Russian River Mainstem: The mainstem of the Russian River generally flows to the southeast to its confluence with Mark West Creek, at which point it turns sharply to the west and traverses the Coast Range, ultimately emptying into the Pacific Ocean at Jenner. Within the Russian River Watershed, the Coyote Dam and the Warm Springs Dam are major reservoirs and provide flood protection, water supply and storage, and recreational opportunities.

Coyote Dam: Coyote Dam is located on the East Fork of the Russian River near Ukiah and construction of the dam resulted in the creation of Lake Mendocino; the Warm Springs Dam is located on Dry Creek west of Healdsburg, and resulted in creation of Lake Sonoma.

Following construction of the Coyote Dam on the east fork in 1959, the Russian River has experienced substantial physical changes. Continued urbanization of the Russian River floodplain may result in impacts to the free flow of flood waters, increase exposure of persons and property to flooding, and cause deterioration or destruction of natural riparian habitats. As the dam holds back both water and sediment, the river experiences erosion of its bed and banks and subsequently incises (entrenches) into its floodplain, allowing the river to entrench over 18 feet in the Ukiah Valley in the past. Erosion of the banks of the Russian River and loss of riparian trees typically result from these conditions, as well as the erosion of creeks tributary to the river.

Land use patterns within the Ukiah Valley have also resulted in the conversion of streams and creeks to channelized and tunneled drainage facilities. Such channelization has interfered with natural drainage patterns, and has the potential to increase the occurrence of flooding due to an increase in impermeable surfaces within the Valley. Within the Russian River Basin, approximately 93 percent of the average seasonal runoff occurs in a five-month period beginning in December and ending in April. Surface runoff within the City's basin is derived almost entirely from rainfall, although snow does fall in the mountains of the eastern part of the Eel watershed, located north of the Russian River. Annual rainfall in the City of Ukiah is approximately 35 inches. Stream flow responds directly to the rainfall pattern; high flows will drop quickly without sustaining rainfall. During the dry summer months, stream flow consists of groundwater seepage, channel storage, or reservoir storage.

Project Site Setting: The environmental setting of the project site can be characterized as densely urban because it is the location of the major street interchange between U.S. Highway 101 and Talmage Road, which is classified as a local arterial street in the City General Plan. Topographically, the project site is flat except for the interchange elevations. Elevations range between approximately 594 feet above sea level along US 101 and 597 feet above sea level along the Talmage Road overpass.

Potential Impacts (Items a, b, c, d, e, f, g, h, i and j):

Flooding: The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRM) that delineate flood hazard zones for communities. The FEMA FIRM map indicates that the project site is not located within a floodway or floodplain and is outside the 500-year and 100-year flood areas. Accordingly, it is concluded that flooding does not represent a potentially significant impact resulting from the proposed project.

Erosion: Erosion from the disturbed areas during future site preparation and construction activities, most notably grading, could cause adverse impacts to water quality if the exposed soil is not properly stabilized and storm water carries silt into tributaries of the Russian River.

However, Division 9, Chapter 6, Floodplain Management, and Chapter 7, Erosion and Sediment Control, of the Ukiah City Code provide regulations pertaining to proposed construction and the potential for effects on existing hydrology or water quality within the City and/or region.

Division 9, Chapter 7, Erosion and Sediment Control, Sections 9700 to 9706, of the Ukiah City Code provides requirements for reducing the potential for construction activities to result in an increase in erosion or contribution of sediment to onsite or offsite water bodies. Measures are identified to address the requirement to prepare an erosion and sediment control plan and to address such issues as grading and storage methods, clearing and grading activities, and waterway crossings.

These standards are mandatory, and as a result, all future development projects will provide erosion control measures to preclude siltation of the Russian River.

Additionally, the North Coast Regional Water Quality Control Board (NCRWQCB) has primary responsibility for protecting the surface and groundwater quality within the proposed project area. The NCRWQCB's efforts are generally focused on preventing either the introduction of new pollutants or an increase in the discharge of existing pollutants into bodies of water that fall under its jurisdiction. The NCRWQCB is concerned with all potential sources of contamination that may reach subsurface water supplies through direct surface runoff or infiltration. Discharges from the project area are subject to state water quality laws and regulations.

The State Regional Water Quality Control Board requires Best Management Practices (BMPs) to be implemented by the project proponents. The intent of incorporating BMPs is to prevent any net detrimental change in runoff quantity or quality resulting from new development and redevelopment. Runoff reduction control measures should be implemented according to the New Development and Redevelopment Handbook (California Stormwater Quality Association, 2004), which provides general guidance for selecting and implementing BMPs to reduce pollutants in runoff in newly developed areas and redeveloped areas to waters of the state. The New Development and Redevelopment Handbook also provides guidance on developing project-specific stormwater management plans including selection and implementation of BMPs for a particular development or redevelopment project.

Staff is able to conclude that the proposed project would not be subject to flooding; would not cause flooding; and because of existing local and State mandatory erosion control standards, would not result in excessive erosion and siltation of any waterways. Accordingly, the project would not cause or create the impacts or exceed the thresholds listed in items a-j above.

Mitigation Measures: No mitigation is required.

Impact Significance After Mitigation: N/A

9. LAND USE AND PLANNING Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion: The City of Ukiah is a compact urban environment, and functions as the County seat for Mendocino County. Commercial, public, residential and industrial land uses are planned for specific areas of the City as set forth in the 1995 Ukiah General Plan (Housing Element updated in 2011). Allowed/permitted land uses are defined via zoning districts as stipulated in the Ukiah Municipal Code. The proposed project involves street/interchange improvements and not a change in land use. However, a number of land use planning documents were reviewed to answer the criteria/threshold questions listed above. These included the Ukiah General Plan, Ukiah Municipal Airport Master Plan, Mendocino County Airports Comprehensive Land Use Plan; and the Mendocino Council of Governments Route 101 Corridor Interchange Study.

<u>Ukiah General Plan</u>: The Circulation/Transportation Element of the Ukiah General Plan acknowledges the circulation systems serves all members of the community and that the ability to get from one place to the next is a major ingredient of the quality of life in the Ukiah area. The proposed project is intended to help improve the circulation system and local quality of life.

Goal CT-21 calls for improving freeway access. Underlying Policy CT-21.1 directs the City to "Work to improve existing freeway interchanges." While the underlying Implementation measures do not specifically mention the Talmage Road interchange, it is clear that the Goal and Policy are to improve the interchanges if and when they become inadequate. The proposed project is consistent with Goal CT-21 and Policy CT-21.2.

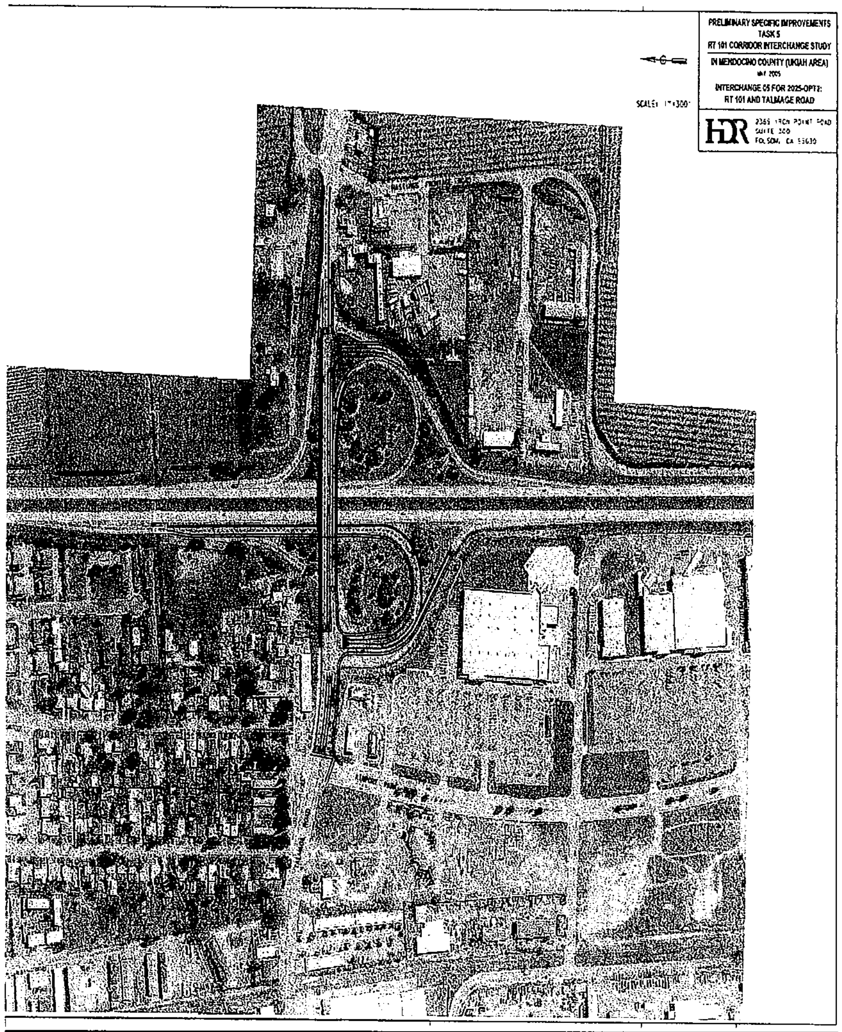
<u>Ukiah Municipal Airport Master Plan Report (Adopted July 1996) and Mendocino County Airport Comprehensive Land Use Plan (adopted October 1993; Revised 2010)</u>: The Ukiah Municipal Airport Master Plan Report provides a comprehensive evaluation of the status, anticipated future uses, and proposed future course of development at the Airport. The Airport supports a

variety of flight operations, although no scheduled air carriers operate out of the Airport; however, private and charter aircraft, delivery (cargo) aircraft, and the California Department of Forestry and Fire Protection Attack Center utilize the Airport to provide passenger and public safety protection services. The Mendocino County Sherriff and other law enforcement agencies also maintain their air equipment at the Airport, and air ambulance services frequently utilize the air field.

The Mendocino County Airport Land Use Commission is responsible for ensuring that proposed development in the vicinity of county airports is consistent with airport activities. The Mendocino County Airport Comprehensive Land Use Plan establishes criteria and policies that the Land Use Commission uses in assessing the compatibility between the public-use airports in the county and proposed land use development in areas surrounding the county's airports. The Plan establishes Compatibility Criteria and identifies a specific set of zones and associated criteria for each of the potential impact types, which include noise, safety, airspace, and overflight.

These compatibility zones establish permitted and prohibited land uses, human density standards, open space requirements, and other standards related to land use. The proposed project area is located within compatibility zone C (Common Traffic pattern). Prohibited uses include those that involve large assemblages of people in difficult to evacuate structures such as hospitals, schools, and nursing homes. Hazards to flight are also prohibited. Roadway improvements, which do not involve large assemblages of people in difficult to evacuate structures are not inconsistent with Compatibility Zone C.

Mendocino Council of Governments Route 101 Corridor Interchange Study: The Mendocino Council of Governments prepared a Route 101 Corridor Interchange Study in 2005. The Study concluded that it may be possible that traffic levels in 2025 may warrant improvements to the Talmage Road/Highway 101 interchange. Two alternatives for this possible future improvement were presented in the Study. Alternative 2, depicted below, is consistent with the City's current proposed project for the west side of the interchange. Alternative 2 also includes improvements to the east side of the interchange and possible widening if needed. The City's currently proposed project constitutes "phase 1" of the interchange improvement project.



Alternative 2 Diagram

Potential Impacts (Items a, b and c): As discussed and concluded above, the project is consistent and would not conflict with the applicable land uses plans and documents, would not physically divide an established community, and would not conflict with any habitat conservation plan because none exist for the project area.

Mitigation Measures: None required.

Impact Significance after Mitigation: N/A

10. MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Setting: The planning area is densely urbanized and is devoid of mineral resources. There are no mineral extraction operations in or near the project area, and the Ukiah General Plan does not identify or delineate any mineral resource areas or recovery sites within the City of Ukiah.

Potential Impacts (Items a and b): Because there are no known mineral resources, extraction or recovery sites on or near the project site, none would be impacted by the project.

Mitigation Measures: None required.

Impact Significance after Mitigation: N/A

11. NOISE Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒

11. NOISE **Would the project result in:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Setting: Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as medical facilities, parks, schools, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transit lodging, and other places where low interior noise levels are essential are also considered noise-sensitive. Those noted above are also considered vibration sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance.

The project area is comprised of a mix of residential and commercial land uses, as well as U.S. Highway 101. Existing noise and vibration sensitive land uses in the proposed project vicinity primarily include a variety of residential properties +100 feet to the northwest.

Potential Impacts (Items a, b, c, d, e and f): An Environmental Noise Assessment was performed by Illingworth & Rodkin, Inc, dated January 24, 2013 to determine if the proposed street/interchange improvements would generate significant amounts of noise that would exceed CEQA criteria or violate any local noise standards. This report is incorporated into this Initial Environmental Study by reference.

The Illingworth & Rodkin report identified and evaluated five potential noise impacts resulting from the proposed project:

1. Conflict with Ukiah Municipal Code Standards: The report found that the Ukiah Municipal Code limits construction activities to 7:00 am to 7:00 pm and that noise generated from the construction activities would not be prolonged, unusual, or unnatural in their time or place. Accordingly, it was concluded that the temporary construction noise "impact" was considered less-than-significant.

2. Exposure to Groundborne Vibration: The report found that the proposed project would not result in excessive groundborne vibration levels at adjacent land uses.

3. Substantial Permanent noise Level Increase: The report included noise modeling to calculate existing and future plus project traffic noise levels resulting from the proposed project. The report concluded that the modeled increase in traffic noise levels would not be perceptible outside of a laboratory environment resulting in less-than-significant impacts.

4. Temporary Construction Noise: The report found that the typical noise generated by construction activities and various pieces of construction equipment could be noticed by the residential neighborhood located to the north of the project site. However, because of the approximate 200-foot separation distance, the fact that the noise would move along the right-of-way as construction evolved, and the temporary nature of the noise, the report concluded that the impacts would be less-than-significant.

5. Compatibility with Aircraft Noise Exposure: The report evaluate whether or not construction workers would be exposed to excessive aircraft noise from the nearby airport. The report concluded that because of the one-quarter mile distance, existing background traffic noise from Highway 101 and Talmage Road, and the fact that aircraft noise is intermittent, construction workers would not be exposed to excessive aircraft noise.

Based on the technical study prepared for the project, it is concluded that the proposal would not cause or create the impacts or exceed the thresholds listed in items a-f listed in the checklist above.

Mitigation Measures: None Needed.

Impact Significance After Mitigation: N/A

12. POPULATION AND HOUSING **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Setting: The 2010 Census indicates that the population of Ukiah is approximately 16,075 persons, with a slow and stable growth taking place over the past several years.

Potential Impacts (Items a, b, and c): The proposed project involves street/interchange improvements and therefore would not induce population growth, displace persons from housing, or eliminate existing housing units, because no housing would be constructed or demolished as a result of the project.

Mitigation Measures: None required.

Impact Significance After Mitigation: N/A

13. PUBLIC SERVICES / UTILITIES **Would the project result in:**		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
a)	Fire protection?	☐	☐	☐	☒
b)	Police protection?	☐	☐	☐	☒
c)	Schools?	☐	☐	☐	☒
d)	Parks?	☐	☐	☐	☒
e)	Other public facilities?	☐	☐	☐	☒

Setting: The project area is served by the utility providers within the City of Ukiah (City). Public safety services (police, fire and ambulance) are provided by both the City and supplemented by county and state resources when needed. Other public services provided by the City include those for education and parks/recreation. Additionally, the California Department of Forestry and Fire Protection (CAL FIRE) provides fire protection services for the area from its station located at 2690 North State Street within the city of Ukiah. CAL FIRE provides wildfire protection to undeveloped forested areas surrounding the city of Ukiah and beyond. CAL FIRE is largely concerned with the prevention and control of wildland fires and deterring the spread of fire into developed areas. Although CAL FIRE does not normally respond to structure fires, it provides protection to structures threatened by forest fire.

Similarly, the City provides parks and recreation services and the Ukiah Unified School District provides and maintains local schools.

Potential Impacts (Items a, b, c, d and e): The project is a street improvement project that involves improvements to the existing Talmage Road/Highway 101 southbound interchange and associated traffic control and management, and therefore would not adversely impact public services or facilities. Accordingly, the project would not result in a need for additional public services or infrastructure. By improving the interchange, the project would improve traffic circulation and result in better service levels at nearby intersections – enabling emergency vehicles to more efficiently access and respond to emergencies situations.

Mitigation Measures: None required.

Impact Significance After Mitigation: N/A

14. TRANSPORTATION/TRAFFIC **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☒	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

Setting

The environmental setting of the project site can be characterized as densely urban because it is the location of the major street interchange between U.S. Highway 101 and Talmage Road, which is classified as a local arterial street in the City General Plan. Topographically, the project site is flat except for the interchange elevations. Elevations range between approximately 594 feet above sea level along US 101 and 597 feet above sea level along the Talmage Road overpass.

Background

Technical Memorandum and Traffic Impact Study: A Technical Memorandum and Traffic Impact Study was prepared for the project by GHD, Inc, dated June 21, 2013 and is incorporated into this Initial Environmental Study by reference.

The following is the *Purpose Statement* from the Technical Memorandum:

To further refine the proposed Project, and in support of the preparation of a Mitigated Negative Declaration (MND) for the Project, this Technical Memorandum (TM) summarizes the results of a traffic impact study for the project.

The preparation of this TM and associated traffic and operational analysis was closely coordinated with, reviewed and accepted by the California Department of Transportation (Caltrans) District 1 Traffic Operations.

This analysis consists of a review of previous studies completed for the Project, development of a traffic model for the Talmage Road corridor and interchange and measuring traffic model outputs against operational measures of effectiveness.

Previous Studies: *The Costco DEIR and other previous environmental and transportation studies have identified the need to improve the southbound U.S. 101 interchange at Talmage Road (State Route 222). These studies provided options to mitigate the anticipated transportation impacts. The following is a summary of the previously completed studies which were reviewed in the planning of this project and preparation of this Traffic Impact Study:*

- *Ukiah Bicycle and Pedestrian Master Plan (February 1999)*
- *Route 101 Corridor Interchange Study in Mendocino County, Ukiah Area (August 2005)*
- *Airport Industrial Park CIP Mitigation Monitoring Analysis (June 2007)*
- *Walmart Expansion Final EIR (October 2011)*
- *Costco Wholesale Project Draft EIR (January 2013)*

Ukiah Bicycle and Pedestrian Master Plan: *The Ukiah Bicycle and Pedestrian Master Plan (City of Ukiah, 1999) classifies Talmage Road as a regional bicycle facility and "bicycle activity corridor," and identifies it as a Class III connector bike route. A Class III bikeway provides for shared use with pedestrian or motor vehicle traffic. The portion of Talmage Road within the project area is not identified as a pedestrian activity area.*

The Route 101 Corridor Interchange Study: *The Route 101 Corridor Interchange Study in Mendocino County (MCOG, 2005) was prepared as a result of concerns regarding regional growth and development in the Ukiah Area, and summarizes technical analysis performed, preliminary designs and concepts for interchange improvements. The study evaluated six freeway interchanges along U.S. 101 in the Ukiah area, and included an analysis of present needs, existing (2005) and future (2025) levels of service (LOS), constraints on improvement options, right-of-way needs, and planning level improvement costs. The study identified the following concerns at the U.S. 101 interchange at Talmage Road:*

• Congestion at nearby Talmage Road / Airport Park Boulevard intersection (2005 and 2025)

o 2005 p.m. westbound left turn queue spillover – could block southbound ramp intersection

o 2025 westbound queues could block southbound ramp intersection

• Congestion at northbound and southbound ramp intersections (2025)

• Southbound off-ramp to westbound Talmage Road – queue spillover to mainline in 2025 p.m. peak

• Excess collision rate at nearby Talmage Road / Airport Park Boulevard intersection

• Poor sight distance at both northbound and southbound ramp intersections due to sharp vertical curvature of the Talmage Road Overcrossing

The study recommended the following future (2025) improvements and options to address the identified concerns:

• Interchange Option 1 (2025): Add signals to northbound and southbound ramp intersections. This would very likely require modification of the entire interchange to a tight diamond (Type L-

1) configuration, requiring additional right-of-way.

o Coordinate new signals with optimized existing signal at Talmage Road / Airport Park Boulevard intersection.

• Interchange Option 2 (2025): Modify the existing interchange to a partial cloverleaf design utilizing existing right-of-way.

o Coordinate new signals with optimized existing signal at Talmage Road / Airport Park Boulevard intersection.

• Overpass (2025): Widen Talmage Road Overcrossing as needed to accommodate queued vehicles at newly signalized ramp intersections.

Airport Industrial Park CIP Mitigation Monitoring Analysis: *The Airport Industrial Park CIP Mitigation Monitoring Analysis (City of Ukiah, 2007) presents the results of a mitigation monitoring analysis for the Redwood Business Park considering the full build-out of remaining* *parcels and land uses and resulting impacts. The study included a LOS analysis of area intersections and a peak hour signal warrant analysis. Trip generation was estimated using the Institute of Transportation Engineers (ITE) publication Trip Generation (7th Edition). The study identified the following unacceptable operations within the project area at the build-out condition:*

- *Talmage Road/U.S. 101 Southbound Off-Ramps: This unsignalized intersection is projected to operate at unacceptable LOS "F" during both the AM and PM peak hour periods. This unacceptable LOS is projected to occur because of the delay experienced by vehicles on the minor street approach which is the U.S. 101 Southbound off-ramp that are waiting for gaps in the uncontrolled east/west traffic flow on Talmage Road.*

From the results of the analysis, the study recommended the following build-out transportation improvements:

- *Talmage Road/US 101 SB Off-Ramps: It is recommended that the Westbound approach on Talmage Road be widened to accommodate a dedicated lane for vehicles coming off of the Southbound off-ramp. Along with this mitigation, it is recommended that the Westbound approach on Talmage Road at the Airport Park Boulevard intersection be re-striped to accommodate dual left-turn lanes and a shared through-right turn lane. It is noted that any improvements recommended on State facilities will require approval from Caltrans.*

Walmart Expansion Final EIR: *The Walmart Expansion Environmental Impact Report (EIR) (City of Ukiah, 2011) was prepared by the City for the expansion and alternation of the existing Walmart store in Ukiah, California. The EIR identified the following impacts and mitigation measures associated with transportation and traffic within the State right-of-way:*

Impact 4.10-1*: Implementation of the Project would increase traffic volumes on area roadways. This impact is less than significant.*

Measure 4.10-2*: The project applicant shall provide proportional share payments to the City of Ukiah for the planned improvements and reconfiguration of the Talmage interchange, which would improve queuing to acceptable conditions (i.e., accommodated in the available storage) at Talmage Road and U.S. 101 Southbound Off-Ramp. The improvement planned by the City of Ukiah at Talmage Road / Airport Park Boulevard would need to be implemented in addition to Mitigation Measure 4.10-2. Significant and Unavoidable*

Impact 4.10-4*: Implementation of the Project would increase traffic volumes on area roadways under cumulative conditions.*

Measure 4.10-4*: The project applicant shall provide proportional share payments to the City of Ukiah for the planned improvements and reconfiguration of the Talmage interchange, which would improve traffic conditions to acceptable conditions at Talmage Road / Airport Park Boulevard and Talmage Road / U.S. 101 Southbound Off-Ramp. Significant and Unavoidable*

Impact 4.10-5: *Implementation of the Project would substantially increase potential traffic safety hazards by causing queuing backups that exceed, or by increasing the degree to which queuing backups are projected to exceed, the available storage length under 2030 No project conditions.*

***Measure 4.10-5**: The project applicant providing proportional-share payments to the City of Ukiah, prior to issuance of building permits, for the planned improvements and reconfiguration of the Talmage interchange. Implementation of the measure would improve queuing to acceptable conditions. Significant and Unavoidable*

The impacts summarized above were considered significant and unavoidable because at the time the EIR was certified the Talmage Interchange project had not yet been officially funded through the City's Capital Improvement Program (CIP). Following certification of the EIR, the Ukiah City Council unanimously agreed to add it to the City's CIP and develop a funding program for the project. Following certification of the EIR, the project application was not approved by the City Planning Commission.

***Costco Wholesale Project Draft EIR:** The Costco Wholesale Project Draft Environmental Impact Report (DEIR) (City of Ukiah, 2013) was prepared by the City for the construction of a new Costco Wholesale warehouse in Ukiah, California. The DEIR identified the following impacts and mitigation measures associated with transportation and traffic within the State right-of-way:*

***Impact 3.10.1:** Implementation of the Project would increase traffic volumes on area roadways. This impact is potentially significant.*

***Measure 3.10.1:** Construct the Talmage Road Interchange improvements described above, including the provision of two left turn lanes on the westbound Talmage Road approach to Airport Park Blvd. The Project applicant shall contribute proportional-share payments to the City of Ukiah for the improvements. Significant and Unavoidable*

***Impact 3.10.3:** Implementation of the Project would increase traffic volumes on area roadways under Near-Term conditions. This impact is potentially significant.*

***Measure (same as for 3.10.1):** Significant and Unavoidable*

***Impact 3.10.4:** Implementation of the Project would increase traffic volumes on area roadways under Future (2030) conditions. This impact is potentially significant.*

***Measure (same as for 3.10.1):** Significant and Unavoidable*

***Impact 3.10.5:** Under Future plus Project conditions, traffic associated with the Project would 2contribute to inadequate queuing storage at Talmage Road/Airport Park Blvd. and Talmage Road/US 101 Southbound Off-Ramp. This impact is potentially significant.*

***Measure (same as for 3.10.1):** Significant and Unavoidable*

The impacts summarized above were considered significant and unavoidable because the funding program for the project has not been completed at the time the DEIR was completed.

GHD Technical Memorandum and Traffic Impact Study Analysis

The GHD Study data collection and analysis, and existing geometry operational analysis are described on pages 10-16 of the GHD Study, which is incorporated herein by reference. A discussion of alternative designs to solve the traffic congestion issues is included on pages 16-19, and the preferred alternative is described on pages 19-23.

The four alternatives evaluated to resolve traffic issues at the Talmage Road (SR 222) / U.S. 101 southbound on/off-ramp intersection were:

• Alternative 1: Signalized intersection with three left turn lanes

• Alternative 2: Signalized intersection with two left turn lanes

• Alternative 3: Two-lane three-leg roundabout intersection

• Alternative 4: One-lane four-leg roundabout intersection

The following is a discussion of the Preferred Alternative found on pages 19-20 of the Study:

The four southbound ramp intersection alternatives described above were based, in part, on recommendations made in the Walmart Expansion Final EIR (City of Ukiah, 2011) and Costco Wholesale Project DEIR (City of Ukiah, 2013), and were developed further as a part of this alternatives evaluation and traffic analysis. Each of these alternatives is compatible with the MCOG preferred interchange alternative (Option 2). However, these improvements have independent utility, and the full interchange improvement is separate from this analysis.

The two roundabout alternatives (Alternatives 3 and 4) were eliminated from consideration due to operational and safety issues, right-of-way requirements and cost. The two signal alternatives (Alternatives 1 and 2) were evaluated further with the assistance of Caltrans District 1 Traffic Operations. Through this evaluation process Alternative 2 was eliminated because of excessive vehicle queuing and delay issues related to the dual left turn lanes. Alternative 1 (triple left turn lanes) was analyzed in detail by GHD and Caltrans and determined to be the Preferred Alternative for the following reasons:

> • *95th percentile vehicle queue lengths on the southbound off-ramp approach to Talmage Road are generally maintained within available storage lengths.*
>
> • *The triple-left turn configuration from the southbound off-ramp to Talmage Road reduces merge/diverge maneuvers on the westbound Talmage Road approach to Airport Park Boulevard.*
>
> • *The triple-left turn configuration from the southbound off-ramp to Talmage Road improves lane utilization and flow of traffic to destinations compared with dual-left configuration.*
>
> • *The triple-left turn configuration from the southbound off-ramp to Talmage Road improves signal timing and reduces control delays when compared with dual-left configuration.*

Additional details of the Preferred Alternative (Alternative 1) are summarized below. Required design exceptions will be obtained as required.

- *Widening and realignment of the southbound off-ramp to eastbound Talmage Road and providing new curb and gutter and shoulder. The realigned off-ramp would terminate at a new signalized intersection with Talmage Road.*

- *Realigning the southbound on-ramp and providing new curb and gutter and shoulder.*

- *Widening Talmage Road to provide two westbound left-turn lanes at Airport Park Boulevard, Constructing a new curb and gutter on the realigned off-ramp and Talmage Road.*

- *Constructing a new signalized intersection at Talmage Road and the realigned southbound on/off ramps. The new signalized intersection would be coordinated with the existing signalized intersection at Talmage Road/Airport Park Boulevard due to their close proximity.*

- *Installing new vehicle detectors where required for signal actuation.*

- *Installing new safety lighting, as required.*
- *Constructing new sidewalk and curb and gutter along the north side of Talmage Road between Airport Park Boulevard and the western edge of the overcrossing structure. A small retaining wall may be required along a portion of Talmage Road due to existing grades on the north side.*

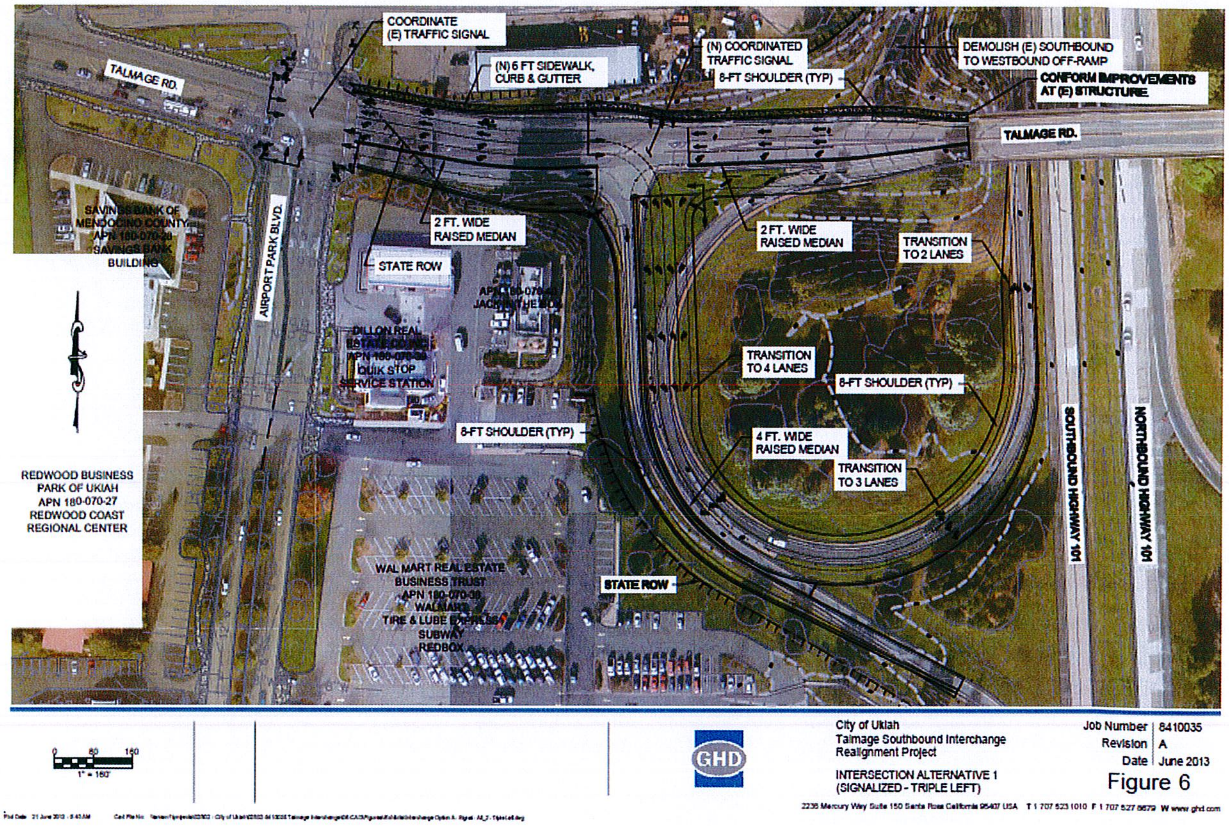
- *Constructing new curb and gutter along the south side of Talmage Road between Airport Park Boulevard and the southbound on-ramp.*

- *Providing breakdown shoulders along both sides of Talmage Road and the on/off ramps, where right-of-way allows.*

- *Constructing new raised medians.*

The detailed level of service analysis of the preferred alternative includes an operational analysis of the Talmage Road corridor for the 2032 traffic volume condition. The analysis and results are described on pages 20-24 of the Study.

The Preferred Alternative – (Number 1: three left turn lanes):



Potential Impacts (Items a, b, c, d, e, f and g): The purpose of the project is to improve traffic congestion for the build-out of the Airport Industrial Park and to improve the Talmage Road gateway into the City. The Technical Memorandum and Project Traffic Impact Study prepared by GHD, Inc. concludes, with the concurrence of CalTrans District 1 Traffic Operations, that the proposed project would in fact improve existing and future (2032) traffic conditions. The following is an excerpt from the Conclusions section of the Study:

The analysis of the Preferred Alternative was executed in close coordination with Caltrans District 1 Traffic Operations. The pertinent conclusions of the analysis are summarized below:

• *All study intersections are anticipated to operate at an acceptable level of service for the future (2032) traffic conditions, with the exception of Intersection No. 3.*

> *o Study Intersection No. 3 does not meet the signal warrants for the future (2032) traffic conditions, and is proposed to remain an unsignalized intersection until the future northbound interchange signalization and widening of the existing overcrossing structure is implemented.*

• *An evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 for signalization should occur once traffic volumes reach existing (2012) with an applied growth factor of 1.25 to 1.30.*

• The results of the queuing analysis for the Preferred Alternative show that there is adequate available storage length at all intersections within the State right-of-way. When traffic volumes reach the level of existing (2012) with an applied growth factor of 1.25 to 1.30 the northbound approach at Intersection No. 1 should be evaluated for median modifications to increase the length of the left turn pocket to provide additional storage, and to provide a single left turn lane and dual right turn lanes.

The proposed project/preferred alternative is consistent with the conclusions and recommendations of past studies concerning needed improvements for build-out of the Airport Industrial Park (Redwood Business Park and Airport Business Park), and has received support from CalTrans.

General concurrence with the results of this study and approval of the Preferred Alternative by Caltrans District 1 Office of Regional and Community Planning was provided in the April 15, 2013 Costco Wholesale Project Draft EIR comment letter to the City of Ukiah (see below).

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 1, P. O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 441-4554
FAX (707) 441-5869
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April 15, 2013

1-MEN-101-23.3
Ukiah Costco DEIR
SCH# 2011112025

Kim Jordan
Planning & Community Development Department
City of Ukiah
300 Seminary Avenue
Ukiah, CA 95482

Dear Ms. Jordan,

Thank you for giving us the opportunity to provide additional comments on the Draft Environmental Impact Report (DEIR) for the proposed Costco Wholesale project. The project is located within the Ukiah Airport Industrial Park, on Assessor's Parcel number 180-110-08 et al, near the junction of State Routes 101 and 222.

Traffic Mitigation

We have completed analysis of the proposed mitigation measures discussed in the DEIR. We consulted GHD and W-Trans to obtain current preferred design alternative concepts and model output information necessary to perform analysis. Our evaluation focused on the primary mitigation measures pertaining to State owned facilities including:

- Talmage Road Interchange Improvements
    - Reconfiguration of US 101 southbound (SB) off-ramp loop
    - Signal installation at intersection of US 101 SB off-ramp and Talmage Road
    - Installation of two westbound left-turn lanes (WBL) at intersection of Talmage Road and Airport Park Blvd.

We conclude that the mitigation measures proposed in the DEIR adequately mitigate projected traffic impacts on State facilities. Therefore, we request that the proposed mitigation be required as a condition of approval for the project.

Details regarding the technical analysis can be provided upon request.

Caltrans Permit/Approval

Any work within the State right of way will require an approved encroachment permit. Encroachment permit applications are reviewed for consistency with State standards and are

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Kim Jordan
4/17/2013
Page 2

subject to Department approval. Requests for Caltrans encroachment permit application forms can be sent to Caltrans District 1 Permits Office, P.O. Box 3700, Eureka CA 95502-3700, or requested by phone at (707) 445-6389. For additional information, the Caltrans Permit Manual is available online at: <http://www.dot.ca.gov/hq/traffops/developserv/permits/>.

If you have questions or need further assistance, please contact me at (707) 441-4554 or jaime_hostler@dot.ca.gov.

Sincerely,

Jaime Hostler

Jaime Hostler
Associate Transportation Planner
Caltrans, District 1
Office of Regional & Community Planning

c: Phil Dow

Based on the GHD Technical Memorandum and Traffic Impact Study, as well as the other cited resource documents, Staff is able to conclude that the proposed project would improve traffic congestion and safety rather than adversely impact it. Additionally, after review of the past studies that discussed needed improvements to the Talmage Road / Highway 101 interchange, as well as the Ukiah City Code and General Plan, Staff is able to conclude that the proposed project would not conflict with any traffic plan, ordinance, program or policy. Moreover, based on the GHD Technical Memorandum and Traffic Impact Study, Staff is able to conclude that the project would not result in a change in traffic patterns causing substantial safety risks; would not increase traffic hazards; would not result in inadequate emergency access; would not result in inadequate parking capacity; or conflict with efforts or plans supporting alternative transportation because it's purpose is to improve traffic circulation and safety and avoid these types of impacts.

The memorandum goes on to indicate that an evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 (northbound) for signalization should occur if traffic volumes reach existing (2012) with an applied growth factor of 1.25 to 1.30. Accordingly, Staff is recommending this evaluation as a mitigation measure.

Mitigation Measures:

7.An evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 for signalization should occur if traffic volumes reach existing (2012) with an applied growth factor of 1.25 to 1.30.

Impact Significance After Mitigation: N/A

15. UTILITIES AND SERVICE SYSTEMS **Would the project:**	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Setting: Ukiah operates a wastewater treatment facility and water treatment facility and distribution infrastructure. Solid waste is collected at the Ukiah Solid Waste Transfer Station and trucked to a landfill in Lake County. Storm drainage is managed through a system of above and below ground storm water management infrastructure.

Potential Impacts (Items a, b, c, d, e, f and g): The proposed project involves improving the existing southbound Highway 101 off-ramp at Talmage road and would not involve, need or require wastewater treatment infrastructure or water supply or infrastructure. Nor would the project involve the construction of substantial new storm drain facilities that would impact the environment. Any street demolition material (paving, concrete, etc.) not recycled would be delivered to the Solid Waste Transfer Station, which has the capacity to accept such debris.

Based on the above, it is concluded that the project would not cause or create the impacts or break the thresholds established in criteria a-g above.

Mitigation Measures: None Needed

Impact Significance After Mitigation: N/A

16. GLOBAL CLIMATE CHANGE / GHG

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Setting: Certain gases in the earth's atmosphere, classified as Greenhouse Gas Emissions (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it. Prominent GHGs contributing to the greenhouse effect include:

1) Carbon Dioxide (CO2) is an odorless, colorless gas that is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO2 is the most widely emitted GHG; fossil fuel combustion in stationary and mobile sources is the primary source of anthropogenic (human-made) emissions. Due to the emergence of industrial facilities and mobile sources in the past 250 years, the concentration of carbon dioxide in the atmosphere has increased significantly

2) Methane (CH4) emissions come from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of CH4 are landfills, natural gas systems, and enteric fermentation. CH4 is the primary component of natural gas, which is used for space and water heating, steam production, and power generation; 3) Nitrous oxide (N2O) production sources include natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production.

3) Hydrofluorocarbons (HFCs) are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is growing, as the continued phase out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum.

4) Perfluorocarbons (PFCs) are compounds consisting of carbon and fluorine. They are primarily created as a by-product of aluminum production and semi-conductor manufacturing. PFCs are potent GHGs with a GWP several thousand times that of CO2, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years) range from 5,700 to 11,900.

5) Sulfur hexafluoride (SF6) is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. SF6 is the most potent GHG that has been evaluated by the Intergovernmental Panel on Climate Change (IPCC) with a GWP of 23,900; however, its global warming contribution is not as high as the GWP indicates due to its low mixing ratio compared to CO2 (4 parts per trillion (ppt) in 1990 versus 365 parts per million (ppm)). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is extremely unlikely that global climate change of the past 50 years can be explained without including the contribution from human activities.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO2 emissions, approximately 54 percent is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO2 emissions remains stored in the atmosphere.

Global Warming Potential (GWP) - Water vapor is also a GHG, and is naturally occurring and unregulated. The most abundant GHGs are water vapor and CO2. Many other trace gases have greater ability to absorb and re-radiate long wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of GHGs, scientists have established a GWP for each GHG based on its ability to absorb and re-radiate long wave radiation and uses CO2 as the reference gas with a GWP of one.

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known. The quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts related to global climate change are inherently cumulative.

Attributing Climate Change Greenhouse Gas Emission Sources: Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial and agricultural emissions sectors (California Air Resources Board (ARB), 2008). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB, 2010). Emissions of CO2 are byproducts of fossil fuel combustion. CH4, a highly potent GHG, results from off-gassing is largely associated with agricultural practices and landfills. N2O is also largely attributable to agricultural practices and soil management. CO2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO2 through sequestration and dissolution, respectively, two of the most common processes of CO2 sequestration.

State Greenhouse Gas Emissions Inventory: According to different ranking systems, California is the 12^{th} to 16^{th} largest emitter of CO2 in the world (California Energy Commission (CEC), 2006). California produced 484 million metric tons (MMT) of CO2 equivalent (CO2e) in 2004 at its peak over the inventory period, and produced 478 MMT in 2008 (ARB, 2010). CO2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the GWP of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (CCAR, 2009), one ton of CH4 has the same contribution to the greenhouse effect as approximately 21 tons of CO2. Therefore, CH4 is a much more potent GHG than CO2. Expressing emissions in CO2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO2 were being emitted. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2008, accounting for 37 percent of total GHG emissions in the state (ARB, 2010). This sector was followed by the electric power sector (including both in-state and out-of-state sources; 24 percent) and the industrial sector (19 percent).

Local Inventory: Both the City and the County of Mendocino are currently preparing Greenhouse Gas Emission Inventories and Climate Action Plans. To date, these plans have not been adopted and neither the City nor the County have GHG emission inventories.

Potential Impacts (Items a and b): California is the 12th to 16th largest producer of GHGs in the world, producing 478 MMT in 2008. This is a fraction of the GHGs generated throughout the world, and an individual project cannot generate enough GHG emissions on its own to significantly influence global climate change. A project participates in this potential impact to the extent its incremental contribution, combined with the cumulative contributions of all other sources of GHGs, when taken together, is considerable in its contribution to global climate change impacts.

Although a numeric threshold is typically the best measure for determining significance in CEQA analyses, no agency with jurisdiction over the proposed project, or the area in which the project is located, has adopted a quantitative threshold. However, on June 3rd, 2010 the Mendocino County Air Quality Management District (MCAQMD) Air Pollution Control Officer issued new CEQA guidance for the MCAQMD which requested that planning agencies and consultants use the Bay Area Air Quality Management District (BAAQMD) CEQA Thresholds adopted on May 28th, 2010 (updated May 2011) to evaluate new projects. The BAAQMD's approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move us towards climate stabilization. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant.

The proposed project is a street improvement project intended to improve existing and future traffic circulation and safety. The southbound Highway 101 on and off-ramps at Talmage Road are not specific destinations such as a retail store, airport, gas station, favorite restaurant, etc., and therefore would not in and of itself attract new vehicles that would produce additional greenhouse gas emissions beyond existing conditions. It is reasonable to conclude that if the proposed project is constructed, it would not experience a "build it and they will come" phenomenon. It would, however, provide improved traffic flow and safety for existing and future traffic and pedestrians using the on and off-ramps to access businesses, gas stations, the airport, and other destinations.

For this reason, the proposed project would not result in a considerable contribution to cumulative GHG emissions. These same factors suggest the proposed project would not result in inefficient, wasteful or unnecessary consumption of energy per the criteria described in Appendix F of the CEQA Guidelines and the thresholds established by the Mendocino County Air Quality Management District.

The proposed project in and of itself would not generate GHG emissions, directly or indirectly, that would have a significant impact or cumulatively considerable contribution to climate change due to the fact that the project involves upgrading the existing southbound on and off-ramps within the existing Caltrans right-of-way, and as indicated above, the on and off-ramps are not a destination like a retail store, gas station, airport, etc., that would attract people/vehicles or induce additional vehicle trips beyond what is existing.

Air Quality Study: The following excerpt is from the Air Quality Study prepared for the project and discussed on page 29:

GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be reduced to some degree by longer intervals between maintenance and rehabilitation events. Currently MCAQMD has adopted the BAAQMD significance thresholds, with some modifications, that apply to *construction projects.*

Based on the calculations from the Road Construction Emissions Model, the maximum daily CO_2 emissions would be 3,569 lbs/day and the total emissions from the construction of the project would be 197.3 tons. The completed project would reduce delay and improve traffic flow through the Talmage Road intersection, possibly reducing CO_2 emissions from operation.

The relocation of the south bound off ramp would help relieve congestion in the peak hour traffic periods during the day. With the construction of the project the vehicle-miles-travelled (VMT) would remain the same as the No-Build scenario. The speed during the peak and off peak hours would remain the same. The combination of these would have an overall neutral effect on the GHG emissions generated in the project area when compared with the No-Build scenario. Table 6 shows the GHG expressed in tons per day of CO_2. The net difference between the Build and No-Build scenarios is so small that they are not reflected in the calculations when shown in terms of tons per day. Operational emissions were calculated using CT-EMFAC, A computer model to Estimate Transportation Emissions. CT-EMFAC was developed by UC Davis for Caltrans.

CO_2 Emissions in Tons per Day

Scenario	***Year***		
	2011	***2020***	***2032***
Existing	*11*	--	--
No-Build	--	*12*	*10*
Build	--	*12*	*10*

Due to the traffic remaining the same with or without the project, the daily CO_2 emissions are not expected to change as a result of the project. The CO_2 emissions numbers are only useful for a comparison between alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions would be because CO_2 emissions are dependent on other factors that are not part of the model such as the fuel mix[3], rate of acceleration, and the aerodynamics and efficiency of the vehicles.

Mitigation Measures: None required.

Impact Significance After Mitigation: N/A

[3] EMFAC model emission rates are only for direct engine-out CO_2 emissions not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components

MITIGATION MONITORING AND REPORTING: AB 3180 requires all public agencies to adopt a monitoring and reporting program whenever they adopt an EIR or "Mitigated Negative Declaration."

Impact	Mitigation Measure	Responsibility	Timing	Verification
Air Quality	1. The project proponents shall implement all Mendocino County Air Quality Management District requirements for preventing particulate matter (dust) from becoming airborne, including, but not limited to: e) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust. f) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. g) The screening of all open-outdoor sandblasting and similar operations. h) The use of water or chemicals for the control of dust during the demolition of existing buildings or structures.	City Public Works (DPW) and Planning and Community Development Department Staff	During all site preparation and construction activities.	
Biological – Plant and Animal Communities	2. Work will not be conducted during the rainy season (defined as October 15-April 15).	DPW	Prior to the commencement of work	
Biological – Plant and Animal Communities	3. Pre-construction surveys for special-status species (i.e., birds) by a qualified biologist shall be conducted at the appropriate times prior to construction activities to determine presence/absence at the site. If no special-status species are found, no further action is required. If individual nesting birds are found, a buffer zone around the species	DPW and Community Development	Prior to the commencement of work: Pre-Construction	

	or nest shall be required at a sufficient distance to prevent "take" of individuals until after the nesting season, as determined by a qualified biologist and based on site specific conditions.			
Biological – Plant and Animal Communities	4. If the pre-construction survey discover special-status species (i.e., birds), grading or removal of shrub vegetation shall be conducted outside the nesting season, which occurs between approximately February 15 and August 15, depending on species.	DPW and Community Development	Prior to the commencement of work	
Biological – Plant and Animal Communities	5. To delineate the buffer zone around a nesting tree (to protect the nest(s) and tree), orange construction fencing placed at the specified radius (as determined by a qualified biologist) from the base of the tree within which no machinery or workers shall intrude.	DPW and Community Development	Prior to the commencement of work	
Geology and Soils	6. All recommendations contained in the Limited Materials and Preliminary Geotechnical Report prepared by Rau and Associates, dated May, 2013 shall be followed and/or incorporated into the project.	DPW	Prior to the commencement of work and during all phases of construction	
Traffic	7. An evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 for signalization should occur once traffic volumes reach existing (2012) with an applied growth factor of 1.25 to 1.30.	DPW and Planning and Community Development Department Staff	On-going monitoring and evaluation	

MANDATORY FINDINGS OF SIGNIFICANCE

FINDINGS Does the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Discussion: This Initial Environmental Study concludes that the proposed project, as mitigated, would not have potentially significant adverse impacts on the environment for the following reasons:

1. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, does not have the potential to degrade the quality of the local or regional environment;

2. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in short-term impacts that will create a disadvantage to long-term environmental goals;

3. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in impacts that are individually limited, but cumulatively considerable; and

4. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in environmental impacts that will cause substantial adverse effects on human beings, either directly or indirectly.

5. The Initial Environmental Study examined areas of potential impacts and based on the conclusions reached in the Initial Environmental Study, it has been determined that:

   a) The purpose of the project is to improve existing and future traffic circulation and safety.

   b) Based on the findings and conclusions contained in the Initial Environmental Study and the following technical studies prepared for the project, the proposed project would not meet or exceed the impact thresholds contained in the Initial Environmental Study Checklist:

      - Talmage Road Improvement Project Draft Environmental Noise Assessment, Illingworth & Rodkin, Inc., January 24, 2013.

      - Natural Environment Study Minimal Impact Talmage Road/US 101 Interchange, Wildlife Research Associates, January 18, 2013.

      - Talmage Road Improvement Project Draft Environmental Air Quality Assessment, Illingworth & Rodkin, Inc., February 21, 2013.

      - Aerially Deposited Lead and Soil Impacts from Hydrocarbons – Talmage Interchange, GHD, Inc., January 30, 2013.

      - Limited Materials Report and Preliminary Geotechnical Report: Transportation Improvements for U.S. 101/Talmage Road Southbound Interchange Realignment Project in Ukiah – Rau & Associates, May, 2013.

      - Talmage Road Southbound Interchange Project Traffic Impact Study and Technical Memorandum – GHD, Inc., June 21, 2013

      - Archeological Survey Report, ASC March, 2013

      - U.S. Highway 101 / Talmage Road Interchange Project Historic Proeprty Survey Report, Anthropological Studies Center, Sonoma State University, March, 2013

   c) A review of the Ukiah General Plan, Airport Master Plan, City-Wide Traffic Study, and other pertinent planning documents reveals that the project is consistent with the goals, policies, programs, and projects contained in those plans.

Accordingly, it has been determined that a Mitigated Negative Declaration is appropriate for the project.

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature:

Date: 7-22-13

Charley Stump, Director
Department of Planning & Community Development
City of Ukiah

REFERENCES CITED

1. City of Ukiah General Plan, 1995, 2011 (Housing Element)
2. The Linkage Between Land Use, Transportation and Air Quality, State Air Resources Board, 1993.
3. The Land Use - Air Quality Linkage: How Land Use and Transportation Affect Air Quality, State Air Resources Board, 1997.
4. A Source of Air Quality Conditions Including Emissions Inventory, Ozone Formation, PM10 Generation, and Mitigation Measures for Mendocino County, CA., Sonoma Technologies, Inc., November, 1998.
5. General Plan Revision and Growth Management Plan Technical Report: Natural Habitat Section, Michael W. Skenfield, and October, 1991
6. Soil Survey of Mendocino County, Eastern Part, and Trinity County, Southwestern Part, California, U.S. Department of Agriculture - Soil Conservation Service, January, 1991.
7. A History of the Salmonid Decline in the Russian River, Steiner Environmental Consulting, August, 1996
8. U.S.G.S. Topographical Map, Ukiah Quadrangle, 1958 (photo inspected 1975).
9. Ukiah Municipal Airport Master Plan Report, Shutt Moen Associates, July, 1996
10. City Air Photographs: 2000, and 2001
11. City of Ukiah Citywide Circulation Study: Final Draft, Omni-means Engineers and Planners, November, 2006.
12. Hazardous Waste and Substance Sites List from California Department of Toxic Substances
13. Greenhouse Gas, Climate Change, and Energy, National Energy Information Center (NEIC) Energy Information Administration.
14. Mendocino County Economic and Demographic Profile, 2010
15. City of Ukiah Historical and Architectural Resources Inventory Report, 1984-85, 1999
16. The Factors of Urban Morphology in Greenhouse Gas Emissions: A Research Overview by Michael Mehaffy, Stuart Cowan, and Diana Urge-Vorsatz, 2009
17. Final EIR – WalMart Expansion Project, ESA, certified January 18, 2012
18. Draft EIR – Ukiah Costco Project, dated January, 2013.
19. Talmage Road Improvement Project Draft Environmental Noise Assessment, Illingworth & Rodkin, Inc., January 24, 2013.
20. Natural Environment Study Minimal Impact Talmage Road/US 101 Interchange, Wildlife Research Associates, January 18, 2013.
21. Talmage Road Improvement Project Draft Environmental Air Quality Assessment, Illingworth & Rodkin, Inc., February 21, 2013.
22. Aerially Deposited Lead and Soil Impacts from Hydrocarbons – Talmage Interchange, GHD, Inc., January 30, 2013.
23. Limited Materials Report and Preliminary Geotechnical Report: Transportation Improvements for U.S. 101/Talmage Road Southbound Interchange Realignment Project in Ukiah – Rau & Associates, May, 2013.
24. Talmage Road Southbound Interchange Project Traffic Impact Study and Technical Memorandum – GHD, Inc., June 21, 2013
25. Archeological Survey Report, ASC March, 2013
26. U.S. Highway 101 / Talmage Road Interchange Project Historic Proeprty Survey Report, Anthropological Studies Center, Sonoma State University, March, 2013

City of Ukiah

Planning and Community Development

CEQA MITIGATED NEGATIVE DECLARATION

Talmage Road / U.S. 101 Interchange Improvement Project

PROJECT: Talmage Road/U.S. Highway 101 Interchange Improvement Project

DATE: July 22, 2013

PROJECT PROPONENT: City of Ukiah, 300 Seminary Avenue, Ukiah

LOCATION: The site is situated at the Talmage Road/Highway 101 interchange in the southeast area of the City of Ukiah.

PROJECT DESCRIPTION: The proposed project includes improvements to the Talmage Road/U.S. 101 southbound on- and off-ramps and improvements to Talmage Road within the State right-of-way. Modifications within the State right-of-way to the Talmage Road/U.S. 101 southbound on- and off-ramps include removal of the existing southbound off-ramp to westbound Talmage Road from service, widening and realignment of the southbound off-ramp to eastbound Talmage Road to four lanes with terminus at a new signalized intersection with Talmage Road, signing and striping, minor grading, new sidewalks, curbs and gutters.

In addition to these improvements, Talmage Road would be widened to add a westbound through lane (two westbound through lanes) between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp (one through lane and one right-turn lane). Existing signals at the intersection of Talmage Road and Airport Park Boulevard would also be replaced.

ENVIRONMENTAL SETTING: The site is a freeway interchange and described as densely urban. There are a number of trees, shrubs and grasses present inside the interchange loop.

FINDINGS SUPPORTING A MITIGATED NEGATIVE DECLARATION:

1. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, does not have the potential to degrade the quality of the local or regional environment;

6. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in short-term impacts that will create a disadvantage to long-term environmental goals;

7. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in impacts that are individually limited, but cumulatively considerable; and

8. Based upon the analysis, findings and conclusions contained in the Initial Environmental Study, the project, as mitigated, will not result in environmental impacts that will cause substantial adverse effects on human beings, either directly or indirectly.

9. The Initial Environmental Study examined areas of potential impacts and based on the conclusions reached in the Initial Environmental Study, it has been determined that the proposed project, as mitigated, would not in and of itself, have significant adverse impacts on the environment for the following reasons:

   a. The purpose of the project is to improve existing and future traffic circulation and safety.

   b. Based on the findings and conclusions contained in the following technical studies, as well as the analysis prepared for the project, the proposed project would not meet or exceed the impact thresholds contained in the Initial Environmental Study Checklist:

      - Talmage Road Improvement Project Draft Environmental Noise Assessment, Illingworth & Rodkin, Inc., January 24, 2013.
      - Natural Environment Study Minimal Impact Talmage Road/US 101 Interchange, Wildlife Research Associates, January 18, 2013.
      - Talmage Road Improvement Project Draft Environmental Air Quality Assessment, Illingworth & Rodkin, Inc., February 21, 2013.
      - Aerially Deposited Lead and Soil Impacts from Hydrocarbons – Talmage Interchange, GHD, Inc., January 30, 2013.
      - Limited Materials Report and Preliminary Geotechnical Report: Transportation Improvements for U.S. 101/Talmage Road Southbound Interchange Realignment Project in Ukiah – Rau & Associates, May, 2013.
      - Talmage Road Southbound Interchange Project Traffic Impact Study and Technical Memorandum – GHD, Inc., June 21, 2013

   c. A review of the Ukiah General Plan, Airport Master Plan, City-Wide Traffic Study, and other pertinent planning documents reveals that the project is consistent with the goals, policies, programs, and projects contained in those plans.

STATEMENT OF DECLARATION: After appraisal of the possible impacts of this project, the City of Ukiah has determined that the project, as mitigated, will not have a significant effect on the environment, and further, that this Mitigated Negative Declaration constitutes compliance with the requirements for environmental review and analysis required by the California Environmental Quality Act.

The Initial Environmental Study and all resources information used to perform the initial environmental analysis may be reviewed at the City of Ukiah Department of Planning and Community Development, Ukiah Civic Center, 300 Seminary Avenue, Ukiah, California.

Charley Stump, Director
Planning and Community Development
City of Ukiah

7-22-13
Date

City of Ukiah

NOTICE OF PREPARATION
Environmental Impact Report

Date: **October 22, 2013**

To: **Responsible Agencies, Organizations, and Interested Parties**

From: **City of Ukiah**
Planning and Community Development Department
300 Seminary Ave., Ukiah, CA 95482

Subject: **Notice of Preparation of a Draft Environmental Impact Report**
Talmage Road/Highway 101 Interchange Off-Ramp Realignment

The City of Ukiah originally proposed a Mitigated Negative Declaration for this project (SCH# 2013072057) and is now preparing an Environmental Impact Report.

The City of Ukiah will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the proposed Talmage Road/Highway 101 Interchange Off-Ramp Realignment project, in compliance with the California Environmental Quality Act (CEQA). The Lead Agency is requesting input as to the scope and content of the environmental information that should be contained in the Draft Environmental Impact Report.

The project involves the modification and reconstruction of the southbound portion of the U.S. 101 interchange at Talmage Road to provide additional capacity and to address future impacts associated with projected build-out growth in the Airport Industrial Park.

It involves a partial cloverleaf interchange configuration with a new signalized intersection at the southbound ramp terminus with Talmage Road. There will be three (3) left turn lanes onto westbound Talmage Road and one (1) eastbound lane. Two dedicated left turns would be provided into the Airport Industrial Park. The existing southbound off-ramp would be removed. The new signalized intersection at Talmage Road and the southbound on/off ramps is proposed to be interconnected and coordinated with the existing signalized intersection at Talmage Road and Airport Park Boulevard. Other proposed improvements include new sidewalks, signing and striping, medians, and safety lighting. The project area generally extends from the intersection of Talmage Road and Waugh Lane in the west to the intersection of Talmage Road and Hastings Frontage Road in the east, and from the U.S. 101 southbound off ramp diverge in the north to the U.S. 101 southbound on ramp merge in the south.

Potentially significant environmental issues may include Air Quality, Biological Resources, Geology/Soils, Noise and Traffic.

Because of the time-sensitive nature of the EIR process, we request your response at the earliest possible date, and **not later than November 26, 2013** (30 days from the publication of this notice).

The City will hold a public meeting to identify and receive input on the potentially significant environmental effects to be discussed in the EIR.

Meeting Time: Thursday, November 7, 2013, from 5:30 to 6:30 pm
Meeting Location: Ukiah Council Chambers, 300 Seminary Ave., Ukiah, CA 95482

If you have any questions regarding this matter, please contact Charley Stump, Director of Planning and Community Development at (707) 463-6219 or cstump@cityofukiah.com.

Comments may be submitted in writing during the review period and addressed to:

Charley Stump, Director
Planning and Community Development Department
City of Ukiah – Civic Center
300 Seminary Ave., Ukiah, CA 95482 / Email: cstump@cityofukiah.com

Appendix B

Geotechnical Report

Limited Materials and Geotechnical Report

Limited Materials Report And Preliminary Geotechnical Report

Transportation Improvements for US 101/Talmage Road Southbound Interchange Realignment Project in Ukiah, California

Prepared for: GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Submitted By:

RAU AND ASSOCIATES, INC.

CIVIL ENGINEERS • LAND SURVEYORS

100 NORTH PINE STREET - P.O. BOX M - UKIAH, CA 95482 - (707) 462-6536

Job No. R09153 Date: May, 2013

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May 13, 2013

Mr. Matt Kennedy, Project Manager
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Job Number R09153

RE: LIMITED GEOTECHNICAL AND MATERIALS INVESTIGATION FOR TRANSPORTATION IMPROVEMENTS ON THE US 101/TALMAGE ROAD SOUTHBOUND INTERCHANGE REALIGNMENT PROJECT, UKIAH, CA

Dear Mr. Kennedy;

In accordance with your authorization, we have performed the above-referenced study for the proposed transportation improvement project in Ukiah, California. The project includes: Widening of the Highway 101 Southbound off-ramp from the southern edge of the grade separation structure to Talmage Road; widening of a segment of Talmage Road; obliteration of the southbound off-ramp which terminates on the north side of the grade separation structure; and traffic capacity improvements to the Talmage Road and Southbound off-ramp intersection and the Talmage Road and Airport Park Boulevard intersection.

The project includes street improvements, upgrading existing signalized intersection at Talmage and Airport Park Boulevard, and installation of a new signalized intersection at Talmage and the Southbound off-ramp.

The scope of service included a review of available geotechnical maps, literature and data for the area, sampling of near-surface soils from 7 boring locations for R-Values, Remolded Shear, and Corrosion Potential, discussion with the project team, and a written report with recommendations for the structural section and for corrosion potential.

The scope of service for this report did not include any review for pollutants or toxic materials on the property, and such a review is not included in the competencies of Rau and Associates, Inc. GHD, Inc. teamed with Rau and Associates, Inc. to provide the pollutant/toxic materials evaluation in a separate report.

The accompanying preliminary report presents our conclusions as well as the results of the geotechnical investigations on which they are based. If you have any questions concerning the data, conclusions or recommendations presented herewith, please do not hesitate to call me.

Very truly yours,

REGISTERED PROFESSIONAL ENGINEER
GEORGE C. RAU
GE710
Exp. 09-30-2013
GEOTECHNICAL
STATE OF CALIFORNIA

George C. Rau
Registered Civil Engineer 21908
Registered Geotechnical Engineer 00710
Expires 9-30-2013

Summary

The results of this materials investigation concluded that the site is suited for the proposed improvements, subject to standard Caltrans requirements for a structural section at each location. Corrosion potential is acceptably low so as not to warrant any particular remediation.

There are fill materials under the southbound off-ramp area from approximately 100 feet south of the grade separation structure to the intersection of Talmage Road. The fill materials were apparently compacted to Caltrans Standards during the original construction of this off- ramp, judging by their in-place density and the construction drawings. Areas of loosely consolidated alluvial soils underlying the compacted fill were identified by Caltrans in their soil investigations for the grade separation structure carrying Talmage Road over US 101. Ground water was encountered at depths of around 10.5 feet in June, 1958. The current investigation encountered similar materials from the base of the fill to depths of 10 feet or more and a water table as high as 8 feet from the surface. Construction of fills and of structures such as low retaining walls or signal bases will have to address these constraints.

This report contains recommendations to address the identified conditions.

Introduction

Rau and Associates was retained by GHD, Inc. (formerly Winzler and Kelly) to investigate the site of proposed transportation improvements from the southbound off-ramp of US Highway 101 to Talmage Road, and on Talmage Road from the grade separation structure of US 101 to the North Coast Rail Authority tracks in Ukiah, California. A site map showing the project location is provided as an attachment (Appendix A- Page 2). GHD is the Prime Consulting Engineer for the project, which is being financed by the successor to the City of Ukiah's Redevelopment Agency. The Ukiah Redevelopment Agency purchased a number of commercial parcels and is committed to making the transportation improvements necessary to facilitate development of commercial business entities on the parcels.

The report includes an evaluation of the results from several prior geotechnical investigations performed in the area of the proposed project (References 13 through 19) as they relate to the current project. The previous field work included backhoe test pits up to 10 feet deep, cone penetrometers up to 18 feet deep, and augered borings to approximately 50 feet deep. Evaluation of the soils from the prior work assisted in interpretation of the recent work performed for this project.

The current investigation included seven borings from 4.5 feet deep to 27.5 feet deep. The logs of these borings were compared with previous work in completing the evaluation of materials conditions.

Purpose and Scope of Work

The purpose of this geotechnical investigation is to provide recommendations for subgrade treatment and structural sections for a widening of a segment of the Southbound off-ramp from US Highway 101 to Talmage Road, to provide recommendations for subgrade treatment and structural sections for widening a segment of Talmage Road, and to evaluate the site soils for potential corrosive effects to reinforced concrete foundations for traffic signals at the intersection of the Southbound off-ramp and Talmage Road, and at the intersection of Airport Park Boulevard and Talmage Road, as well as for any reinforced concrete retaining walls necessary for the proposed project.

The scope of the geotechnical investigation included:

- Review of previously prepared geotechnical reports, review of miscellaneous backhoe test-pit logs and exploratory boring logs, and laboratory testing previously completed.
- Selection of representative locations for sampling near or at segments of roadway with a lack of specific information.
- Review and interpretation of laboratory results including remolded shear testing, testing for corrosive constituents in the soils, and the results of R-Value testing for street structural sections.
- Review of earth materials literature, geologic mapping, and seismic literature and mapping pertinent to the site as noted in "Selected References."
- Recommendations for subexcavation of site soils;
- Recommendations concerning the removal and/or reprocessing of fill soils;
- Recommendations for pavement structural sections;
- Recommendations for site subdrainage if necessary.
- Recommendations for structure support

The scope of this study specifically excluded sampling and/or testing for, or evaluation of the occurrence and distribution of hazardous substances. No opinion is intended regarding the potential for presence or distribution of any hazardous substances at this or nearby sites.

Site/Project Description

The site includes the area around the Highway 101 Southbound off-ramp and Talmage Road up to the intersection with the NWPRR, which includes the intersection of Talmage Road and Airport Park Boulevard. Airport Park Boulevard lies east of the NWPRR tracks and south of Talmage Road and is a major arterial for a commercial area of more than 125 acres in size. The commercial businesses generate a significant amount of truck traffic, which has implications on pavement designs.

The site is relatively flat and gently sloping towards the east and south. The location of the site is shown in Appendix A.

The proposed project will consider the widening of both Talmage Road and the Southbound off-ramp. Approximately 1000 feet of Talmage Road will be widened. The intersections of Airport Park Boulevard with Talmage Road and Talmage Road with the Southbound off-ramp will be improved.

There will be a new traffic signal system installed at the Southbound off-ramp and Talmage Road intersection. The traffic signal system at the Talmage Road and Airport Park Boulevard intersection will also be modified.

Testing and Study Procedures

Research

Office study included review of seismic, FEMA, and geologic maps relevant to the project location. State Highway 101 Plans from 1964 and Geotechnical reports, completed previously for projects in the vicinity, were reviewed and will be found in the list of "Selected References" reviewed for this Geotechnical Investigation.

According to the highway plans, the ramp structural section consisted of four layers. The bottom layer is 0.5 feet of Class I aggregate sub-base. Above the sub-base are 0.34 feet of Class B CTB (cement treated base) and 0.33 feet of Class A CTB. The top layer consists of 0.25 feet of AC (asphalt concrete).

From the highway plan's profile of the on-ramp, fill was placed beginning at Station 683+00. Also from the plan's boring logs for the overpass construction, there was the presence of a very soft silty sand layer for the first 10 feet, underlain by slightly compacted sand and gravel to loose sandy silt with gravel. This boring log is close to the location of the Southbound off-ramp and Talmage Road intersection, lying at the west end of the grade separation structure.

Field Reconnaissance and Testing

Field reconnaissance of the site included visual observations of existing conditions, and geotechnical borings drilled at seven representative locations along the Southbound off-ramp and Talmage Road, with soil samples taken from these borings. Appendix B shows the locations of the seven borings drilled. Drilling and sampling was performed on December 10, 2012.

Field operations were observed by a geotechnical engineer, who logged the borings.

Portions of the samples were retained for testing in the Rau and Associates, Inc. (RAU) laboratory in Ukiah. Gradation and Textural analysis of the materials and a determination of maximum wet densities were performed in the RAU laboratory. Portions of the samples were shipped by UPS for laboratory testing to Taber Consultants of West Sacramento. Taber Consultants retained sufficient sample volumes to perform the testing for R-Values, remolded direct shear, and Atterberg Limits. Taber sent portions to Sunland Analytical of Rancho Cordova for an evaluation of soil corrosion potential.

Earth Materials and Conditions

General

Published geologic mapping of the area (Reference 1) indicates that the underlying soils are alluvial deposits of Quaternary age (Holocene Epoch) considered to be approximately 10,000 years old or less. More recent geologic mapping in the area also reveals the underlying soils are alluvial deposits of Quaternary (Holocene) age (Reference 2). Alluvial deposits are those sedimentary deposits laid down by rivers or streams.

The alluvial deposits cover about 30 square miles of the Ukiah Valley floor and are typically comprised of un-cemented gravel, sand, silt, and clay of varying thickness. The layering is generally sub-parallel to the ground surface and thinning towards the valley margins. The thickness of the alluvium is greatest near the Russian River but is difficult to establish with any accuracy due to its lithologic similarity with underlying basin deposits. Porosity and permeability are generally high due to the coarse grained character of the material but can be very low in areas where deposition of silts and clays dominate (Reference 2).

Natural soils over the site are generally coarse-grained silty sands/sandy silts with some gravel content at depths below 10 feet. Typical of alluvial deposits, they have little widespread lateral continuity and contain inter-fingering of the sedimentary layering of finer grained soils. They are better drained in general, although seasonal water tables perch on top of the more slowly permeable layers and saturate the more granular layers during episodes of extended rainfall.

According to the USDA (United States Agricultural Department) Soil Survey, the project site soil is predominately identified as "Urban Land." It is surrounded though by three different soil units; the land northeast of the Talmage interchange is identified as "Cole Loam" (map unit 113), southwest of the interchange underlying Airport Park Boulevard is identified as "Russian Loam, gravelly substratum" (190); and southeast of the interchange is identified as "Russian Loam" (188.) Each of these soil complexes is characterized as having slopes ranging from 0-2 percent and originating from parent material comprised of alluvium derived from sedimentary rock. The two Russian loam formations are characterized as being "well drained," while the Cole loam formation is characterized as "somewhat poorly drained."

The Cole loam formation has a typical profile of loam from 0-15 inches underlain by silty clay down to 60 inches. The Russian loam has a profile consisting of loam from 0-38 inches and stratified very fine sandy to silt loam down to 60 inches. The Russian loam with gravelly substratum consists of loam from 0-30 inches underlain by stratified gravelly coarse sand to sandy loam form 30-51 inches and stratified gravelly coarse sand to gravelly sandy loam form 51-60 inches. These three formations are predominately low plasticity silt and clay (ML, CL) with the exception of the large amount of gravel contained in the lower portion of the Russian loam with gravelly substratum. This matches the findings from the borings (Appendix B.) Borings mostly contained sandy silt, with the exception of the two borings nearest Airport Park Boulevard (G6, G7) which contained gravel layers starting at depths of approximately 10 feet.

Faulting and Seismicity

The Maacama Fault Zone, approximately 1.7 miles (2.7 km) easterly of the site, is considered to be active and is the dominant fault zone for the project area. According to the CBC, active faults are those with Holocene displacement (within the last 11,000 years). There has been little distortion of the alluvial surface in the area of the subject project. There are no active faults shown in close proximity to the project area (References 3 - 6).

Although, historically, there have been no major recorded earthquakes on this fault (Reference 6) it is considered on the basis of likely length of rupture to be capable of generating earthquakes on the order of Richter Magnitude 7.1 (Reference 9).

The California Geologic Survey's interactive web page (Reference 11) allows one to ascertain the probabilistic ground motions with a 10% probability of being exceeded in 50 years expressed as a fraction of the acceleration due to gravity. For latitude of 39.1308 degrees and a longitude of -123.2023 degrees, which is in the central part of the project, this page indicates that the peak ground acceleration in alluvium is 0.534 times the acceleration of gravity.

The project is approximately 27.6 miles (44.4 km) east of the San Andreas Fault (Reference 5). That fault was the locus of the 1906 Richter Magnitude 8.3 earthquake (estimated) which resulted in at least moderate ground shaking in the Ukiah area (Reference 8). Earthquakes of that magnitude are estimated to occur at intervals of approximately 303 years (Reference 10).

On the basis of the flat to gentle slopes and uniform ground surface, there is no significant risk with respect to landsliding at the site. Liquefaction and/or co-seismic settlement are a risk in alluvium. This report did not assess that hazard because of the small structures involved.

Flood Plain Hazard

According the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 060186 0811 B dated June 1, 1982) the project area is located in Zone C or Zone B. Zone C is defined as "areas of minimal flooding." Zone B consists of areas between the 100 year flood and the 500 year flood, or certain areas subject to 100 year flooding with average depths of less than one foot or where the contributing drainage area is less than one square mile (Reference 12). Elevations of the 100 year Flood range from 598 feet at the Airport Park Boulevard and Talmage Road intersection to 596 feet at the Talmage Road and Southbound off-ramp intersection.

Highway centerline grades in this area vary from 599.7 at Airport Park Boulevard and Talmage Road to 598.2 at the southbound off-ramp intersection with Talmage Road. Average ground grades outside the paved areas vary from approximately 597.6 to 595.6, respectively.

Site Materials and Conditions

Borings were drilled along the Southbound off-ramp (G1, G2, G3, G5), and on both the north (G7, G8) and south (G6) side of the intersection of Talmage Road and the Southbound off-ramp. Boring Logs are provided in Appendix B. The material along the off-ramp was brown silty sand on top of light brown sandy silt. The material at the intersection was brown silty sand with gravel down to a depth of approximately 10 feet, interpreted as fill, and then contained silty sand and silty clay layers down to a depth of 28 feet, with a large amount of gravel present beyond 20 feet. The ground water level was located at a depth of 8 feet (approximately elevation 587) according to boring G8.

Laboratory testing was performed on select samples from borings for determination of the R-Value, of corrosion potential, of remolded direct shear values of the soils, Atterberg Limits, and maximum wet density. The results of these tests are found in Appendix C of this report.

Laboratory Results are summarized in the following Table:

Sample Designation	R-Value	Atterberg Limits			Direct Shear		Max. Wet Density	Soil	Min. Resistance	Chloride	Sulfate
		LL	PL	PI	c (psf)	ϕ (deg)	(pcf)	pH	(ohm-cm x 1000)	(ppm)	(ppm)
Bulk G3/G5	9	26	18	8	-	-	-	-	-	-	-
Bulk G8	-	-	-	-	-	-	-	5.61	6.43	9.1	1.1
Bulk G1/G2/G4	-	-	-	-	-	-	138.0	-	-	-	-
G2 @ 2.0'-3.5'	-	27	19	8	-	-	-	-	-	-	-
G3 @ 2.0'-3.5'	-	25	18	7	-	-	-	-	-	-	-
G6 @ 2.0'-3.5'	-	22	19	3	271	47	-	-	-	-	-
G8 @ 1.0'-3.0'	-	28	18	10	342	32	-	-	-	-	-
G8 @ 2.5'-3.5'		26	21	5	181	37	-	-	-	-	-
G8 @ 5.5'-6.0'	-	22	17	5	423	39	-	-	-	-	-

Discussion:

The boring logs completed for the project matched what was expected from a review of the State Highway 101 1964 plans. Borings G5-G7 contained fill in the first few feet, matching the ramp profile provided in the plans. The fill is compacted, which is evident in the SPT blow counts being higher than the underlying "undisturbed" soils. Borings G6 and G7, which were in close proximity to borings completed in 1964 for the overpass, show layers of predominately silty sands underlying the top fill layer, with low blow counts down to a depth of 15 to 20 feet. This again matches the 1964 boring logs, which were characterized as soft and loosely compacted soils down to a 20 foot depth.

The geotechnical reports for the general project area provided a significant amount of data in regards to seasonal groundwater levels varying significantly over the area. At the north end, borings at the Shell gas station (Southeast Corner Talmage and Airport Park) encountered groundwater at about 14 feet on 4-4-97(Reference 19) which was about an average rainfall year (39.07 inches). On 4-25-95, BACE Geotechnical (Reference 18) encountered groundwater from about 4 feet to 7 feet deep between Commerce Drive south to the south boundary of the Friedman Bros Property at 1255 Airport Park Boulevard.

R-Values varied widely at different locations in the vicinity. A summary of the various R-Values from test results in the area is provided in Appendix D. They vary widely from R=9 from a composite sample from G-3 and G-5 on this project to as high as R=65 at the intersection of Commerce Drive and Airport Park Boulevard, less than 1,000 feet away to the southwest. Values of R=14.5 and R=15 are interspersed with values in the 49 to 57 range.

Pavement failure on a segment of Airport Park Boulevard has been attributed to moisture trapped in the subgrade and pervious soils which subsided. The off-ramp, with its substantial structural section of cement treated base and pavement over aggregate subbase and three feet or more of engineered fill, appears to have held up well with little indication of pavement or base failure.

For all of these reasons, it is recommended that a design R-Value, using the lowest test value of 9, be used for the current project.

Conclusions

The project area is considered suitable for the proposed construction, subject to certain constraints.

Pavement- Support is available for the expected heavy truck traffic over the next 20 years, provided that the soils are reprocessed and recompacted to support a structural section of adequate thickness, in accordance with the recommendations of this report.

The site soils at subgrade level of recommended structural section are interpreted as having low potential for expansion, based upon the results of the R-Value testing which was conducted, as well as the results of laboratory testing contained in a number of geotechnical reports in the area (References 15, 17,and 18).

Groundwater Levels - High seasonal groundwater was below the level of any proposed subgrade elements to support the structural section, ranging from about 4 feet below the surface to about 9 feet below the surface as found in numerous borings during the wet period of various years (References 15, 17 and 19). It is not anticipated that the groundwater level will rise high enough to saturate the subgrade and thereby weaken the soils supporting the structural section.

Fills and Weak Soil Layers- There are weak/unconsolidated soil layers underlying the existing compacted fills upon which the current paved structural section is situated. The construction of widened fills to increase the number of traffic lanes will have to take those surface soils into account. Likewise, structures, such as low retaining walls and pier supports for signals and lighting will have to be planned with the knowledge that weak/unconsolidated surface soils exist.

Corrosive Potential to Concrete and Steel - Routine corrosivity tests were performed by an outside laboratory (Sunland Analytical of Rancho Cordova, California) on a bulk sample taken from boring G8 to preliminarily screen for corrosion potential in the near-surface native soil environment. The results of their tests are presented in Appendix C.

Rau and Associates, Inc. does not practice corrosion engineering; as such, these corrosivity test results are presented for the preliminary use of our client and their project team. Our review of Caltrans Test Method 532 (see Appendix C) indicates favorable conditions for steel and favorable concrete reactivity.

Recommendations

Reprocessing of Certain Subgrade Soils and Fill Soils

Unconsolidated Subgrade Soils for Pavement Support: Subgrade soils in areas to receive widened paved surfaces outside the existing fill prisms, should be sub-excavated to a depth of 36 inches below finish pavement grade, or 12 inches below existing ground, whichever is deeper, for a distance of at least three feet beyond the back edge of curb. The exposed soil surface should be reviewed by a geotechnical engineer for soft spots or other abnormalities, which may require deeper subexcavation. Then the exposed soil surface should be scarified and recompacted to 95% when tested in accordance with Caltrans Test Method (CTM) 216 and 231. Selected subexcavated soils which are granular in nature can be used to bring the subgrade up to the prescribed level for construction of the structural section. Selected soils shall have a minimum Resistance Value (R-Value) of 20 within four feet of the finished grade elevation. In addition, the maximum size rock particle or lump shall be 3 inches, with 10-40 percent passing the No. 200 sieve. All reprocessed soils should be compacted to 95% when tested in accordance with Caltrans Test Method (CTM) 216 and 231.

Under walkways, the subexcavation depth can be reduced to 18 inches below finish walkway grade or six inches below existing undisturbed soil, whichever is deeper. Selection of granular soils for backfill, processing soils for optimum moisture content and compaction to 95% relative compaction should be done to prepare the subgrade.

It is anticipated that this depth of subexcavation may cause problems with existing utilities. If such conflicts occur, other means of subgrade stabilization could be employed. These include using geogrids such as BX-1200 by Tensar, using densifying materials such as Permazyme 11X, or using full depth asphalt concrete. Such treatments are beyond the scope of this report, but could be developed as an alternative if desired.

Any imported fill shall be approved by the project geotechnical engineer prior to delivery to the site. The portion of imported borrow placed within 4 feet of the finished grade shall have a Resistance (R-Value) of not less than 20, with a maximum rock particle or lump size of 3 inches and with 10-40 percent passing the 200 sieve.

The approved fill shall be placed in loose lifts which do not exceed 8 inches in thickness and then compacted to 95% relative compaction in accordance with Caltrans Test Method (CTM) 216 and 231. Compaction testing should be performed on the fill at intervals of approximately one foot of compacted thickness to confirm that recommended compaction is achieved.

Areas anticipated to receive heavy traffic loading should have special attention paid to the soil type encountered at the rough-grade elevations. Samples of site materials have been tested for R-value with recommendations regarding pavement structural sections found in following paragraphs. Confirming R-Value testing is recommended during construction to assure that the R-Value is a minimum of 9. If R-Values are found to be higher than 9, the structural section should not be changed because of the variable soils and wide variations in R-Values documented over the general area.

Unconsolidated Subgrade Soils for Strip Foundation Support for Low Retaining Walls: Subgrade soils in areas outside the existing fill prisms, should be sub-excavated to a depth of 36 inches below bottom of spread or strip foundations for low retaining walls (maximum height of stem above top of footing = 5 feet). The exposed soil surface should be reviewed by a geotechnical engineer for soft spots or other abnormalities, which may require deeper subexcavation. Then the exposed subexcavated surface should be scarified and recompacted to 95% when tested in accordance with Caltrans Test Method (CTM) 216 and 231. Assuming the subexcavated soils are granular in nature, they can be used to bring the subgrade up to the prescribed level for construction of the retaining wall foundation. All reprocessed soils should be compacted to 95% when tested in accordance with Caltrans Test Method (CTM) 216 and 231. The subexcavation and recompaction of soils should extend a minimum of four feet beyond the footprint of the foundation for the retaining wall.

It is anticipated that this depth of subexcavation may cause problems with existing utilities. If such conflicts occur, other means of subgrade stabilization could be employed. These include using geogrids such as BX-1200 by Tensar, using densifying materials such as Permazyme 11X, or backfilling at least twelve inches below the bottom of foundation with cement slurry backfill. Such treatments are beyond the scope of this report, but could be developed as an alternative if desired.

Any imported fill shall be approved by the project geotechnical engineer prior to delivery to the site. The approved fill shall be placed in loose lifts which do not exceed 8 inches in thickness and then compacted to 95% relative compaction in accordance with Caltrans Test Method (CTM) 216 and 231. Compaction testing should be performed on the fill at intervals of approximately one foot of compacted thickness to confirm that recommended compaction is achieved.

Grading / Site Preparation

All grading should be performed in accordance with the Caltrans "Standard Specifications (latest Edition). Prior to grading for the purpose of installing utilities or for the preparation of subgrade to receive the structural section, subexcavation of areas of relatively undisturbed native soils will be necessary. Subexcavation limits and procedures are described in another section of this report.

The site soils likely to be encountered as a result of subexcavation and reprocessing of old fill material and sub-excavated native soil at the limits of subexcavation (up to 3' below original ground level) are anticipated to be silty sand / sandy silt to sandy clay. Zones of wet or saturated soils can be expected at depths greater than ± 4', depending on the time of year excavation is performed. Care should be given to depth of excavation and the potential to over-work the soils resulting in pumping of the shallow wet soils. The optimum time of year to perform site work is July 15 to October 15 when the ground water is at its lowest.

The near-surface soils are indicated to have a low plasticity index. Local concentrations of more clayey soil may be encountered; such materials should be selectively removed and used in either deeper fills or outside areas of pavements.

If potentially expansive clay soils, with a plasticity index of 20 or more are encountered during subexcavation and reprocessing of site soils, they should be replaced with approved materials having low expansion potential with a Plasticity Index less than 12 and R-Value of 20 (Minimum), or they could be mixed with more granular material and used in the fill slope areas. The project geotechnical engineer should review subexcavation limits to confirm that expansive clayey soils are not present.

Slopes of fills should be no steeper than 2H:1V for structural reasons. For traffic safety reasons, it may be necessary to flatten slopes to 4H:1V or flatter, unless a design exception is warranted.

Prior to subgrade preparation, utility trench backfills should be properly placed and compacted. The upper six inches of subgrade should be re-rolled to provide a smooth, unyielding surface, compacted to at least 95 percent relative compaction, and within 2 percent of optimum moisture content. The subgrade soils should be maintained in a moist condition and free of shrinkage cracks until covered with the complete pavement section.

Pavement Structural Section

Class 2 Aggregate Base should conform to the requirements of Section 26, Caltrans Standard Specifications (latest edition). Aggregate base should be placed in six inch thick layers in a manner to prevent segregation, uniformly moisture-conditioned, and compacted to at least 95 percent relative compaction to provide a smooth, unyielding surface. The asphalt concrete surfacing should conform to the quality requirements of Section 39, Caltrans Standard Specifications (latest edition).

A Laboratory Resistance-Value Test (R-Value) has been performed on a composite sample from borings G3 and G5. The resulting R-Value was found to be 9. Even if select soils are tested during construction and found to have higher R-Values, it is recommended that the conservatively designed structural section be constructed. There is ample physical evidence of pavement failures in the general area, coupled with the wide variation in R-Value results to warrant the more conservative approach.

Structural sections were designed in accordance with the Caltrans Highway Design Manual. Traffic Indices are being evaluated by GHD as part of their evaluation of traffic loading on the streets due to the continuing heavy commercial development in Redwood Business Park. The values of 10, 10.5, 11, and 12 were selected as potential Traffic Indices on Talmage Road, and the Southbound on-ramp.

Structural Section alternatives are recommended to be constructed as follows:

R-Value	TI	Thickness (Feet) (1)		
		Asphalt Pavement	Class 2 Aggregates Base (2)	Class 2 Aggregates Sub-Base (3)
9	10.0	0.50	1.00	0.92
9	10.5	0.55	1.00	1.08
9	11.0	0.60	1.00	1.08
9	12.0	0.65	1.00	1.33

(1) These thicknesses are recommended minimums.
(2) R-Value = 78 Minimum
(3) R-Value = 50 Minimum

As noted above, subgrade for pavement sections should be compacted to 95% in accordance with California Test Method 216 and 231. Moisture content at compaction should be at or above optimum moisture content.

Retaining Wall Foundations

Appropriate soil design values for retaining walls which will be necessary along the north side of Talmage Road are as follows: at-rest soil pressure for walls which cannot yield at the top shall be 60 pounds per cubic foot (pcf), equivalent fluid pressure for level backfill up to 20% (10°). Add 1 pcf, equivalent fluid pressure, for each degree of slope exceeding 10°, with the maximum slope not exceeding 2H:1V.

Add two feet of surcharge to the area of the structure where traffic wheel loads can approach within four feet of the structure.

For free-standing walls, which can yield at the top, active soil pressure can be 40 pounds per cubic foot (pcf), equivalent fluid pressure for level backfill up to 20% (10°).

Passive soil pressure of 300 pcf per foot of depth in weathered bedrock formation material may be used. A friction factor of 0.30 may be assigned in these materials.

Apply the resultant of the seismic, active and at-rest pressures at a depth of 0.5H from the base of the wall, where H equals the wall height in feet.

All retaining walls should have a minimum of a one-foot thickness of gravel behind them to allow them to be freely drained. In lieu of gravel, other types of waterproofing with drainage such as *Miradrain* or *Inka Drain* may be used.

An impervious layer should cap the backfill behind any retaining wall exposed to the elements or exposed to the potential of sheet flow drainage from the upslope direction. The purpose of this cap is to help prevent migration of surface water carrying sediment into the backfill material. The impervious layer can be clay or clayey soils with an Expansion Index less than 20, concrete, or cement-treated site soils. Thickness of the cap should generally be approximately 12" to 18" over the pervious gravel backfill.

For sloped backfill, consideration should be given to providing a surface swale or gutter system to help divert and carry away the surface runoff before it reaches the structure.

Pier Foundations for Signals or Street Lights

Isolated cast-in-drilled-hole reinforced concrete piers for the support of signal standards or lighting standards should be extended to the minimum depth specified in Standard Plan ES-7N (2010) into soils which have been reprocessed for a depth of at least three feet below original ground surface, or where the depth of compacted fill exceeds three feet of compacted depth, or where the top of the pier is fixed by a concrete slab. The minimum diameter of these piers shall be as shown on the Standard Plan.

Where isolated piers for the support of signal standards or lighting standards are installed in soils which have not been reprocessed, and where the top of the pier is not restrained from movement by any concrete surfacing, the diameter of the pier should be increased one foot to account for the unconsolidated surface soils.

Drainage

Surface: The street surface should be designed to direct surface water to the curb and gutter section and then into storm drains to prevent ponding on the paved surface for long periods of time.

Subsurface: Curb and gutter sections should extend to at least 18 inches below the pavement surface in order to prevent saturation of the edge of aggregate base from landscape irrigation.

Investigative Limitations

This geotechnical investigation and review of the proposed highway improvements were performed in accordance with the usual and current standards of the profession as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report. The conclusions are based upon reasonable geotechnical and engineering interpretation of available data. The recommendations are based upon the information provided regarding the planned use of this area, combined with our analysis of the site conditions revealed by the field reconnaissance and investigative work performed.

The samples taken and tested, and the observations made are considered to be representative of the site; however, soil and geologic conditions may vary significantly between subsurface excavations. As in most projects, conditions revealed during construction may be at variance with preliminary findings. If the proposed construction is modified or re-sited, or if it is found during construction that subsurface conditions differ from those we encountered at the subsurface excavation locations, we should be afforded the opportunity to review the new information or changed conditions to determine if our conclusions and recommendations must be modified.

This report is issued with the understanding that it is the responsibility of the Client, or of his/her Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Owner and all other design professionals for the project, and incorporated into the plans, and that the specifications require that the construction contractor implement such recommendations in the field. The safety of others is the responsibility of the Contractor. The Contractor should notify the Owner and Rau and Associates, Inc. if he considers any of the recommended actions presented herein to be unsafe or otherwise impractical.

Changes in the conditions of a site can occur with the passage of time, whether they are due to natural events or to human activities on this, or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

We would appreciate the opportunity to review the final plans and specifications to determine if the intent of our recommendations has been implemented in those documents.

We would appreciate the opportunity to review the subexcavations and to perform compaction testing as engineered fill is constructed for traffic lanes and associated walkways, including a review by a geotechnical engineer of the bottom of the sub-excavation limits.

We would also appreciate the opportunity to review the foundation excavations for signal pedestals and retaining wall foundations while equipment is working at the site and before reinforcement is installed to verify that conditions in the actual excavations are as we believe them to be.

We emphasize that this report is applicable only to the proposed construction and the investigated site. This report should not be utilized for construction on any other site.

REGISTERED PROFESSIONAL ENGINEER
GEORGE C. RAU
GE710
Exp. 09-30-2013
GEOTECHNICAL
STATE OF CALIFORNIA

Rau and Associates, Inc.

By: George C. Rau
George C. Rau
Registered Civil Engineer 21908
Registered Geotechnical Engineer 00710
Expires 9-30-2013

Attachments:

Appendix A:	Location Map, Site Map, Geology Map and Legend
Appendix B:	Locations of Field Tests and Boring Logs
Appendix C:	Results of Laboratory Tests
Appendix D:	Summary of Test Results in the Area

Selected References

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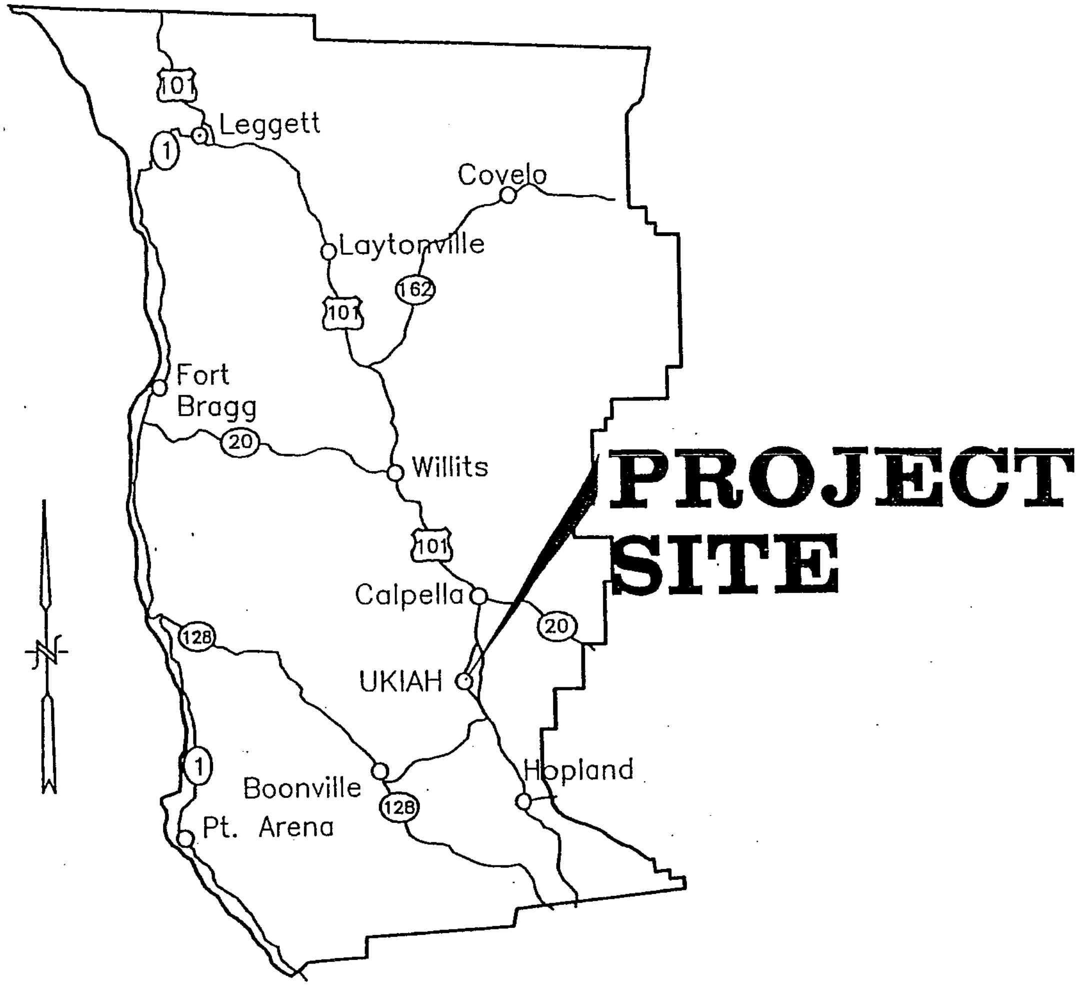
19. Logs of Test Borings for Golden Gate Petroleum, Airport Park Way at Talmage Road, April 4, 1997.

Appendix A

Location Map

Site Map

Geology Map and Legend

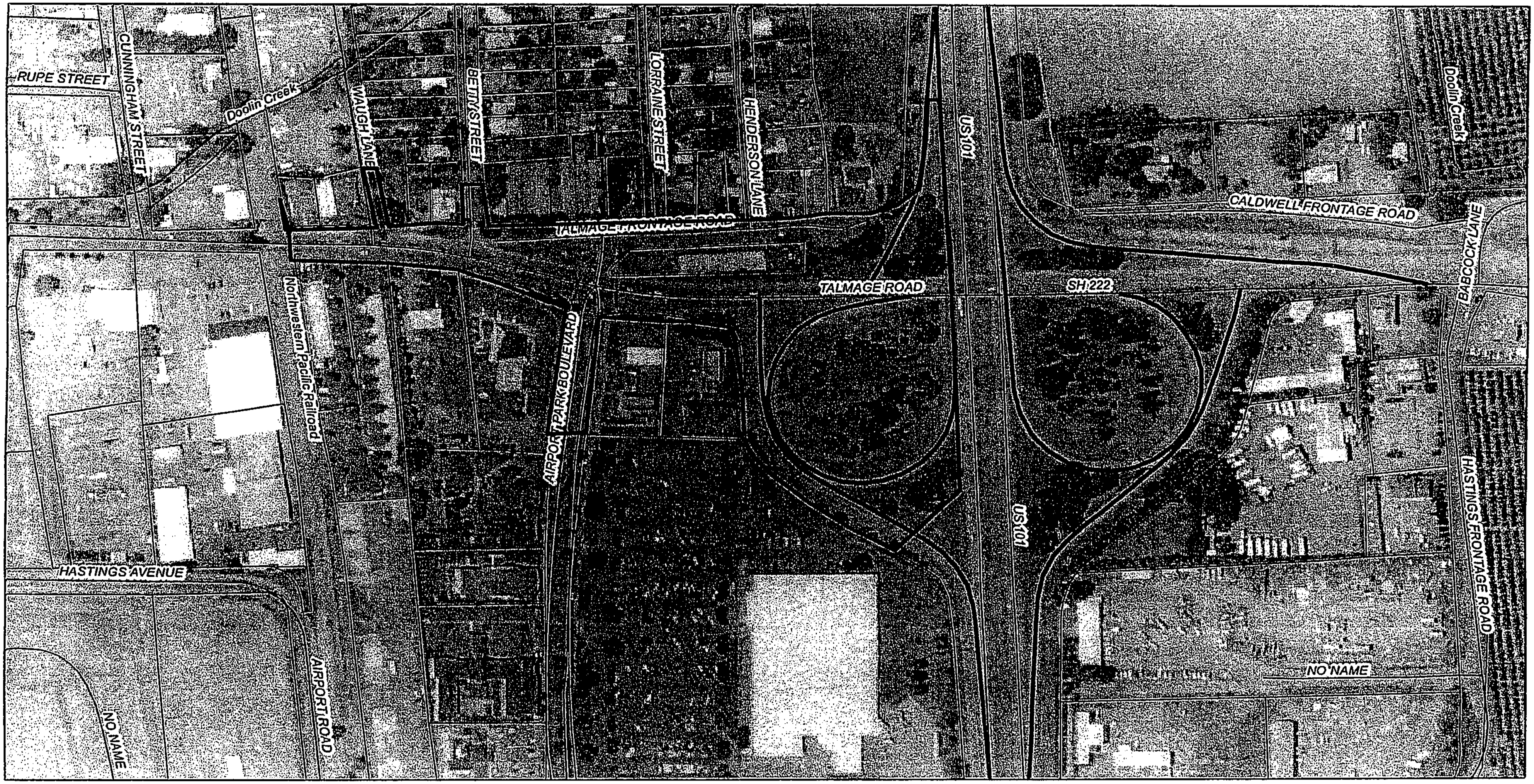


COUNTY MAP

N.T.S.

GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS
LOCATION MAP
RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
JANUARY, 2013	R09153	A 1 of 4



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Note: Property lines shown are approximate
Data Source: Mendocino County
2010 Ortho Photo courtesy USDA

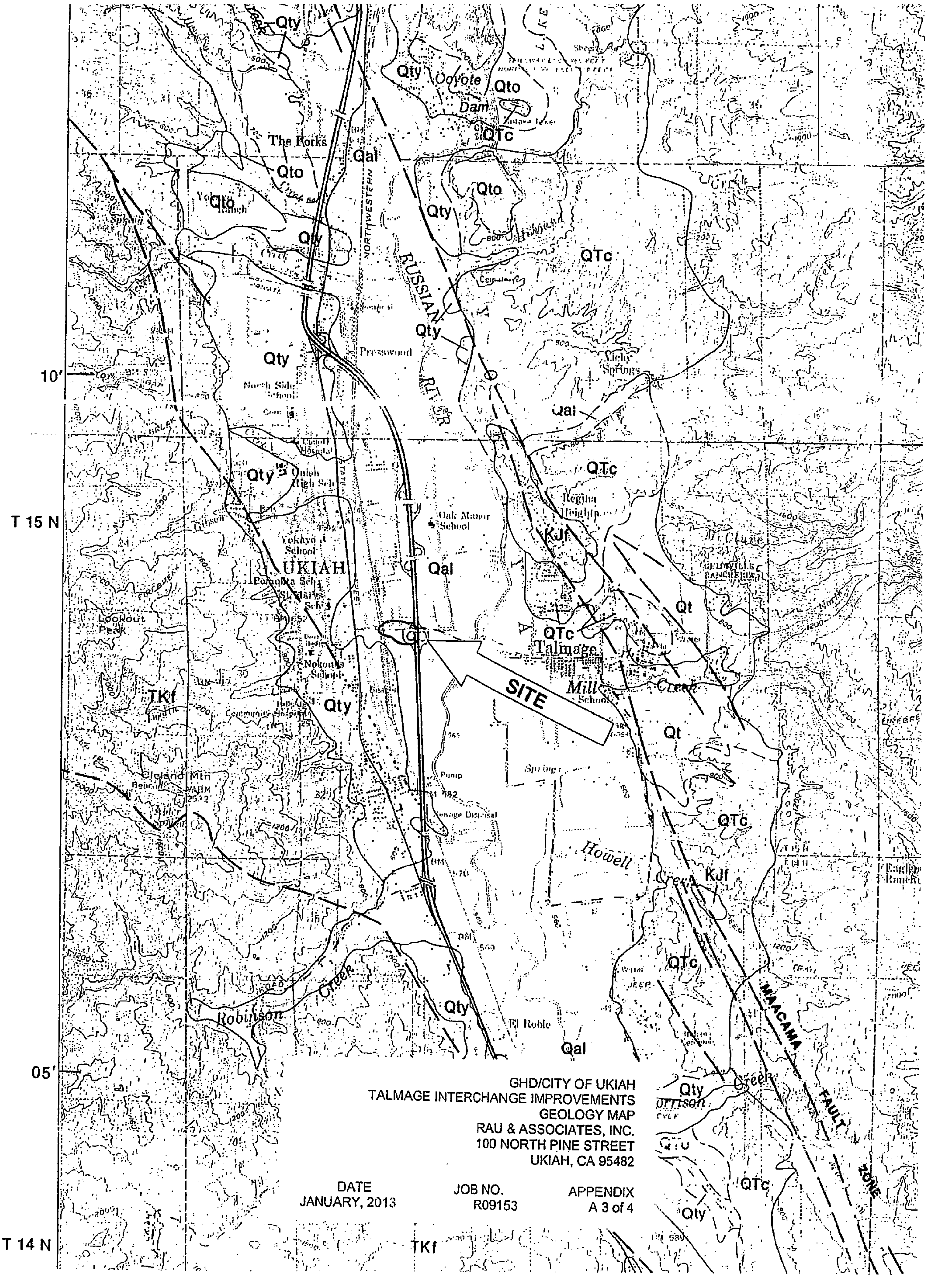
0 100 200 400
1"=200'

N

SITE MAP
Talmage Road/US 101
Interchange Improvements
Ukiah, CA

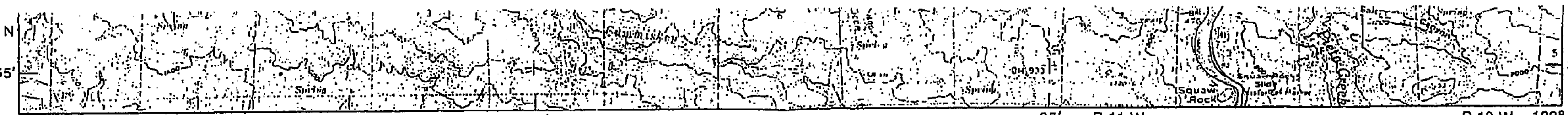
GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS
SITE MAP
RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
JANUARY 2013	P09153	A 2 of 4



GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS
GEOLOGY MAP
RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
JANUARY, 2013	R09153	A 3 of 4



Base from U.S. Geological Survey Hopland, 1960, Potter Valley, 1960, and Ukiah, 1958

Geology modified from California Department of Forestry (1979), Cardwell (1965), Pampeyan and others (1980), and Orchard (1979).

0 1 2 3 4 MILES

0 1 2 3 4 5 6 KILOMETERS

CONTOUR INTERVAL 80 FEET
National Geodetic Vertical Datum of 1929

EXPLANATION

Qal	Alluvium	Holocene	Quaternary
Qty	Younger continental terrace deposits	Pleistocene	Quaternary
Qto	Older continental terrace deposits	Pleistocene	Quaternary
Qt	Continental terrace deposits, undifferentiated	Pleistocene	Quaternary
QTc	Continental basin deposits	Pleistocene and Pliocene	Quaternary and Tertiary
	Franciscan Complex		
TKf	Coastal belt		Tertiary and Cretaceous
KJf	Central belt		Cretaceous and Jurassic

CONTACT – Dashed where approximately located

FAULT – Approximately located; dotted where concealed, queried where uncertain

INDEX MAP CALIFORNIA

GEOLOGIC MAP OF UKIAH VALLEY, MENDOCINO COUNTY, CALIFORNIA

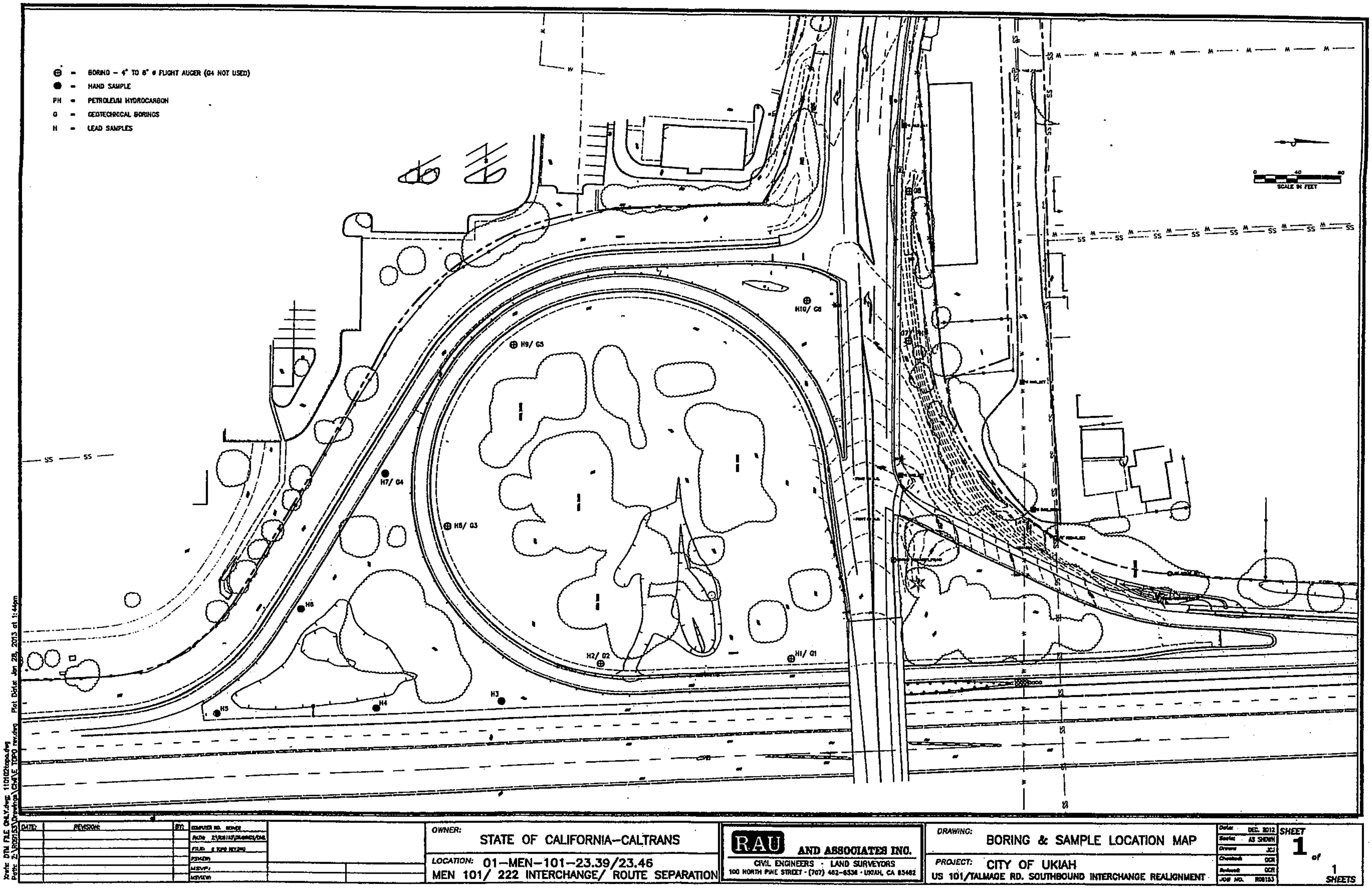
GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS
GEOLOGY LEGEND
RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
JANUARY, 2013	R09153	A 4 of 4

Appendix B

Locations of Field Tests

Boring Logs



⊕ - BORING - 4" TO 8" ø FLIGHT AUGER (G4 NOT USED)
● - HAND SAMPLE
PH - PETROLEUM HYDROCARBON
G - GEOTECHNICAL BORINGS
H - LEAD SAMPLES
SCALE IN FEET
0
40
80
H1/ G1
H2/ G2
H3
H4
H5
H6
H7/ G4
H8/ G3
H9/ G5
H10/ G6
G7
G8
OWNER:
STATE OF CALIFORNIA–CALTRANS
LOCATION: 01–MEN–101–23.39/23.46
MEN 101/ 222 INTERCHANGE/ ROUTE SEPARATION
RAU AND ASSOCIATES INC.
CIVIL ENGINEERS · LAND SURVEYORS
100 NORTH PINE STREET · (707) 462-6536 · UKIAH, CA 95482
DRAWING:
BORING & SAMPLE LOCATION MAP
PROJECT: CITY OF UKIAH
US 101/TALMAGE RD. SOUTHBOUND INTERCHANGE REALIGNMENT
DEC. 2012
AS SHOWN
JCJ
DCR
DCR
R08153
SHEET
1
of
1
SHEETS
DATE:
REVISION:
BY:
Plot Date: Jan 28, 2013 at 1:44pm

Job Name: TALMAGE OFF RAMP | Driller: CLEAR HEART DRILLING | Job No. R09153
Location: BORING - 1 | Drill Rig: TRACK MOUNTED NA5D63 | Boring No. 1
Ground Elevation: N/A | Ground Water Elevation: N/A | Date: 12-10-2012 |

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand	SILTY SAND: Dark brown silty sand w/ gravel, moist, soft
2.5"SPT	2/5/3	8										
										SM	Silty Sand	SILTY SAND: Brown silty sand, moist, soft
					5							
					10							
					15							
					20							
					25							
					30							

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GHD
TALMAGE OFF RAMP

W. SIDE OF OFF RAMP

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B1 OF 8

Job Name: TALMAGE OFF RAMP Driller: CLEAR HEART DRILLING Job No. R09153
Location: BORING - 2 Drill Rig: TRACK MOUNTED NA5D63 Boring No. 2
Ground Elevation: N/A Ground Water Elevation: N/A Date: 12-10-2012

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand	SILTY SAND: Brown silty sand w/ gravel, damp, stiff PP = 3-4 TSF
2.5"SPT	2/4/6	10										
					5					SM	Silty Sand	SILTY SAND: Light brown silty sand, damp, stiff
					10							
					15							
					20							
					25							
					30							

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GHD
TALMAGE OFF RAMP

W. SIDE OF OFF RAMP

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B2 OF 8

Job Name: TALMAGE OFF RAMP Driller: CLEAR HEART DRILLING Job No. R09153
Location: BORING - 3 Drill Rig: TRACK MOUNTED NA5D63 Boring No. 3
Ground Elevation: N/A Ground Water Elevation: N/A Date: 12-10-2012

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand	SILTY SAND: Brown silty sand w/ gravel, wet, soft
2.5"SPT	1/2/3	5										
					5					SM	Sandy Silt	SANDY SILT: Light brown sandy silt, damp, medium stiff
					10							
					15							
					20							
					25							
					30							

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GHD
TALMAGE OFF RAMP

NW. SIDE OF OFF RAMP

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B3 OF 8

Job Name: TALMAGE OFF RAMP Driller: CLEAR HEART DRILLING Job No. R09153
Location: BORING - 5 Drill Rig: TRACK MOUNTED NA5D63 Boring No. 5
Ground Elevation: N/A Ground Water Elevation: N/A Date: 12-10-2012

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand (Fill)	FILL: Mixed aggregate baserock with brown silty sand
2.5"SPT	7/3/4	7								SM	Sandy Silt	SANDY SILT: Brown sandy silt w/ few gravels, wet, soft PP = 0.5-1 TSF
					5					SM	Sandy Silt	SANDY SILT: Light brown sandy silt, damp, medium stiff
					10							
					15							
					20							
					25							
					30							

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GHD
TALMAGE OFF RAMP

SW CORNER OF CLOVER LEAF

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B4 OF 8

Job Name: TALMAGE OFF RAMP | Driller: CLEAR HEART DRILLING | Job No. R09153

Location: BORING - 6 | Drill Rig: TRACK MOUNTED NA5D63 | Boring No. 6

Ground Elevation: N/A | Ground Water Elevation: N/A | Date: 12-10-2012

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand (Fill)	SILTY SAND (Fill): Brown silty sand w/ gravel, saturated @ 2', medium dense
2.5"SPT	4/6/11	17										
					5							
2.5"SPT	6/6/6	12										
SPT	2/3/3	6										
					10							
2.5"SPT	2/4/4	8										
										GM	Sandy Gravel	SANDY GRAVEL: Brown sandy gravel, moist, medium dense Sheared alluvium rock
SPT	4/8/9	17										
					15					CL	Silty Clay	SILTY CLAY: Brown silty clay w/ gravel, wet to saturated, medium dense
2.5"SPT	3/5/9	14										
SPT	3/5/5	10										PP = 1.5-1.75 TSF
										GW	Gravel	GRAVEL - SAND MIXTURE
					20					GM	Sandy Gravel	SANDY GRAVEL: Brown sandy gravel, saturated, loose
SPT	5/8/10/9	19										
					25							
SPT	12/8/6/ 10	16								CL	Clay	CLAY: Brown clay, damp, stiff PP = 3.25 TSF
					30							

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GHD
TALMAGE OFF RAMP

MEDIAN ISLAND

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B5 OF 8

Job Name: TALMAGE OFF RAMP Driller: CLEAR HEART DRILLING Job No. R09153
Location: BORING - 7 Drill Rig: TRACK MOUNTED NA5D63 Boring No. 7
Ground Elevation: N/A Ground Water Elevation: N/A Date: 12-10-2012

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
					0					SM	Silty Sand (Fill)	SILTY SAND (Fill): Brown silty sand w/ gravel, moist, medium dense
SPT	11/6/4/4	8			5					SM	Silty Sand	SILTY SAND: Brown silty sand w/ gravel, moist, medium dense PP = 4.5+ TSF @ 6' PP = 3.5 TSF @ 7'
SPT	3/2/2/7	9			10					SM	Silty Sand	SILTY SAND: Brown silty sand w/ gravel, moist, medium dense PP = 3.2 TSF @ 11.5'
SPT	4/2/2/2	4			15					SM	Silty Sand	SILTY SAND: Brown silty sand w/ gravel, moist, loose
										GW	Gravel	GRAVEL - SAND MIXTURE
SPT	10/13/9/ 10	19			20					CL	Silty Clay	SILTY CLAY: Veins of Silty clay, moist, medium dense
SPT	13/13/28 /18	46			25					GM	Sandy Gravel	SANDY GRAVEL: Brown sandy gravel, saturated, loose
					30							

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GHD
TALMAGE OFF RAMP

N. SIDE OF TALMAGE EAST

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B6 OF 8

Job Name: TALMAGE OFF RAMP　Driller: CLEAR HEART DRILLING　Job No. R09153

Location: BORING - 8　Drill Rig: TRACK MOUNTED NA5D63　Boring No. 8

Ground Elevation: N/A　Ground Water Elevation: N/A　Date: 12-10-2012　

Misc.	Blows/ 6"	Blows/ Ft. (N)	In-Place Moisture (%)	In-Place Dry Density (PCF)	Depth (Ft)	Sample Interval	%Passing #200 Sieve	Graphic Log	Ground Water Depth (Ft)	USCS	Sample Description	Material Log
2.5"SPT	2/2/4	6			0					SM	Sandy Silt	SANDY SILT: Brown sandy silt w/ gravel, damp, soft PP = 0.7 TSF
SPT	2/2/3	5			5					SM	Sandy Silt	SANDY SILT: Brown sandy silt, saturated, soft Water Level @ 8'
SPT	3/3/4/5	9			10					SC	Sandy Clay	SANDY CLAY: Brown sandy clay w/ gravel, saturated, soft PP = 0.5 TSF
SPT	3/3/4/6	10			15					SC	Sandy Clay	SANDY CLAY: Brown sandy clay w/ gravel, saturated, soft PP = 0.25-0.5 TSF
SPT	11/11/7/ 11	18			20					SM	Silty Sand	SILTY SAND: Reddish brown silty sand w/ gravel, damp, medium dense
SPT	8/5/12/ 11	23			25					CL	Clay	CLAY: Reddish brown clay w/ sand seems, damp, very stiff
					30							

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GHD
TALMAGE OFF RAMP

N. SIDE OF TALMAGE WEST

DATE	PROJECT NO.	APPENDIX B
12-14-12	R09153	B7 OF 8

Appendix C

Results of Laboratory Tests

LABORATORY RESULTS

HYDROMETER TESTS

after coarse particle correction

Trench No.	Depth (in.)	% Sand	% Clay	% Silt	%Coarse Particles	USCS Classification	Description
1	2.0'-3.5'	32	15	18	36	SM	Silty Sand
2	2.0'-4.5'	34	19	19	28	SC/SM	Silty Clayey Sand
3	2.5'-3.0'	38	26	28	7.5	ML	Clayey silt
5	3.0'-3.5'	42	14	29	14.7	SM	Silty Sand

R-VALUE TESTS

No.	Compact Pressure	Density pcf	Moist. %	Expansion Pressure psf	Horizontal Pressure @ 160 psi	Sample Height	Exuded Pressure	R Value	R Value Corr.
1	120.0	113.0	16.9	.03	152	2.54	210	3	3
2	220.0	117.5	15.5	.15	146	2.54	260	6	6
3	350.0	120.0	14.5	.18	139	2.50	320	11	11

R Value @ 300 psi exudation pressure = 9
Sample Number: G3/G5 Composite
Depth = 1'-2.5'
Material Description: (Visual) dark brown sandy clayey silt

MAXIMUM WET DENSITY (CT 216) RESULTS

Trench No.	Depth (ft.)	Wet Density (pcf)	Optimum Moisture (%)
TALMAGE INTERCHANGE	2.5'	138.0	N/A

GHD/CITY OF UKIAH
TALMAGE INTERCHANGE IMPROVEMENTS

RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
JANUARY, 2013	R09153	C 1 of 3

SUMMARY OF SELECTED SOIL TESTS FROM VARIOUS SOIL REPORTS

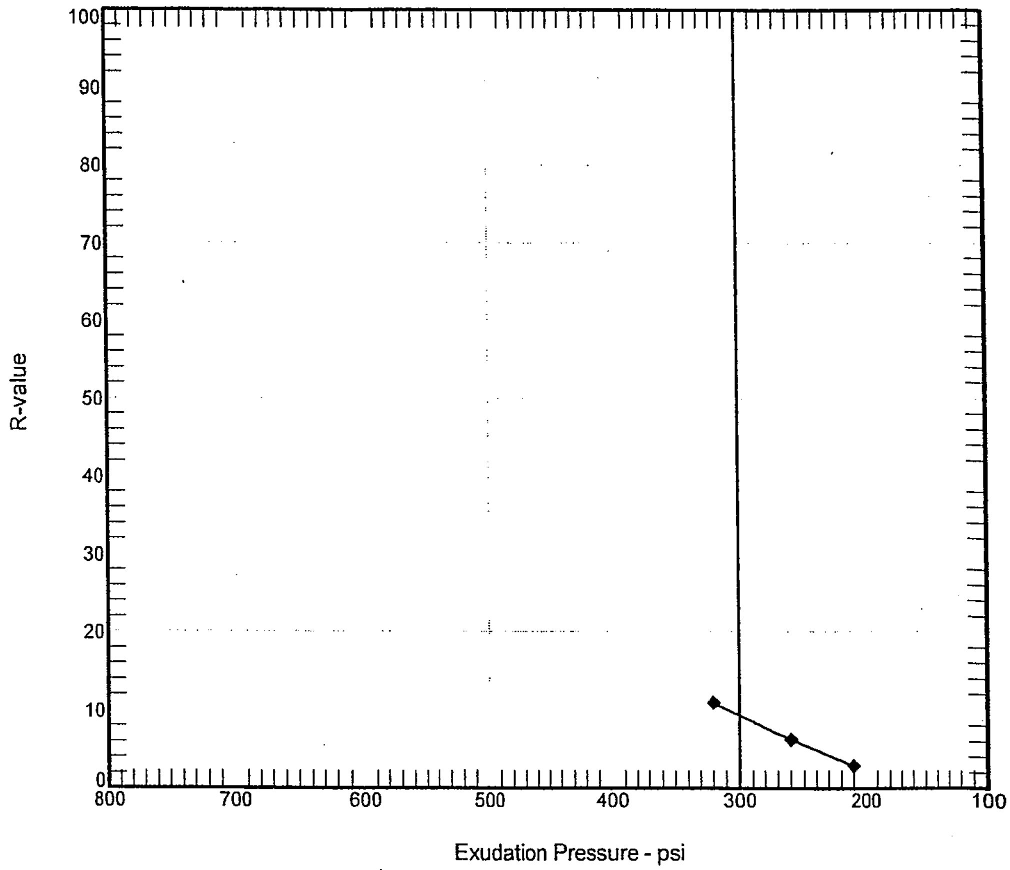
PROJECT	LL	PI	PH	Nominal Resistivity ohm - cm	SULPHATE SO4 ppm	Expansion Index	CHLORIDE CL ppm	REDOXY mv	R VALUE	COMMENTS
Talmage / US 101 Interchange Improvements Ukiah Rau and Associates, Inc. January 2013	26	8							9	SW Cloverleaf, 63/65
	25-27	7-8								G-2 @ 2' - 3.5' ; G-3 @ 2' - 3.5'
	22	3								G-6 @ 2' - 3.5"
	28	10	5.61	6,430	1.1		9.1			G-8 @ 1' - 3'
	26	5								G-8 @ 2.5' - 3.5'
Transportaion Improvements Redwood Business Park Rau and Associates, Inc July 2010			6.4	4,290	0.2		10.8		57	Hastings Intx
			5.55	6,160	0.3		8.8		57	Airport Park Blvd / Airport Road
			5.86	9,110	1.8		11		65	Airport Park Blvd / Commerce Dr
Tractor Supply Co Kleinfelder 1248 Airport Park Blvd 12/30/04	30	12	7.25	6,580	42		70	+659.2	14.5	
South Lots Redwood Business Park BACE Geotechnical May 1997									15	Boring 4 - Lot G2 APN 180-080-58
									22	Boring 11 - Lot F4 (now G) APN 180-080-29
						30				Boring 1 - Lot F7 APN 180-080-60
Lot B & Lots C & D Redwood Business Park BACE Geotechnical June 1995									49	Boring 57 - Friedman's Security Gate 1255 Airport Pakr Blvd APN 180-080-44
						11				Boring 58 - Inside Security Gate Friedman's 1255 Airport Park Blvd
						14				Boring N7 APN 180-080-51,52

GHD/CITY OF UKIAH
AIRPORT PARK BLVD IMPROVEMENTS

RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
January 2013	R09153	C 3 of 3

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	120.0	113.0	16.9	0.03	152	2.54	210	3	3
2	220.0	117.5	15.5	0.15	146	2.54	260	6	6
3	350.0	120.0	14.5	0.18	139	2.50	320	11	11

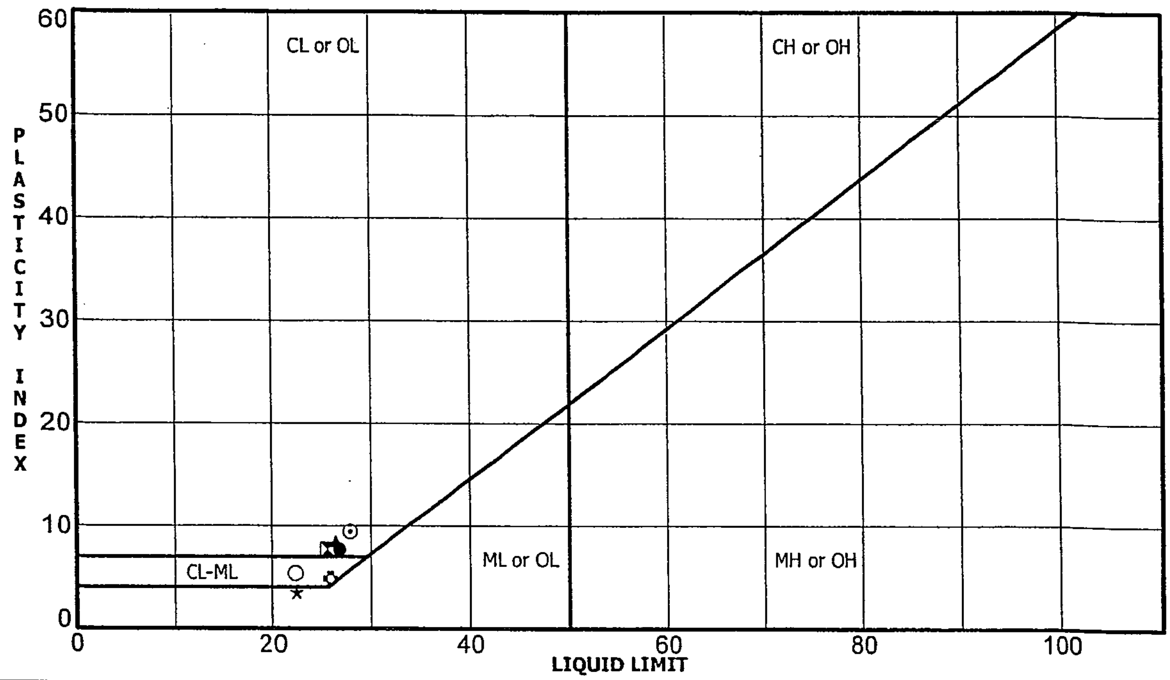
Test Results	Material Description
R-Value at 300 psi exudation pressure = 9	(visual) dark brown sandy clayey silt

Project No.: R09153
Project: Talmage Off-Ramp Improvements
Location:
Sample Number: G-3/G-5 composite
Date: 12/19/2012

Tested by: AST
Checked by: RWD
Remarks:

Taber
Taber Consultants

R-VALUE TEST REPORT



	Boring/Sample	Description	LL	PL	PI	Fines
●	G-2 / 2'-3.5'		27	19	8	
⊠	G-3 / 2'-3.5'		25	18	7	
▲	G-3/G-5 composite		26	18	8	
★	G-6 / 2'-3.5'		22	19	3	
⊙	G-8 / 1'-3'		28	18	10	
✪	G-8 / 2.5'-3.5'		26	21	5	
○	G-8 / 5.5'-6'		22	17	5	

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ATTERBERG LIMITS RESULTS

Rau and Associates, Inc.

Talmage Off-Ramp Improvements

Project No.
R09153

Figure-1

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#R09153 (2011-0037-12)
Talmage Off Ramp Improvements

SUMMARY OF REMOLDED DIRECT SHEAR TESTS

			Peak Values		Ultimate Values	
Boring/Sample Number	**Test Condition**	**Normal Stress** (psf)	**Shear Stress** (psf)	**Displacement** (inches)	**Shear Stress** (psf)	**Displacement** (inches)
G-6 @ 2′-3.5′	3	1000	1276	.190	1263	.250
"	"	2000	2574	.250	2574	.250
"	"	3000	3433	.180	3423	.250
G-8 @ 1′-3′	3-4	1000	950	.130	864	.250
"	"	2000	1663	.250	1663	.250
"	"	3000	2219	.250	2219	.250
G-8 @ 2.5′-3.5′	3	1000	865	.180	833	.250
"	"	2000	1872	.250	1872	.250
"	"	3000	2394	.250	2394	.250
G-8 @ 5.5′-6′	3	1000	1048	.250	1048	.250
"	"	2000	2436	.250	2436	.250
"	"	3000	2680	.250	2680	.250

All samples sheared – specimen test condition as noted – in standard circular shear box under strain control = 0.025 inches per minute.

Test Condition Notation
1. Natural Moisture Content, Unconsolidated
2. Submerged, Unconsolidated
3. Saturated, Consolidated at Test Load
4. Remolded to 90%± Relative Compaction (ASTM D1557)

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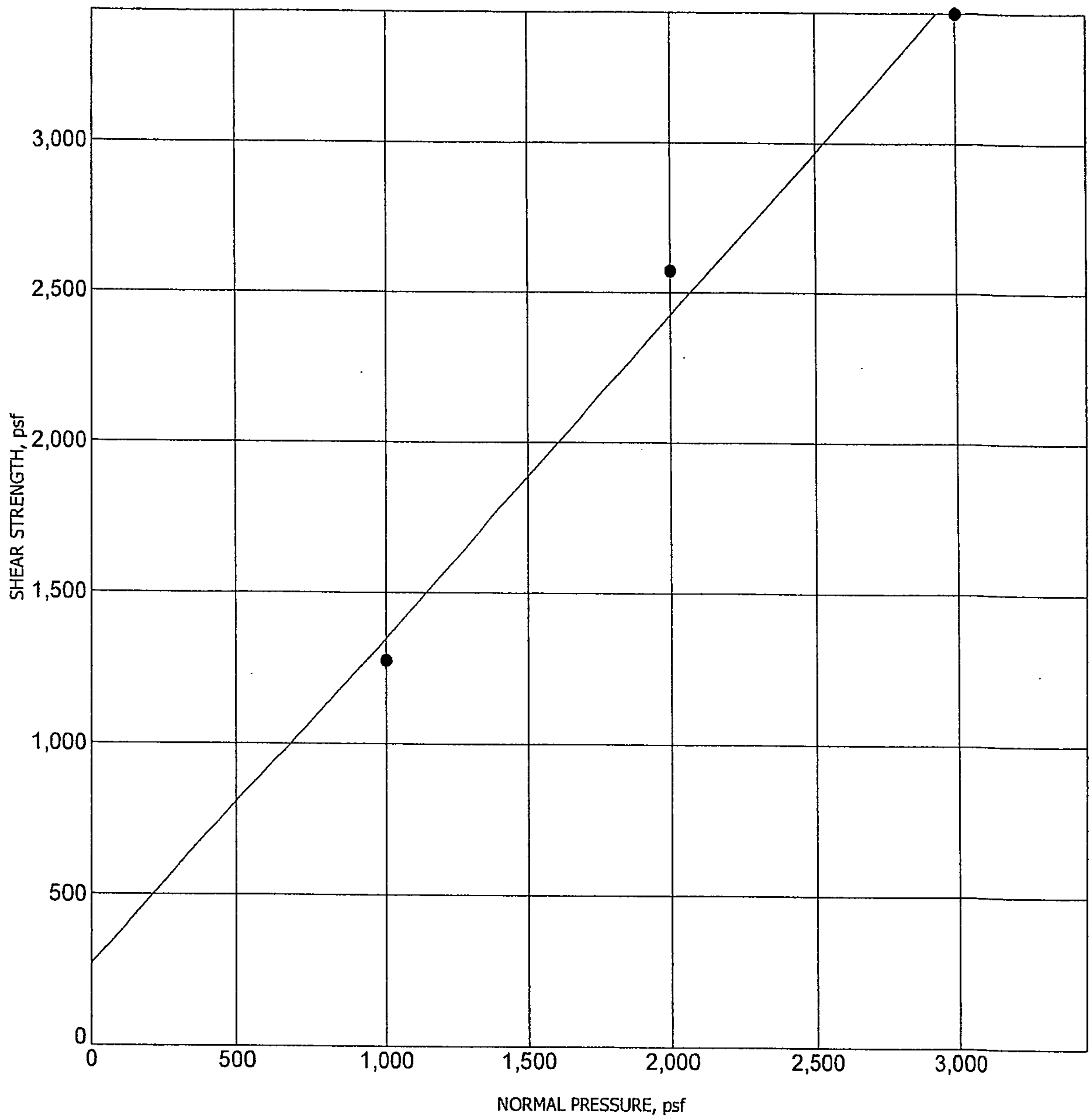
#R09153 (2011-0037-12)
Talmage Off Ramp Improvements

SURCHARGE VOLUME CHANGE TESTS
(1" Thick Specimen, 24-hr Saturation at Indicated Surcharge)

		INITIAL VALUES			
Boring/Sample Number	Surcharge (psf)	Dry Density (pcf)	Moisture (%)	Final Moisture (%)	Compression (-) Expansion (+) %
*G-6 @ 2'-3.5'	1000	120.2	13.4	15.6	(-) 1.8
"	2000	122.8	"	15.4	(-) 3.6
"	3000	125.5	"	15.2	(-) 3.9
**G-8 @ 1'-3'	1000	113.9	11.6	17.1	(-) 0.0
"	2000	114.0	"	16.8	(-) 0.2
"	3000	112.5	"	16.7	(-) 0.4
*G-8 @ 2.5'-3.5'	1000	108.8	15.1	17.5	(-) 1.5
"	2000	113.0	"	17.7	(-) 3.0
"	3000	112.9	"	17.6	(-) 4.2
*G-8 @ 5.5'-6'	1000	119.0	16.7	18.7	(-) 3.0
"	2000	116.5	"	18.5	(-) 5.0
"	3000	118.5	"	18.1	(-) 5.7

* 2.48" diameter specimens
** 2.49" diameter specimens



	Boring/Sample Depth	Description	γ_d	MC%	c	ϕ
●	G-6 / 2'-3.5'				271	47

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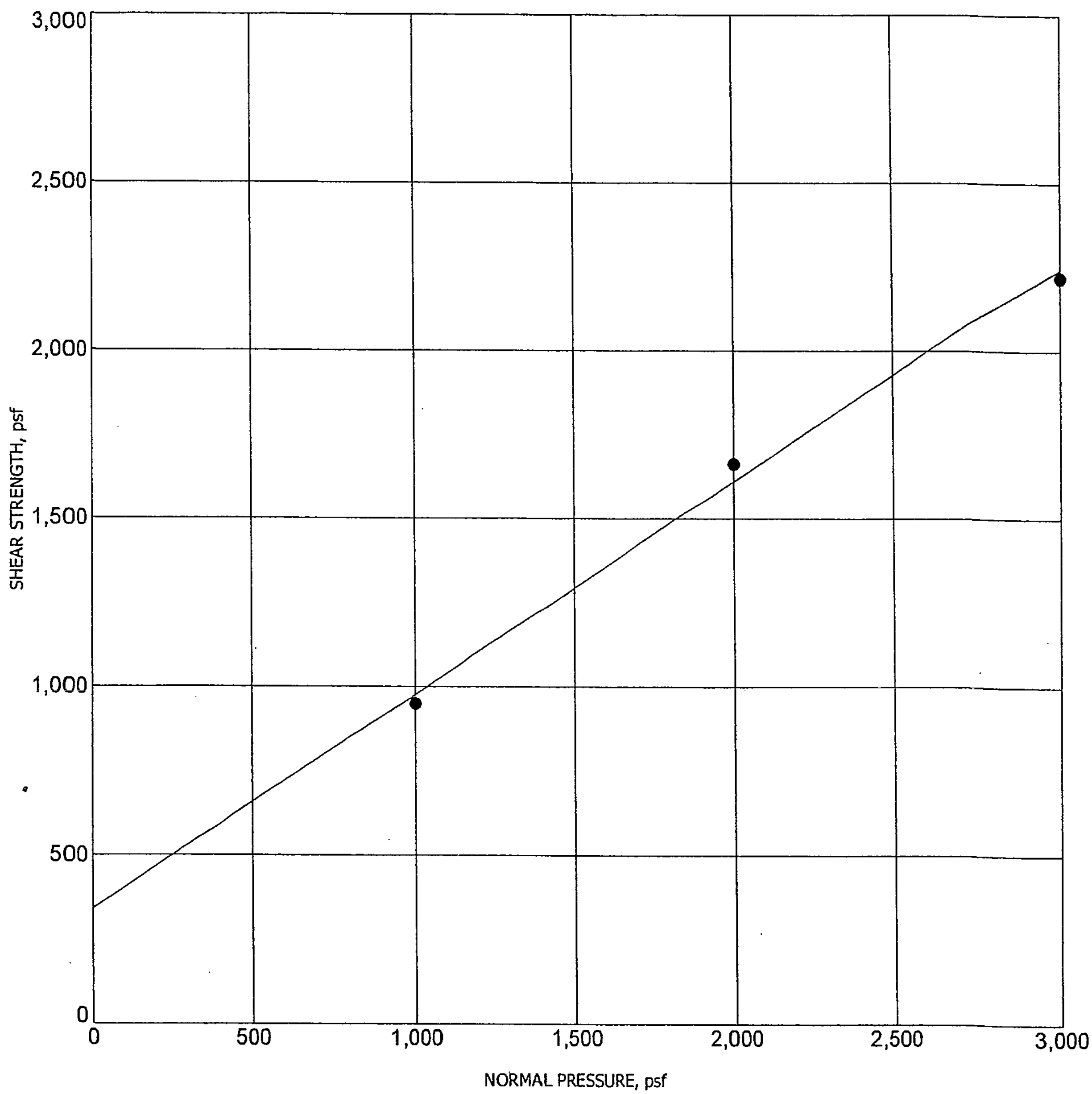
DIRECT SHEAR TEST

Rau and Associates, Inc.

Talmage Off-Ramp Improvements

Project No.
R09153

FIGURE-1



	Boring/Sample Depth	Description	γ_d	MC%	c	ϕ
●	G-8 / 1'-3'				342	32

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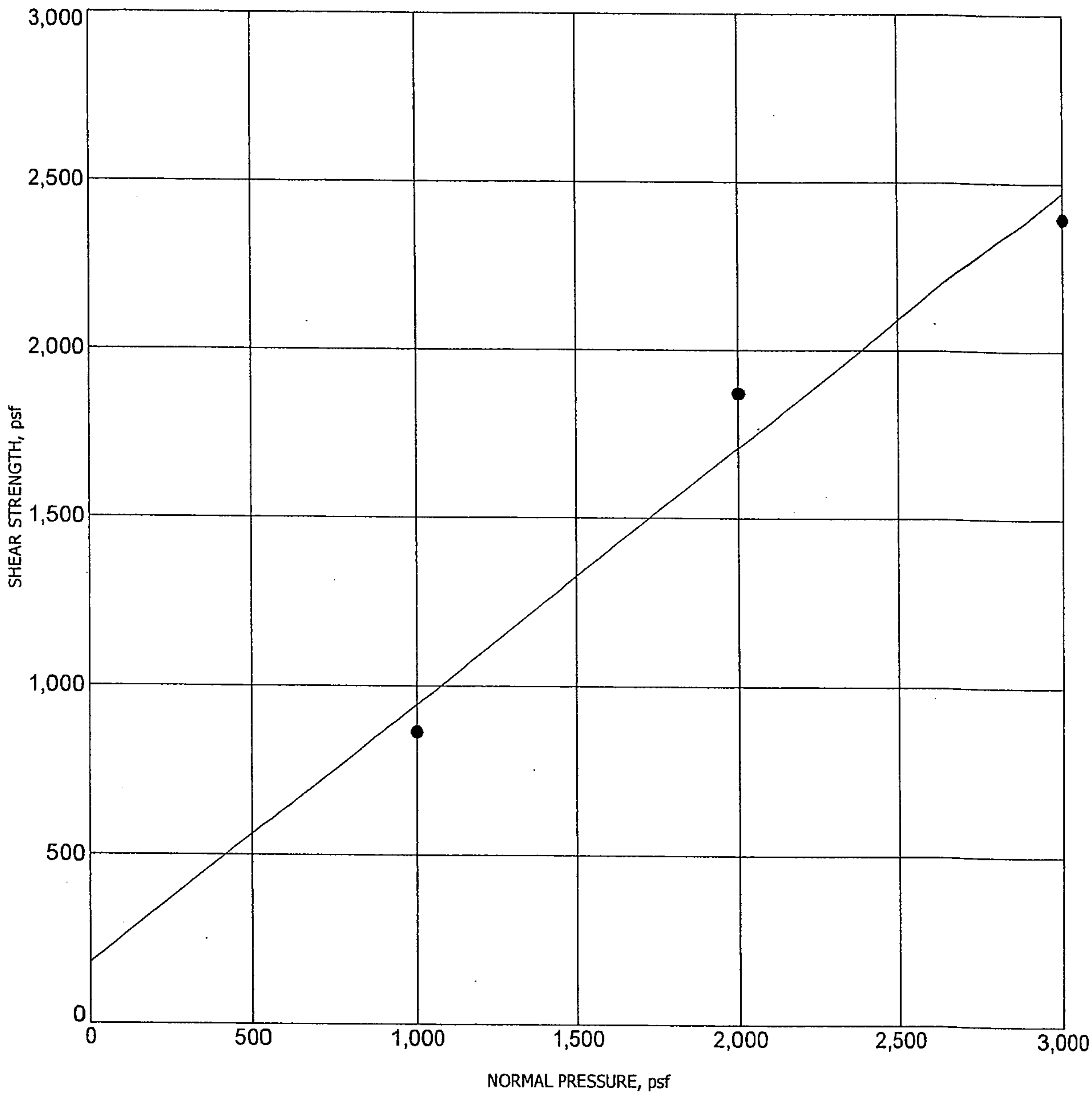
DIRECT SHEAR TEST

Rau and Associates, Inc.

Talmage Off-Ramp Improvements

Project No.
R09153

FIGURE-1



	Boring/Sample Depth	Description	γ_d	MC%	c	ϕ
●	G-8 / 2.5'-3.5'				181	37

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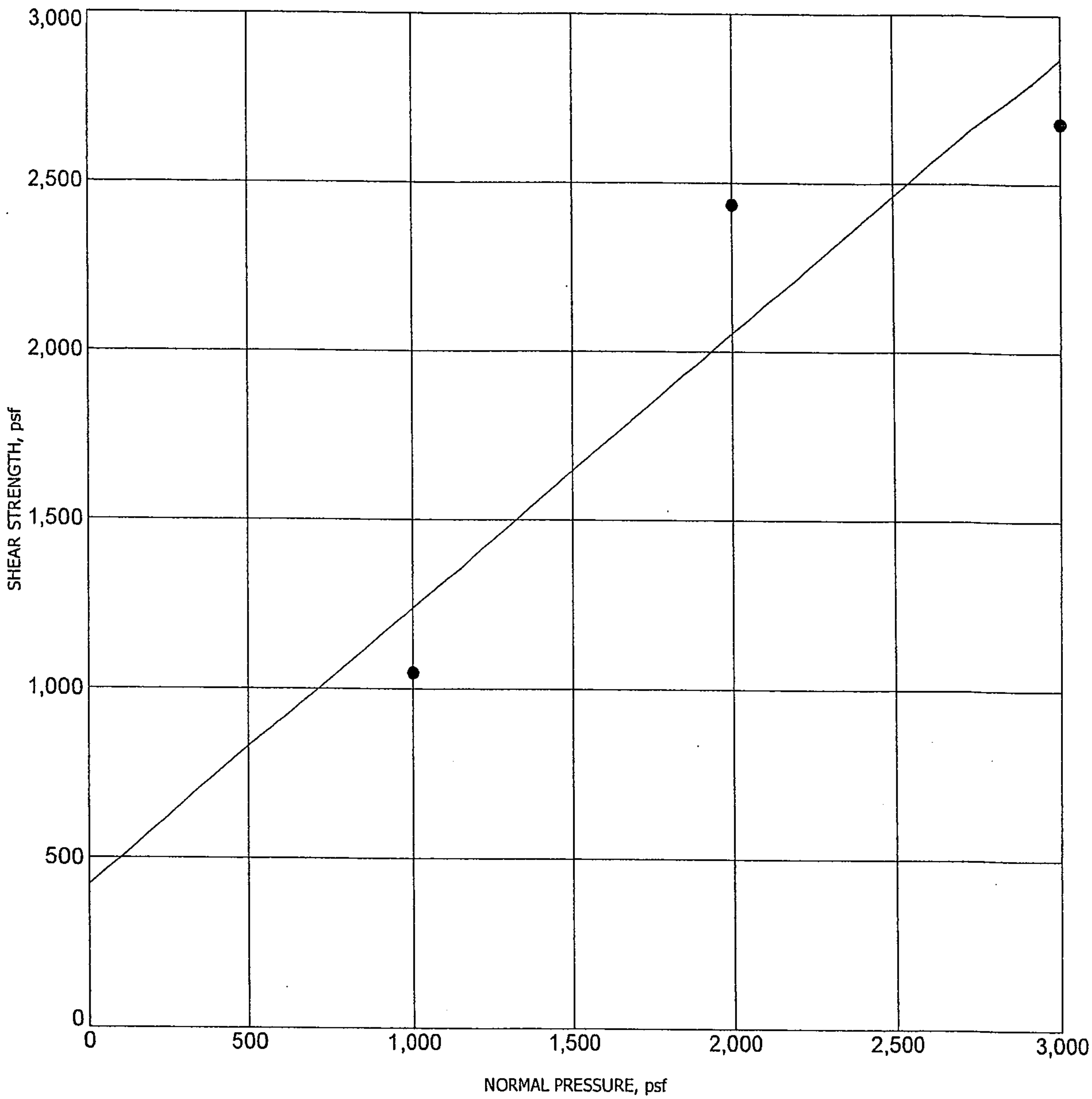
DIRECT SHEAR TEST

Rau and Associates, Inc.

Talmage Off-Ramp Improvements

Project No.
R09153

FIGURE-1



	Boring/Sample Depth	Description	γ_d	MC%	c	ϕ
●	G-8 / 5.5'-6'				423	39

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DIRECT SHEAR TEST	Project No.
Rau and Associates, Inc.	R09153
Talmage Off-Ramp Improvements	**FIGURE-1**

Sunland Analytical
11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/21/2012
Date Submitted 12/18/2012

To: Alexander Taber
Taber Consultants
3911 West Capital Avenue
W. Sacramento, CA 95691-2116

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : R09153 Site ID : G8.
Thank you for your business.

* For future reference to this analysis please use SUN # 63723-131519.

EVALUATION FOR SOIL CORROSION

Soil pH	5.61	
Minimum Resistivity	6.43 ohm-cm (x1000)	
Chloride	9.1 ppm	00.00091 %
Sulfate	1.1 ppm	00.00011 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

Appendix D

Summary of Test Results in Area

SUMMARY OF SELECTED SOIL TESTS FROM VARIOUS SOIL REPORTS

PROJECT	LL	PI	PH	Nominal Resistivity ohm - cm	SULPHATE SO4 ppm	Expansion Index	CHLORIDE CL ppm	REDOXY mv	R VALUE	COMMENTS
Talmage / US 101 Interchange Improvements Ukiah Rau and Associates, Inc. January 2013	26	8							9	SW Cloverleaf, 63/65
	25-27	7-8								G-2 @ 2' - 3.5' ; G-3 @ 2' - 3.5'
	22	3								G-6 @ 2' - 3.5"
	28	10	5.61	6,430	1.1		9.1			G-8 @ 1' - 3'
	26	5								G-8 @ 2.5' - 3.5'
Transportaion Improvements Redwood Business Park Rau and Associates, Inc July 2010			6.4	4,290	0.2		10.8		57	Hastings Intx
			5.55	6,160	0.3		8.8		57	Airport Park Blvd / Airport Road
			5.86	9,110	1.8		11		65	Airport Park Blvd / Commerce Dr
Tractor Supply Co Kleinfelder 1248 Airport Park Blvd 12/30/04	30	12	7.25	6,580	42		70	+659.2	14.5	
South Lots Redwood Business Park BACE Geotechnical May 1997									15	Boring 4 - Lot G2 APN 180-080-58
									22	Boring 11 - Lot F4 (now G) APN 180-080-29
						30				Boring 1 - Lot F7 APN 180-080-60
Lot B & Lots C & D Redwood Business Park BACE Geotechnical June 1995									49	Boring 57 - Friedman's Security Gate 1255 Airport Pakr Blvd APN 180-080-44
						11				Boring 58 - Inside Security Gate Friedman's 1255 Airport Park Blvd
						14				Boring N7 APN 180-080-51,52

GHD/CITY OF UKIAH
TALMAGE OFF-RAMP IMPROVEMENTS

RAU & ASSOCIATES, INC.
100 NORTH PINE STREET
UKIAH, CA 95482

DATE	JOB NO.	APPENDIX
January 2013	R09153	D 1 of 1

Appendix C

Biological Resources Report

Natural Environment Study
Minimal Impact

Talmage Road/US 101 Interchange

City of Ukiah

Mendocino County, California

January 18, 2013

STATE OF CALIFORNIA
Department of Transportation
Project Number: ___________

Prepared By: ______________________________ Date: 1/18/2013

Trish Tatarian
Wildlife Research Associates
707-544-6273

Jane Valerius
Jane Valerius Environmental Consulting
(707) 824-1463

Approved By: ______________________________ Date: ___________

Timothy Eriksen, Public Works Director
City of Ukiah
(707) 463-6280

Approved By: ______________________________ Date: ___________

Rodney Murphy, Project Manager
Caltrans
(530) 741-5127

Talmage Road/US 101 Interchange

NESMI

Summary

This Natural Environment Study Minimal Impact (NESMI) was prepared for the Talmage Road/US Highway 101 (US 101) Interchange in the southern portion of the City of Ukiah, Mendocino County. This NESMI was prepared to determine the potential for special-status communities, plants and animal species to occur within the proposed project area.

The proposed project includes improvements to the Talmage Road/US 101 southbound on- and off-ramps and improvements to Talmage Road west of the freeway overpass structure. Modifications to the Talmage Road/US 101 southbound on- and off-ramps include removal of the southbound off-ramp to westbound Talmage Road from service, and widening and realignment of the southbound off-ramp to eastbound Talmage to three (or four) lanes with terminus at a new signalized intersection with Talmage Road.

No special-status plant surveys were conducted for this proposed project based on the vegetation communities present. No special-status communities or plant species were observed within the project right-of-way (ROW).

No wildlife surveys were conducted for this NESMI due to the season, end of summer, in which the document was prepared. No protocol level surveys for special-status species were conducted; rather, a presumption of presence was and conservation measures to prevent take of individuals have been incorporated into the project description. Eleven wildlife species have been reported in the area; however, no suitable habitat for any of these reported species was found to occur within the project area.

The trees within the proposed project area are potential nesting habitat for a variety of bird species. No special-status bird species were observed during the 2012 late fall field surveys. Although no trees will be removed as part of this project, other nesting habitat, such as blackbery bushes, will be removed for this project. Pre-construction surveys will be conducted two weeks prior to the start of construction, as identified in the conservation measures included in the project description.

1. Introduction

This Natural Environment Study for a Minimal Impact (NESMI) was prepared to describe the existing biological environment and to review the proposed Talmage Road/US 101 Interchange (proposed project) in sufficient detail to determine to what extent the project may affect biological resources. The City of Ukiah is the lead agency for project review pursuant to the California Environmental Quality Act (CEQA). The California Department of Transportation (Caltrans) is a responsible agency under CEQA as this project involves a Caltrans facility. The format for this NESMI follows the recent Caltrans version.

1.1. Project Description

The proposed project site is located in the southeastern portion of the City of Ukiah, and northeast of the Ukiah Municipal Airport. Retail development occurs on the southwest portion of the interchange project area and industrial development occurs on the northwestern portion of the interchange project area.

The proposed project includes improvements to the Talmage Road/US 101 southbound on- and off-ramps and improvements to Talmage Road west of the freeway overpass structure. Modifications to the Talmage Road/US 101 southbound on- and off-ramps include removal of the existing southbound off-ramp to westbound Talmage Road from service, and widening and realignment of the southbound off-ramp to three (or four) lanes with terminus at a new signalized intersection to access both west- and eastbound Talmage Road. This new signalized intersection would be coordinated with the signal at the intersection of Talmage Road/Airport Park Boulevard due to their close proximity and anticipated traffic volumes. In addition to these improvements, Talmage Road would be widened to add a westbound through lane (two through lanes) between the US 101 overpass and Airport Park Boulevard and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/US 101 southbound on-ramp (one through lane and one right-turn lane). Existing signals at the intersection of Talmage Road and Airport Park Boulevard would also be replaced.

Construction Best Management Practices (BMPs) will be incorporated into the construction of the project in accordance with the Regional Water Quality Control Board (www.waterboards.ca.gov/northcoast/). These typically include Storm Water Pollution Prevention Plans as part of the State review of all project stormwater discharges. In addition, the BMPs for the proposed project will include, but are not limited to, the following:

- Work will not be conducted during the rainy season (defined as October 15-April 15).
- Pre-construction surveys for special-status species (i.e., birds) by a qualified biologist shall be conducted at the appropriate times before construction starts to determine presence/absence at the site. If no special-status species are found, no further action other than the Best Management Practice identified above is required. If individual nesting birds are found, a buffer zone around the species or nest will be required at a sufficient distance to prevent "take" of individuals until after the nesting season, as determined by a qualified biologist and based on site specific conditions.
- If the pre-consturction survey discover special-status species (i.e., birds), grading or removal of riparian shrub vegetation will be conducted outside the nesting season, which occurs between approximately February 15 and August 15, depending on species.
- To delineate the buffer zone around a nesting tree, orange construction fencing shall be placed at the specified radius from the base of the tree within which no machinery or workers shall intrude.
- After the fencing is in place there will be no restrictions on grading or construction activities outside the prescribed buffer zones.

2. Study Methods

To evaluate the potential effects to biological resources from the proposed project, the best available scientific and commercial data were used.

Vegetation communities, present and past occurrence locations of special-status species within close proximity of the proposed project areas, and habitats for special-status animal species were examined. Based on the current site conditions through aerial analysis and ground truthing, as described in Section 2.3 Field Survey Methods, the site was evaluated for the potential for occurrence for special-status biological resources. The project description, topographical maps, design maps, species lists maintained by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and California Natural Plant Survey (CNPS) were also used to determine any potential direct or indirect effects.

2.1. Regulatory Requirements

The Federal Endangered Species Act (FESA) outlines the procedures whereby species are listed as endangered or threatened and established a program for the conservation of such species and the habitats in which they occur. The California Endangered Species Act (CESA) amends the California Fish and Wildlife Code (FWC) to protect species deemed to be locally endangered and essentially expands the number of species protected under the FESA. It should be noted that prior to January 1, 2013, CDFW was the California Department of Fish and Game (CDFG). All documentation from CDFW prior to 2013 will be referred to under its former name.

2.1.1. Federal Endangered Species Act

To determine whether the proposed project may result in adverse effects to special-status species, the criteria used was based on guidelines established by the USFWS under Section 7(a) of the FESA, in which a project that may have an adverse effect on listed biological resources must be assessed. The FESA (16 U.S. Code [USC 1531–1544) provides for the conservation of species that are Endangered or Threatened throughout all or a significant portion of their range, as well as the protection of habitats on which they depend. As defined by the ESA, Endangered refers to species that are "in danger of extinction within the foreseeable future throughout all or a significant portion of its range," while Threatened refers to "those animals and plants likely to become Endangered within the foreseeable future throughout all or a significant portion of their ranges." USFWS and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share responsibility for implementing FESA. In general, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species.

Section 7 requires Federal agencies to consult with USFWS or NMFS, or both, before performing any action (including actions such as funding a program or issuing a permit) that may affect listed species or designated Critical Habitat. The Section 7 consultations are designed to assist Federal agencies in fulfilling their duty to ensure Federal actions "do not jeopardize" the continued existence of a species or destroy or adversely modify Critical Habitat.

2.1.2. Federal Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (Title 16, United States Code [USC], Part 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 Code of Federal Regulations [CFR] 21, 50 CFR 10). Most actions that result in taking of, or the permanent or temporary possession of, a protected species constitute violations of the MBTA. The MBTA also prohibits destruction of occupied nests.

2.1.3. California Endangered Species Act

The CESA (FGC §§ 2050–2116) is administered by CDFW. The CESA prohibits the "taking" of listed species except as otherwise provided in State law. It includes FWC Sections 2050–2116, and policy of the State to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat. FWC Section 86 defines take as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

2.2. Literature Search and Review

Records from the biological literature (e.g. Federal Register, etc.), the USFWS electronic list of Endangered and Threatened Species for the Ukiah and Elledge Peak 7.5-minute topographic quadrangles (http://www.fws.gov/sacramento/es_species/Lists/es_species_lists.cfm), and the CDFW California Natural Diversity Database (CNDDB) (CNDDB 2012) (See Attachments A and B) for the two topographic quadrangles that comprise a 3-mile radius around the proposed project were analyzed for this report. The Museum of Vertebrate Zoology at the University of

Berkeley (www.mvzarctos.berkeley.edu) (2012) was also queried for this portion of Mendocino County.

Impacts to special-status species were assessed if: (1) those species occurred in habitats similar to those of the Talmage Road/US 101 Interchange project area, and (2) were known to occur within the project area represented by the Ukiah and Elledge Peak 7.5-minute topographic quadrangles and/or within 3 miles.

2.2.1. Listed and Proposed Listed Communities and Species Potentially Occurring in the Project Area

Special-status Vegetation Communities: Associations or alliances that are either known or believed to be of high priority for inventory in the CNDDB are provided in CDFW's List of *Vegetation Alliances and Associations* (CDFG 2010). Lead and trustee agencies may request that impacts to these communities be addressed in environmental documents.

The following vegetation communities, although listed in the CNDDB and on the USFWS list for the queried topographic quadrangles, do not occur within the project area: freshwater marshes and swamps, vernal pools, meadows and seeps, cismontane woodland, chaparral, coastal scrub, broad-leafed upland forest, or North Coast coniferous forest.

Waters of the U.S. Including Wetlands: No waters of the U. S. or state or wetlands were observed within the study area.

Special-Status Plant Species: A total of five plant species were identified that have the potential to occur within the project area, based on reported locations within 3 miles (CNDDB 2012, USFWS 2012). Of these five species, one is both a federally-listed and state-listed threatened; one is state listed rare and two are special-status plants based on the California Native Plant Society listing.

Plant species associated with vegetation communities occuring within the project area, which include valley and foothill are discussed further below. Please refer to Table 2-1 for a list of these species those species that have potential to occur in the project area based the vegetation communities present. Plant species associated with vegetation communities not present in the project area are listed in Table 2-1 but are not discussed further.

Special-Status Animal Species: Based on the location of the proposed project, a total of 11 animal species were identified that have the potential to occur within the project area based on reported locations within 3 miles (CNDDB 2012, USFWS 2012). Of these 11 species, only three were evaluated for their potential to occur within the project area based on the wildlife habitats present. Please refer to Table 2-2 for a list of these species potentially occurring in the vicinity of the proposed project area. None of the six federally-listed species have potential to occur on the site, based on the habitats present. The remaining two species, both California Species of Concern, do not have potential to occur on the site based on the habitats present.

2.2.2. Recovery Units

No Recovery Units for Special-Status Species occur in this portion of Mendocino County.

2.2.3. Critical Habitat

No Critical Habitat for Special-Status Species occur in this portion of Mendocino County.

Table 2-1: Special-Status Plants Evaluated for Occurrence within a 3-mile radius of the Talmage Road/US 101 Interchange Project Area Based on a Review of the CNDDB and CNPS Electronic Inventory for the Ukiah and Elledge Peak USGS quadrangles.

Scientific Name Common Name	Status USFWS/ CDFG/ CNPS list	Habitat Affinities and Blooming Period	Habitat Present/Absent	Occurrence Potential
Lasthenia burkei Burke's goldfields	FE/CE/1B	Vernal pools, meadows, seeps. Blooms April to June.	Absent.	None. No habitat in study area.
Limnanthes bakeri Baker's meadowfoam	-/CR/1B	Freshwater marsh, seasonally moist or saturated sites within grasslands, meadows and seeps, vernal pools. Blooms April to May.	Absent.	None. No habitat present in study area. No seasonally moist or saturated sites the grassland areas in study area.
Malacothamnus hallii Hall's bush-mallow	-/-/1B	Chaparral, coastal scrub. Blooms May to September, sometimes October.	Absent	None. No habitat in study area.
Malacothamnus mendocinensis Mendocino bush-mallow	-/-/1A	Cismontane woodland. Blooms May to June.	Absent.	None. No habitat in study area.
Pleuropogon hooverianus North Coast semaphore grass	-/CT/1B	Broadleafed upland forest, meadows and seeps, North Coast coniferous forest in open and mesic areas. Blooms April to June.	Absent.	None. No habitat in study area.

NOTES:

U.S. FISH AND WILDLIFE SERVICE
FE = federally listed Endangered

CALIFORNIA DEPT. OF FISH AND GAME
CE = California listed Endangered
CR = California listed as Rare

CALIFORNIA NATIVE PLANT SOCIETY
List 1A: Plants presumed extinct in California
List 1B: Plants rare and endangered in California and elsewhere

Table 2-2: Special-Status Animals Evaluated within a 3-mile radius of the Talmage Road/US 101 Interchange Project Area Based on a Review of the CNDDB and CNPS Electronic Inventory for the Ukiah and Elledge Peak USGS quadrangles

Common Name *Scientific Name*	Status USFWS/ CDFW	Habitat Affinities/ Reported Localities in the Project Area	Habitat Present/absent	Occurrence Potential
		FEDERAL		
Fish				
Onchorhynchus kisutch Coho salmon - Central California Coast ESU	FE/SE	Occurs from Punta Gorda, in northern California, to the San Lorenzo River, in Santa Cruz County, and includes coho salmon populations from several tributaries of San Francisco Bay. Reported in Russian River at HWY 101 bridge north of Perkins Street Bridge in Ukiah (CNDDB 2012).	Absent	None: no riverine habitat present
Onchorhynchus mykiss Steelhead - Central California Coast DPS	FT/-	Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen. Reported in tributary to Russian River, 3.7 mi S (CNDDB 2012).	Absent	None: no riverine habitat present
Oncorhynchus tshawytscha Chinook salmon	FT	Requires gravel diameter of 2 to 3 inches, with depths generally less than 36 inches but more than 20 inches and a velocity of more than 3 ft/sec. Requires water temperatures from 42°F to 51°F.	Absent	None: no riverine habitat present.
Amphibians				
Rana draytonii California red-legged frog	FT/-	Prefers semi-permanent and permanent stream pools, ponds and creeks with emergent and/or riparian vegetation. Occupies upland habitat especially during the wet winter months. Species reported 5 mi west (CNDDB 2012).	Absent	None: no suitable habitat present
Birds				

Common Name *Scientific Name*	Status USFWS/ CDFW	Habitat Affinities/ Reported Localities in the Project Area	Habitat Present/absent	Occurrence Potential
Brachyramphus marmoratus Marbled murrelet	FT/SE	Nests in old growth forests and can migrate up to 20 miles inland. This species nests in mature conifer forests with open crown canopies or slopes to provide easy access, and large limbs in trees such as Douglas-fir, western hemlock, Sitka spruce, coastal redwood and mountain hemlock.	Absent	None: No suitable nesting habitat present.
Strix occidentalis caurina Northern spotted owl	FT, MB/-	Dense coniferous and hardwood forest, shaded, steep sided canyons.	Absent	None: No suitable nesting habitat present.
STATE				
Amphibians				
Rana boylii Foothill yellow-legged frog	-/CSC	Prefers permanent stream pools, and creeks with emergent and/or riparian vegetation. Species reported in Russian River, > 1.3 miles NE of project site (CNDDB 2012).	Absent	None: no suitable aquatic habitat present.
Reptiles				
Emys marmorata Western pond turtle	-/CSC	Prefers permanent, slow-moving creeks, streams, ponds, rivers, marshes and irrigation ditches with basking sites and a vegetated shoreline. Requires upland sites for egg-laying. Species reported 1.6 mi S of project site (CNDDB 2012).	Absent	None: no suitable aquatic habitat present.
Birds				
Aphelocoma coerulescens Western scrub jay	MB/3503	Nests in trees.	Present	Moderate: suitable nesting habitat is present.
Buteo lineatus Red-shouldered hawk	MB/3503.5	Nests in trees adjacent to open fields.	Absent	None: no suitable habitat present.

Common Name *Scientific Name*	**Status USFWS/ CDFW**	**Habitat Affinities/ Reported Localities in the Project Area**	**Habitat Present/absent**	**Occurrence Potential**
Pandion haliaetus Osprey	-/CSC/3503.5	Nests in large trees within 15 miles of good fish-producing water body. Located N of Lake Mendocino (CNDDB 2012).	Absent	None: If present would have been detected.

U.S. FISH AND WILDLIFE SERVICE
FE = federally listed Endangered
FT = federally listed Threatened
FC = federal candidate for listing
MB = Migratory Bird Treaty Act.

CALIFORNIA DEPT. OF FISH AND WILDLIFE
CE = California listed Endangered
CT = California listed as Threatened
CSC = California Special Concern species
3503 = CDFW code – protection of nesting passerines
3503.5 = CDFW code – protection of nesting raptors

2.3. Field Survey Methods

A walk-through of the proposed Talmage Road/US 101 Interchange was conducted in the fall, on September 7, 2012, by Trish Tatarian, Wildlife Research Associates, and Jane Valerius, Jane Valerius Environmental Consulting, to categorize the habitats within the study area.

Protocol and seasonal surveys for special status plants were not conducted within the study area, but the potential for occurrence of special status plants was evaluated, focusing specifically on those with the potential to occur in the area based on the data base searches. Species identification was based on *The Jepson Manual* (Baldwin et. al 2012).

The potential for special status wildlife species to occur within the ROW was also assessed, based on the habitats present. The reconnaissance-level site visit was intended only to evaluate on-site and adjacent habitat types. No special-status species surveys were conducted nor were any protocol level surveys conducted. Fall is too late to conduct survys for nesting birds, which typically nest between March and August.

Sawyer et.al (2008) was used for characterizing plant communities. *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) for was used characterizing wildlife habitats.

3. Environmental Setting

3.1. Description of the Existing Biological and Physical Conditions

The project area is located within the southern portion of the North Coast Bioregion (Welsh 1994). The North Coast Bioregion is bordered on the west by the Pacific Ocean and by the Klamath Bioregion on the east. This bioregion includes wildlife habitats of the redwood forest and mixed evergreen forest. This area of California is moderated by the coastal fog resulting in humid, temperate conditions. As is typical of California's Mediterranean climate, the winter is the wettest season with precipitation ranging 30-70 inches/year, with an average of 40 inches/year.

The site is located south of Lake Mendocino, west of the Mayacamas Mountains, east of Cleveland Mountain and north of Robinson Creek. The Russian River is located approximately 2,650 feet east of the study site and the closest creek is Doolan Creek, located 573 feet north of the project. At the time of the survey in Septmber, 2012, Doolan Creek was a dry gravel bed. Topographically, the project site is flat except for the interchange elevations. Elevations range between approximately 594 feet above sea level along US 101 and 597 feet above sea level along the Talmage Road overpass.

Land uses surrounding the Talmage Road interchange include commercial development in the southwest, industrial and residential in the northwest, agriculture and vineyards in the northeast and industrial and vineyards in the southeastern portion of the interchange.

3.2. Vegetation

Wild Oats Grassland or Avena (barbata, fatua) Semi-Natural Herbaceous Stands: Wild oats grassland is a non-native grassland community that occurs as an understory in wooded area and in the disturbed roadside areas. This vegetation type includes mostly non-native grasses and forbs. Common non-native grasses include annual ryegrass (*Lolium multiflorum*), slender wild oats (*Avena barbata*), oats (*A. fatua*), orchard grass (*Dactylis glomerata*), ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*) and Bermuda grass (*Cynodon dactylon*). Common forb species includes English plantain (*Plantago lanceolata*), wild radish (*Raphanus sativus*), common groundsel (*Senecio vulgaris*), prickly lettuce (*Lactuca serriola*), knotweed (*Polygonum aviculare*), black mustard (*Brassica nigra*), Himalayan blackberry (*Rubus armenicacus*), bull thistle (*Cirsium vulgare*), salsify (*Tragopogon porrifolius*), dove weed (*Eremocarpus setigerus*), and yellow star thistle (*Centaurea solstitialis*). No native herbaceous species were observed.

Landscaped Areas: Landscaped areas occur along Talmage Road and include the planted areas within the Talmage Road/US 101 interchange area. The landscaped areas include both native and non-native plant species. Native species found in these areas include coast redwood (*Sequoia sempervirens*), coast live oak (*Quercus agrifolia*), valley oak (*Q. lobata*) and poison oak (*Toxicodendron diversilobum*). Non-native ornamental species include Italian buckthorn (*Rhamnus alaternus*), St. John's wort (*Hypericum* sp.) and sweetgum tree (*Liquidambar stryaciflua*). These areas were planted and are maintained as evidenced by trimming and, in some areas, irrigation. The coast live oaks occur along the edges of the proposed project. Although no tree removal is proposed for this project, shrub removal may occur.

3.3. Wildlife Habitats

Non-native grassland: Grassland habitat, including native and non-native grasslands, typically provides both primary habitat (e.g., nesting and foraging) and secondary habitat (e.g., a movement corridor). Small species using this habitat as primary habitat include reptiles and amphibians, such as southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), and Pacific slender salamander (*Batrachoseps attenuatus*), which feed on invertebrates found within and beneath vegetation and boulders within the vegetation community. However, the small size of this habitat and its high degree of isolation, bounded by roads and industrial development, reduces the potential suitabilty of this habitat for most species. For instance, passerines (perching birds) are likely to forage in these grasslands on the site, but other, less vagile species are not likely to use the site due to the presence of traffic. Also, research conducted in Germany on toads suggests that traffic densities of 24 to 40 cars per hour result in raised mortality rates of toads crossing from 0 to 50 percent (Andrews and Jochimson 2007).

Urban/Landscape: Tree groves, common in city parks, green belts, and cemeteries, vary in height, tree spacing, crown shape, and understory conditions, depending upon the species planted and the planting design. However, they typically have a continuous canopy. Canopy cover is adjacent to the proposed project area.

Individual trees, including oak, pine, ash and eucalyptus, of all ages, including senescent (dead or dying), occur and contain cavities and dead limbs that may provide nesting habitat for birds that build stick nests, such as scrub jay (*Aphelocoma coerulescens*), mockingbird (*Mimus polyglottos*), and house finch (*Carpodacus mexicanus*). If there are cavities in the trees, they could be used by American kestrel (*Falco sparverius*) and roosting habitat for bats, such as pallid bats (*Antrozous pallidus*). Small mammals potentially using this habitat include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*).

3.3.1. Movement Corridors

Wildlife movement includes migration (i.e., usually one way per season), inter-population movement (i.e., long-term genetic flow), and small travel pathways (i.e., daily movement corridors within an animal's territory). While small travel pathways usually facilitate movement for daily home range activities, such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow among populations.

For the purposes of this report, movement from east to west is limited by the US 101 corridor. Unless there are corridors under the highway, small animals such as amphibians and reptiles, have a high mortality rate. As noted above, traffic loads typically present on surface roads and highways, with traffic densities of 24 to 40 cars per hour, result in mortality rates of amphibians and reptiles between 50 to 95 percent (Andrews and Jochimson 2007).

3.4. Federally Listed Species

The following is a discussion of Federally-listed species having potential to occur on-site and/or are species that are prominent in today's regulatory environment. Tables 2-1 and 2-2 summarize the following information.

3.4.1. Plants

Burke's goldfields *(Lasthenia burkei)*

Status: Federal- and state-listed endangered and CNPS Rank 1B species.

General Ecology and Distribution: Burke's goldfields is an annual herbaceous species in the aster or sunflower family (Asteraceae). This species blooms from April to June and is known to occur in mesic meadows and seeps and in vernal pools at elevations from 15 to 600 meters.

Project Area Occurrence: There is no habitat for this species within the project area. There are no meadows and seeps or vernal pools or wetland habitats of any kind within the project area.

3.4.2. Animals

The following provides an analysis of those species that are prominent in today's regulatory environment and for which potentially suitable habitat occurs within one-mile of the project site, despite the lack of recorded occurrences in the area. The proximity of the closest recorded individual and suitable habitat is also taken into consideration to create the following discussion.

California red-legged frog (*Rana draytonii*)

Status: In 1996, the California red-legged frog (CRF) was listed Threatened (USFWS 1996). A draft Recovery Plan was presented in 2000 (USFWS 2000) and finalized in 2002 (USFWS 2002). In 2001, a final determination of critical habitat for the CRF was published (USFWS 2001). In 2004, the critical habitat was reassessed (USFWS 2004), adopted in 2008 (USFWS 2008) and revised in 2010 (USFWS 2010).

General Ecology and Distribution: This species is typically found from sea level to elevations of approximately 1,500 meters (5,000 feet). Non-breeding CRF have been found in both aquatic and upland habitats. The majority of individuals prefer dense, shrubby or emergent vegetation, closely associated with deep (>0.7 meters) still or slow-moving water. However, some individuals use habitats that are removed from aquatic habitats, seeking cover in ground squirrel burrows, under boulders and logs, and in non-native grasslands (Tatarian 2008). Upland refugia habitat includes areas up to 90 meters from a stream corridor or breeding pond and includes natural features, such as boulders, rocks, trees, shrubs, and logs. In general, densely vegetated terrestrial areas within the riparian corridor provide important sheltering habitat during the winter flooding of the streams (Tatarian 2008).

Project Occurrence. There is no habitat for this species within the project area. There are no meadows and seeps or vernal pools or wetland habitats of any kind within the project area. Although Doolan Creek is located 573 feet (174.6 meters) north of the project site, the grassland area is not accessible for foraging from the nearest water body. As stated previously, movement from east to west is limited by the US 101 corridor. Traffic loads typically present on surface roads and highways, with traffic densities of 24 to 40 cars per hour, result in mortality rates of amphibians and reptiles between 50 to 95 percent (Andrews and Jochimson 2007).

3.5. Regulated Wetlands

There are no areas that meet the definition of wetlands or waters of the U.S. or State within the project area (please refer to the State Water Resources Control Board website at www.swrcb.ca.gov). There were no areas with either a dominance of wetland plant species or any observable evidence of wetland hydrology such as ponded water, soil cracks, algal matting, drift deposits, sediment deposits. There were no areas that had any evidence of a ordinary high water mark or any depressions or topographically low areas where water might pond.

3.6. State Listed Species and Species of Special Concern

3.6.1. Vegetation Communities

No vernal pool or other special vegetation community types regulated by the State occur within the project area.

3.6.2. Plants

Baker's meadowfoam (*Limnanthes bakeri*)

Status: State listed rare plant and CNPS Rank 1B species. Rank 1B species are considered to be rare, threatened or endangered in California and must be considered during an environmental review of a project.

General Ecology and Distribution: Baker's meadowfoam is an annual herbaceous species in the meadowfoam family (*Limnanthaceae*). This species blooms from April to May and is known to occur in meadows and seeps, freshwater marshes and swamps, vernally mesic valley and foothill grassland, and in vernal pools at elevations from 175 to 910 meters (575 to 3,000 feet).

Project Area Occurrence: There is no habitat for this species within the project area. There is one recorded occurrence for this species located on the west side of US 101, 800 yards (730 meters) south of Talmage Road in the Redwood Business Park. This occurrence was on the north side of a small seasonal wetland. It appears that this occurrence may have been extirpated by development in the area as the CNDDB record states that in 1993 the area was seen covered with fill and developed.

North coast semaphore grass (*Pleuropogon hooerianus*)

Status: State listed threatened plant and CNPS Rank 1B species.

General Ecology and Distribution: North coast sempahore grass is a perennial rhizomatous herbaceous grass species in the grass family (*Poaceae*). This species blooms from April to June and is known to occur in mesic, open areas in broadleafed upland forests, meadows and seeps and North Coast coniferous forest at elevations from 10 to 671 meters (33 to 2,200 feet).

Project Area Occurrence: There is no habitat for this species within the project area. The closest recorded occurrence for this species is along State Highway 253 (Boonville-Ukiah Cutoff Road), about 1.4 air miles north of Eleldge Peak summit, south of Ukiah.

3.6.3. Animals

The following provides an analysis of those species that are prominent in today's regulatory environment and for which potentially suitable habitat occurs within one-mile of the project site, despite the lack of recorded occurrences in the area. The proximity of the closest recorded individual and suitable habitat is also taken into consideration to create the following discussion.

Foothill Yellow-legged Frog (*Rana boylii*)

Status: California Species of Special Concern

Description: This native frog ranges in size between 1.5 to 3.5 inches (3.81 – 8.89 centimeters) in length. Indistinct dorso-lateral skin folds occur behind the eyes. The dorsal coloring typically matches the background habitat and can be gray, brown to olive in color, with dark mottling on the granular skin. The ventral coloring is white on the abdomen, with yellow on the legs and black mottle under the buccal cavity.

General Ecology and Distribution: This species typically inhabits rocky streams, preferring streams with cobble sized substrates (Jennings and Hayes 1994). Occupied drainages range from sea level to 2,040 meters (6,700 feet) (Jennings and Hayes 1994). Streams in woodland, chaparral or forest with little to no bank vegetation cover are also preferred (Stebbins 1985). *R. boylii* prefers small to moderate sized streams with at least some cobble-sized substrate (Jennings and Hayes 1994). This aquatic frog rarely uses the upland habitat outside the riparian corridor.

Project Area Occurrence: This species has been reported 1.3 miles northeast of the project site in the Russian River (CNDDB 2012). Although Doolan Creek is located 573 feet (174.6 meters) north of the project site, no suitable habitat is present within the proposed project area. No further analysis is required.

Nesting Passerines and Raptors – including western scub jay (*Aphelocoma californica*), mockingbird (family *Mimidae*), American kestrel (*Falco sparverius*) and red-shouldered hawk (*Buteo lineatus*), among others.

Status: Protected under the Federal Migratory Bird Treaty Act and Fish and Game Codes 3503 and 3503.5.

General Ecology and Distribution: As early as February, passerines begin courtship and once paired, they begin nest building, often around the beginning of March. Nest structures vary in shapes, sizes and composition and can include stick nests, mud nests, matted reeds and cavity nests. For example, black phoebes (*Sayornis nigricans*) may build a stick nest under the eaves of a building. Depending on environmental conditions, young birds may fledge from the nest as early as May. If the prey base is large, the adults may lay a second clutch of eggs.

Project Area Occurrence: No surveys were conducted for these species during the preparation for this NESMI based on the seasonality of the site reconnaissance. Several passerine (perching birds) species may nest on the site in the various habitats, including, but not limited to, western scub jay and mockingbird. Conservation measures adopted by the proposed project will prevent direct and indirect impacts to individuals. No further analysis is required.

4. Project Impacts

As noted in Seciton 3, based on a lack of special-status vegetation communities within the proposed project area and the lack of special-status individual plants and their habitats identified during the surveys in September 2012, no take of specials-status plant species will occur. Therefore, no further action is required.

Conservation measures adopted in the project description will prevent take of individual special status wildlife species (see Section 1.1). Therefore, no further action is required.

5. Permits Required

As noted in Section 3, there will be no impacts to wetlands or waters of the U.S., or State. Therefore, no Section 404 permit from the U. S. Army Corps of Engineers and no Section 401 Water Quality Certification from the North Coast Regional Water Quality Control Board is required. Likewise, no Section 1602 Streambed Alteration Agreement from CDFW is needed for this project.

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Appendix A: Plants observed within the Talmage Road/US 101 Interchange Project, September 2012.

Scientific Name	Common Name
Avena barbata	Slender wild oats*
Avena fatua	Oats*
Brassica nigra	Black mustard*
Bromus diandrus	Rip-gut brome*
Bromus hordaeceus	Soft chess*
Centaurea solstitialis	Yellow star thistle*
Cirsium vulgare	Bull thistle*
Cynodon dactylon	Bermuda grass*
Dactylis glomerata	Orchard grass*
Eremocarpus setigerus	Dove weed*
Hypericum sp.	St. John's work – ornamental*
Juglans sp.	Walnut*
Lactuca serriola	Prickly lettuce*
Liquidambar stryaciflua	Sweetgum tree*
Lolium multiflorum	Annual ryegrass*
Plantago lanceolata	English plantain*
Polygon aviculare	Knotweed*
Populus sp.	Poplar*
Quercus agrifolia	Coast live oak
Quercus lobata	Valley oak
Raphanus sativus	Wild radish*
Rhamnus alaternus	Italian buckthorn – ornamental*
Rubus armeniacus	Himalayan blackberry*
Rumex crispus	Curly dock*
Senecio vulgaris	Common groundsel*
Sequoia sempervirens	Coast redwood

Scientific Name	Common Name
Toxicodendron diversilobum	Poison oak
Tragopogon porrifolius	Salsify*
Vitis vinifera	Grapes*

* Non-native plant species.

Appenidx B. Animals Observed within the Talmage Road/US 101 Interchange Project, September 2012.

Common name	**Scientific name**
Mourning Dove	*Zenaida macroura*
Anna's hummingbird	*Calypte anna*
Black phoebe	*Sayornis nigricans*
Western Scrub jay	*Aphelocoma californica*
Bushtit	*Psaltriparus minimus*
California towhee	*Pipilo crissalis*

7. Background Data Sets – CNDDB and USFWS

California Department of Fish and Game
Natural Diversity Database
Ukiah and Elledge Peak

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	*Emys marmorata* western pond turtle	ARAAD02030			G3G4	S3	SC
2	*Pandion haliaetus* osprey	ABNKC01010			G5	S3	
3	*Rana boylii* foothill yellow-legged frog	AAABH01050			G3	S2S3	SC

Commercial Version – Dated July 01, 2012 – Biogeographic Data Branch
Report Printed on Monday, September 10, 2012

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Information Expires 01/01/2013

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 120910015123

Database Last Updated: September 18, 2011

Quad Lists

Listed Species

Fish

Oncorhynchus kisutch
- coho salmon - central CA coast (E) (NMFS)
- Critical habitat, coho salmon - central CA coast (X) (NMFS)

Oncorhynchus mykiss
- Central California Coastal steelhead (T) (NMFS)
- Central Valley steelhead (T) (NMFS)
- Critical habitat, Central California coastal steelhead (X) (NMFS)

Oncorhynchus tshawytscha
- California coastal chinook salmon (T) (NMFS)
- Critical habitat, California coastal chinook salmon (X) (NMFS)

Amphibians

Rana draytonii
- California red-legged frog (T)

Birds

Brachyramphus marmoratus
- marbled murrelet (T)

Strix occidentalis caurina
- northern spotted owl (T)

Plants

Lasthenia burkei
- Burke's goldfields (E)

Candidate Species

Mammals

Martes pennanti
- fisher (C)

Quads Containing Listed, Proposed or Candidate Species:

Ukiah (550B)

Elledge Peak (550C)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service.

Appendix D

Cultural Resources Report

ARCHAEOLOGICAL SURVEY REPORT FOR THE TALMAGE ROAD/US 101 SOUTHBOUND INTERCHANGE IMPROVEMENT PROJECT, CITY OF UKIAH, MENDOCINO COUNTY, CALIFORNIA

ASC
ANTHROPOLOGICAL STUDIES CENTER
SONOMA STATE UNIVERSITY

ARCHAEOLOGICAL SURVEY REPORT FOR TALMAGE ROAD/US 101 SOUTHBOUND INTERCHANGE IMPROVEMENT PROJECT, CITY OF UKIAH, MENDOCINO COUNTY, CALIFORNIA

Prepared by

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Ukiah and Elledge Peak Quadrangle

March 2013

Revised December 2013

SUMMARY

Archaeologists from the Anthropological Studies Center at Sonoma State University, contracted through GHD, conducted an archaeological study for the City of Ukiah. The City plans to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the existing southbound off-ramp, widening and realignment of the southbound on-ramp, and a new southbound off-ramp loop with terminus at a new signalized intersection at Talmage Road. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

The proposed project footprint consists of approximately 10 acres of Caltrans property near the intersection of Talmage Road and U.S. 101 Ukiah, California. A record search conducted at the Northwest Information Center at Sonoma State University supplemented with material at the Anthropological Studies Center, identified no previously recorded cultural resources within the proposed project footprint. A pedestrian survey conducted by ASC archaeologists in March 2013 identified no cultural resources.

It is Caltrans' policy to avoid cultural resources whenever possible. Further investigation may be needed if the site[s] cannot be avoided by the project. If buried cultural materials are encountered during construction, it is Caltrans' policy that work stop in that area until a qualified archaeologist can evaluate the nature and significance of the find. Additional survey will be required if the project changes to include areas not previously surveyed.

INTRODUCTION

The Anthropological Studies Center (ASC) of Sonoma State University, at the request of GHD and the City of Ukiah, conducted an archaeological study of approximately 10 acres at the intersection of Talmage Road and U.S. 101, Ukiah, California. This study was completed for proposed improvement to the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the existing southbound off-ramp, widening and realignment of the southbound on-ramp, and a new southbound off-ramp loop with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

The purpose of the study was to identify and record all prehistoric and historic-era archaeological resources within the proposed project footprint. This study was conducted to address part of the identification requirement of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR Part 800). These require that prior to any federal undertaking the lead agency shall take into account the effect of the undertaking on any historic properties. For the purposes of Section 106, a historic property is any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (National Register). Background research and field survey were conducted in December 2012 and January 2013 by ASC personnel. No previously recorded sites had been reported in the study area.

A pedestrian survey of the study location was carried out on 15 March 2013 by Kate Erickson Green, M.A., RPA. Green is a staff archaeologist at the Anthropological Studies Center and has 7 years of experience in California prehistoric and historic-period archaeology. See Appendix A for Study Location Map (Map 1), Study Coverage Map (Map 2), and Project Footprint Map for survey location.

The field survey did not identify any cultural resources.

HIGHWAY PROJECT LOCATION AND DESCRIPTION

The study area is located adjacent to U.S. 101 on both north and south sides at the Talmage Road interchange in Ukiah, Mendocino County, California. The study area lies within an unsectioned portion of the Yokaya land grant in Township 15 North and Range 12 West, as depicted on the USGS 7.5-minute *Ukiah, California* quadrangle (see Map 2). The study area consists of approximately 10-acres.

The project footprint consists of the southbound to westbound off ramp of U.S. 101 at Talmage Road, continuing southwest along Talmage Road to the intersection of Airport Park Boulevard on both the north and south sides of the road; it continues south around the circular southbound to eastbound ramp and southbound entrance (See Map 2). The vertical extent of anticipated ground disturbing activities is a maximum of 3 ft.

The project will not affect any known archaeological properties.

SOURCES CONSULTED

On 18 December 2012, Kyle Rabellino of the ASC conducted a record search at the Northwest Information Center (NWIC) of the California Historical Resources Information System, located at Sonoma State University in Rohnert Park, California. The NWIC, an affiliate of the State of California Office of Historic Preservation, is the official state repository of archaeological and historical records and reports for the 16-county area that includes Mendocino County. Additional research was conducted using the files and literature of the ASC.

This research included the project footprint and a 1/2-mile radius in order to determine whether known archaeological resources had been recorded within or adjacent to the study area and to assess the likelihood of unrecorded archaeological resources based on historical references and the distribution of environmental settings of nearby sites. The radius of study was extended to 1-mile to locate the nearest resources to the project footprint.

Included in the literature review were the *California Inventory of Historic Resources* (California Department of Parks and Recreation [DPR] 1976) and the Office of Historic Preservation's *Five Views: An Ethnic Sites Survey for California* (1988), *California Historical Landmarks* (1990), *California Points of Historical Interest* (1992), and the *Historic Properties Directory*

(HPD; CA-OHP through 5 April 2012). The HPD includes updated listings of the National Register of Historic Places, the California Historical Landmarks, the California Register of Historical Resources, and the California Points of Historical Interest.

NWIC files and maps indicate that three prior studies have been conducted adjacent to the proposed project footprint. In 1991 Thomas Origer conducted a survey of approximately 100 acres of the proposed Redwood Business Park adjacent to the current project footprint. The 1991 survey area abuts the project footprint along the southern side of Talmage Road and the U.S. 101 ramps (Origer 1991). No resources were recorded as part of the survey. In 2009, Richard Olsen of Caltrans prepared an Archaeological Survey Report (ASR) and Historic Property Survey Report (HPSR) for the State Route 222 Route Relinquishment Project along Talmage Road east of the current project footprint. The survey covered approximately 1.8 miles of Talmage Road (SR 222) from the intersection of U.S. 101 on the west to the community of Talmage on the east. The survey did not record any cultural resources (Olsen 2009a:ii, 2009b:3). Another study was conducted in 2009 by Wesley Wills of the ASC for a recycled water and stormwater development project (Wills 2009a). The survey covered numerous small areas throughout Ukiah, including a 2-acre lot immediately adjacent to the southbound U.S. 101 off-ramp. Another section of survey was located along U.S. 101 along the northbound onramp from Talmage Road. Both of these survey locations were negative for cultural resources (Wills 2009a:14).

Four studies have been conducted within a 1/2-mile radius of the project footprint. In 2000, a study was conducted by Jones and Stokes for a proposed fiber optic cable route between Point Arena and Robbins, California. As the proposed cable route nears the project footprint, it follows the alignment of the Northwestern Pacific Railroad (P-23-003663). The line runs parallel to U.S. 101 on its eastern side south of Ukiah, crossing to parallel the western side of the highway approximately 1.4 miles south of the project footprint. The line then continues north and passes the project footprint to the west at a distance of approximately 0.17 mile. A 20 meter corridor on either side of the rail line was surveyed. Two resources were recorded within this segment of the line over a mile distant from the project footprint: the Ukiah Railroad Station (P-23-003463) 1.2 miles northwest; and a prehistoric habitation site (CA-MEN-1108) containing midden, chert and obsidian debitage and tools recorded by Origer in 1976 1.7 miles southwest (Jones & Stokes 2000:57).

Various segments of the Northwestern Pacific Railroad line have been recorded along its entire route. The first recording was in 1995 (Hamilton 1995a, 1995b), a subsequent survey recorded it in 1998 as part of the Willits Bypass project (Lortie 1998), and it was updated for the previously noted proposed fiber optic cable route (Nelson 2000). The station on Perkins Street (P-23-003463) has been listed to the Historic Property Directory.

Two studies by Flaherty in 1992 were all conducted within a 1/2-mile radius of the project footprint. S-013758 covered approximately 1.2 acres 0.5 mile to the northeast (Flaherty 1992a). The second study by Flaherty the same year (1992b) covered an area of approximately 15 acres 0.25 mile northeast of the project footprint for a proposed subdivision (S-014513). A third study (S-013520) covered approximately 13 acres of APN 3-53-23 west of the project footprint just beyond the 1/2 mile radius. All of these studies were negative for cultural resources (Flaherty 1992c).

The closest recorded prehistoric archaeological resources are CA-MEN-3454 (P-23-004814) 0.7 mile northeast, and CA-MEN-3453 (P-23-004813) 0.96 mile west of the project footprint. CA-MEN-3454 is a multi-component site consisting of a low-density lithic concentration that includes Mt. Konocti obsidian and historic–era refuse. The site is located within the southwestern portion of Oak Manor Park along Gibson Creek (Wills 2009b). CA-MEN-3453 is also a multi-component site consisting of a low-density lithic concentration and historic-era features north of the Ukiah International Latitude Observatory buildings (Wills 2009c).

CA-MEN-3114 (P-23-003676) was recorded and excavated at the Grace Hudson School property approximately 1.25 miles southwest of the project location in 2002 (Brown and Neri 2002a, 2002b). The site consists of a chert debitage scatter but excavation did not turn up any temporally diagnostic artifacts (Brown and Neri 2002b). Nearby site P-23-003677 was similarly excavated by Brown and Neri and found to contain a wide range of diagnostic artifacts dating primarily to the Upper Archaic Period with some Middle and Lower Archaic occupation (Brown and Neri 2002b).

The Caltrans Historic Highway Bridge Inventory list was consulted for National Register eligible bridges within the project footprint and search radius. The Route 222 overpass bridge lies within the project area (Bridge No. 10 0189). It was built in 1964 and listed as ineligible to the National Register. Just beyond the project footprint, the Doolin Creek crossings (Bridge No. 10 0190L and 10 0190R) built in 1964 are also listed as ineligible (Caltrans 2013).

The 1916 United States Army Corps of Engineers map shows a variety of development in the area, primarily along Main Street and State Street (US-ACE 1916). It depicts the alignment of the Northwestern Pacific Railroad and the Mendocino State Asylum for the Insane and possible residences within the vicinity of the project footprint. In the 1920s, the Redwood Highway (now U.S. 101) was developed and ran along State Street (US-ACE 1920). The 1944 USGS map depicts rural residences within the vicinity of the project footprint before the construction of U.S. 101 (USGS 1944). In 1965, Caltrans rerouted U.S. 101 to its present location, bypassing downtown Ukiah.

COMMUNICATIONS

On 18 December 2012, the State of California Native American Heritage Commission (NAHC) was asked to review the Sacred Lands file for information on Native American cultural resources in the study area. On 11 January 2013, the NAHC responded with a letter stating that the search failed to indicate the presence of Native American cultural resources within the immediate project area. A contact list of people responsible for Native American concerns in the area was included with NAHC's response. The NAHC's letter and accompanying contact list are included in Appendix B of this report.

On 18 December 2012, a letter was sent to the Grace Hudson Museum with a description of the project and location, as well as a map depicting the project location. As of the date of this report, no response has been received.

On 15 January 2013, a letter was sent to each individual on the NAHC contact list. The letters provided a description and map of the project location. Two responses have been received as of the report date. Gregg Young of the Potter Valley Tribe responded by email on 18 January 2013 stating that the tribe is unaware of any archaeological or cultural sites within the project area but that they wish to be notified of any cultural discoveries during the course of the project. Otis Parrish of the Kashaya Band of Pomo Indians responded by email on 23 January 2013 stating that the tribe had no interest in the work as it was outside of their ancestral territory. Copies of this correspondence may be found in Appendix B.

On 7 November 2013, a revised ASR was sent to each tribal representative on the NAHC contact list. Follow up phone calls were made on 26 November 2013 to confirm receipt and gather any comments. A log of this communication may be found in Appendix B.

BACKGROUND

Environment

The study area sits at an elevation of approximately 580 feet above mean sea level within the Ukiah Valley. The valley is bordered on the west by the Coast Range and on the east by the Mayacamas Mountains.

The area is composed geologically of Quaternary recent alluvium deposits that cover most of the Ukiah Valley (Page 1966:258). This alluvium can be sand, silt, or gravel and are fine-grained sediment that forms on valley floors from drainages and flooding within the valley. The age and make up of these deposits indicates potential subsurface sensitivity (Witter et al. 2006). Soils in the study area primarily consist of Russian Loam, described as a well-drained alluvium derived from sedimentary rock, and Cole Loam which is described as somewhat poorly-drained shallow gravelly loam found on floodplains and footslopes (USDA 2013).

The present alignment of the Russian River flows 0.7 mile west of the project area. Doolin Creek, a small tributary, flows west to east 0.18 mile north of the project area. The Russian River's course has changed over time and the project area is located within past floodplain.

The natural vegetation of the general survey area consists primarily of Blue Oak and Grey Pine forest (Küchler 1977:19). This association is made up of medium tall, dense to open broad-leaved deciduous treet with a mixture of needle-leaved evergreen trees. The open Ukiah Valley in which the study area sits is more consistent with an oak woodland or savannah.

The study area surrounds the west interchange on and off ramps and consists of fill soil with low grass cover and landscaping trees and bushes. Rock fill for drainage stabilization have been added to the southwestern end of the southbound on ramp.

Buried Site Sensitivity

Landform and physical processes play a fundamental role in the creation, preservation, burial, and ultimate discovery of archaeological sites in much of California (Meyer and Rosenthal 1997; Rosenthal and Meyer 2004). The project area's ample rainfall and associated runoff create conditions amenable to erosive and burial sequences that destroy archaeological sites on the one hand, and preserve them on the other. Different landscapes, landforms, and locations have differential probabilities of preserving archaeological remains and containing buried archaeological sites. Although existing archaeological sites are used as a bench-mark for assessing the overall landscape sensitivity, it is important to note that the results of CHRIS records searches reflect only available information on already documented cultural resources. Several factors come into play when predicting an area's sensitivity, including geologic and soil mapping, surface modeling for environmental factors, and caloric costs. Some inherent problems within this analysis are the scale of available mapping units and recent alterations to waterways and other landscape features (Meyer, Kaijankoski, and Rosenthal 2011: 126).

The project footprint is mapped within Holocene (present to 10,000 B.P.) alluvium (Knudsen et al. 2000; Witter et al. 2006). This alluvium can be sand, silt, or gravel and are fine-grained sediment that forms on valley floors from drainages and flooding within the valley. The age and make up of these deposits is what indicates potential for buried site sensitivity. The project footprint is located within an area where three depositional landforms meet. Latest Pleistocene (15, 000 to 11,000 BP), Late Holocene (4,000 to 2,000 BP), and Latest Holocene (2,000 to 1,000 BP) landforms all converge around the Talmage Road and Highway 101 intersection (Meyer, Kaijankoski, and Rosenthal 2011: 92). Cole and Russian soil series, found within the project location, are associated with Late and Latest Holocene landforms that include alluvial fans, floodplains with little uplift or erosional dissection (Meyer, Kaijankoski, and Rosenthal 2011:91). Soils associated with these landforms tend to be weakly developed with minimal subsurface presence. All three of these periods are considered sensitive for buried resources. This information has been combined with surrounding landscape features to categorize the project footprint vicinity as moderately sensitive for surface sites. The project footprint lies at an intersection of low, high, and very high sensitivity for buried site potential based on predictive modeling developed using available data(Meyer, Kaijankoski, and Rosenthal 2011: 113, 121, 124).

While the buried sensitivity indicated ranges from low to high, most of the project footprint is expected to remain within existing fill (3 ft. depth) from previous interchange construction. Portions of the project not in elevated ramp areas may extend into native soil. Installation of new signal poles will require a depth maximum of 8 ft. New signals will be drilled through existing fill and into up to 3 ft. of native soil. Those portions within existing fill will avoid native soils with potential for buried landforms containing sites.

Ethnography

Ethnographic literature indicates that at the time of historic contact, the project footprint was within the territory of speakers of the Northern Pomo Language, one of the seven Pomoan languages (Kroeber 1925:222; McLendon and Oswalt 1978:283). The Northern Pomo did not have an overarching name for themselves as a people speaking a common language. Tribelets, each often having its own dialect, were typically defined by and named for their geographical location, particularly interior valleys (McLendon and Oswalt 1978:283). According to Kroeber (1925:237), the greater Pomo (i.e. the combined population so the seven language groups) formed the second most populous group in California, with an estimated pre-contact population of as many as 8,000 people. Cook (1956:116, 119) suggests that the population was considerable larger, at 20,760, with some 5,040 of these belonging to the Northern Pomo language group.

The area occupied by the Northern Pomo speakers is roughly defined by the Navarro River in the southwest; the northern end of the Russian River Valley beginning just south of Ukiah and extending east across Scotts Valley in Lake County along the southern border; Horse Mountain and the western banks of Clear Lake along the eastern border; and Potter Valley, the area around the current communities of Willits, Sherwood, and Fort Bragg along the northern border; with the western border defined by a stretch of the Pacific Ocean between Fort Bragg and Albion (McLendon and Oswalt 1978:283).

Major interior valleys, including the upper Russian River Valley, appear to have been favored locations for most permanent Northern Pomo Villages (Layton 1990:10). Winter occupation typically took place at the largest, most important villages within each tribelet territory (Tiley 2002:51). Winter houses were conical in shape, up to 15 ft. In diameter, and constructed of redwood bark and poles. These houses could fit up to 12 people, typically women and children. Acorn granaries were built next to these houses, as were private yards fenced in with dried brush. Sweathouses, or men's houses, were roughly 30 ft. in diameter, were semi-subterranean and earth covered, and housed the men during the winter. Wealthier individuals constructed their own individual sweathouses of considerably smaller size. Dance houses were built similarly to the sweat house but on a larger scale, sometimes reaching 60 ft. in diameter and built with multiple exits and depressions for foot drums (Tiley 2002:52). Summer occupation took place in village locations that, though less permanent than the winter occupations, were more than simple seasonal camps. Roofless dance houses created through the placement of tall brush fenced were typical of such summer villages; residences often consisted of lashed-and-bent-pole frames covered with brush bundles. These buildings could house up to 30 people and had a rock and baked clay-lined hearth in the center (Tiley 2002:52-53). More casual summer houses consisting of a ramada-style, pole-and-thatched-roof design were also common (Barrett 1916:4 in Tiley 2002:53).

Occupations of coastal sites appears to have been seasonal, with interior populations traversing the rugged coastal range to collect marine resources during the summer, including abalone, seaweed, kelp, mussels, and sea fish (Loeb 1926:192 in Tiley 2002:43; McLendon and Oswalt 1978:282). The inland valleys near drainages were particularly productive for food resources, which included closer and other greens, berries, seeds, fruits, bulbs in the spring, and buckeye, pepperwood nuts, Manzanita berries, bay nuts, pine nuts, and acorns in the fall (Tiley 2002:43). It is likely that the Northern Pomo, like other Pomo groups, hunted elk, deer, rabbit, and other small animals, and a wide variety of birds (McLendon and Oswalt 1978).

A modern Native American community, the Pinoleville Rancheria is currently located roughly 1/4-mile north of the northern boundary of the Ukiah city limits. The first Pinoleville Rancheria, called *k'ibúk'bú* was in what is now the south-central portion of the town of Ukiah, but was later reestablished at its current location at a site called *yaa mó*, 'bone hole' (McLendon and Oswalt 1978:284).

One Northern Pomo village is depicted by anthropologist Samuel Barrett within the Ukiah area while multiple others have been depicted in the vicinity, based on data Barrett collected in the early 1900s. The village of *kōmlī*, appears to be located between North State Street and the Northwestern Pacific Railroad along Orrs Creek. Barrett (1908:138-139) notes that *kōmlī* village was likely still occupied just prior to the arrival of non-Native settlers, but these occupants then moved to Scotts Valley as a result of conflict with the Central Pomo. Several other village sites – *ka'tilī, smē'wakapda, tcīdōtē'ya* – were located nearby (Barrett 1908:137-138).

Prehistory

An analytic framework for the interpretation of the San Francisco Bay and North Coast Ranges prehistory is provided by Fredrickson (1974), who divided human history in California into three broad periods: the Paleoindian period, the Archaic period, and the Emergent period. The scheme used sociopolitical complexity, trade networks, population, and the introduction and variations of artifact types to differentiate between cultural units. The significance of prehistoric sites rests partly on their ability to help archaeologists explain the reasons for these changes in different places and at different times in prehistory. This scheme, with minor revisions (Fredrickson 1994) remains the dominant framework for prehistoric archaeological research in the region.

The earliest documented human occupation in California, the Paleoindian period (ca. 10,000-6000 B.C.), was a time of variable climate, rising sea levels, and other broad-scale environmental change. People lived in small, highly mobile groups, moving through broad geographic areas and leaving relatively meager archaeological remains.

With the more stable climate of the long Archaic period (6000 B.C. to A.D. 1000), people gradually became more sedentary, new groups entered the area, and regional distinctions developed. The Archaic has been divided into three subperiods (Lower, Middle, and Upper), based on changes in sociopolitical complexity, trade networks, populations, and the introduction of new artifact types (Fredrickson 1974, 1994). Many of the archaeological sites in the North Coast Ranges were first used in the Middle and Upper Archaic, when populations were increasing and groups moved into new areas to exploit a more diverse range of resources. By the Upper Archaic period beginning around 500 B.C., mobility was being replaced by a more sedentary adaptation that included a reliance on intensive acorn processing and storage. Numerous small villages and the beginnings of a more complex society and economy characterize the end of this period.

During the Emergent, or Late, period (ca. A.D. 1000 to the historic period), social complexity developed toward the contact-period settlement pattern of large, central villages where political leaders resided, with associated hamlets and specialized activity sites. Innovations associated with the period include the bow and arrow, small corner-notched points, and a diversity of beads and ornaments. Archaeological sites dating to this period are common throughout the North Coast Ranges; they include sites of ritual significance, such as rock art; small resource-processing areas marked by stone-tool-manufacturing debris (debitage) and flaked-stone tools or milling equipment (such as mortars and pestles); or moderate- to large-sized occupation sites marked by midden soils, dietary bone and shell, and a diversity of artifacts.

History

The first non-Native account of the Mendocino County area was probably that of George Vancouver, who saw the Point Arena landform from his ship in November of 1792 as he sailed from Nootka to San Francisco. The interior areas appear to have remained essentially unexplored until the 1840s, when Governor Pío Pico gave the 11-square-leauge Yokaya land grant to militia captain Cayetano Juárez (Hoover et al. 1990:195). Juárez also owned the Rancho Tulucay in Napa Valley, where he resided (Hoover et al. 1990:195). The two ranchos were separated by some 70 miles as the crow flies; it is unclear how much development Juárez invested on lands so removed from his home rancho.

After the establishment of California statehood in 1850, Mendocino was delineated as one of the 27 original counties, though it lacked a county government until 1859. The county gained its name from Cape Mendocino, after Antonio de Mendoza, the first viceroy of New Spain (Hoover et al. 1990: 192). American settlers began arriving shortly after, but it was not until 1856 that Sam Lowry established what may have been the first non-Native residence in the Ukiah area at what is now the northeast corner of Main Street and Perkins Street in 1856 (Hoover et al 1990:195). The townsite location appears to have been known early on as Parker Valley, but was subsequently christened Ukiah by Judge J. B. Lamar, and is depicted as such on an 1858 map of California (Gudde 1998:406). The town's first hotel was built in 1856 and courthouse in 1860. The town's first newspaper, the Mendocino Herald, was established shortly thereafter (City of Ukiah 2013). With the creation of a county government, Ukiah became the county seat, and has remained so since (Hoover et al. 1990:196). In 1867 the U.S. government approved of Juárez's patents for the land granted him by Governor Pico; Juárez sold the land to developers, Hastings, Curry and Carpenter, who divided the rancho into separate tracts and sold them off (Hoover et al. 1990:195).

In the late 1850s, E. Pryor established a water-powered sawmill on Ackerman Creek, 5 miles northwest of Ukiah, marking the beginnings of the lumber industry in the region. Lumber contributed to increased development of the Ukiah Valley. Stephen Holden's sawmill, built in 1861, was probably the first mill within the town limits of Ukiah. Timber became an increasingly important export throughout the first half of the 20th century and remains so today (City of Ukiah 2012; National Oceanic and Atmospheric Administration 2012).

By 1865 Ukiah's commercial center was spreading west from Main Street to State Street. Ukiah's first subdivision of 13 lots was placed along East Perkins Street in 1869. In the 1870s, residents began to build homes further from the city center on the west side of the courthouse block along Oak, Pine, and Bush Streets. The town began to slowly expand throughout the 1870s. The 1884 General Land Office map for the region depicts the city of Ukiah with almost no outlying development within the landgrant boundaries (US-GLO 1884).

In 1889 the Northwestern Pacific Railroad was extended from Cloverdale north into Ukiah, primarily to support the lumber industry. This also opened the area's agricultural production, consisting of mainly hops and fruit, to Bay Area markets and beyond. Ukiah remained the northern railhead of the road until 1898, when construction extended north to Willits. The arrival of the railroad in Ukiah led to increased commercial and industrial development in the areas along Main Street and Perkins Street. Currently, only the main line and the 1929 railroad station at 305 East Perkins Street remain. By the 1900s, most of the agricultural properties surrounding the urban areas of Ukiah shifted to dairying. Modern agricultural use consists mostly of dairying, fruit, and viticulture.

FIELD METHODS

A pedestrian survey of the study area was undertaken on 15 March 2013, by Project Coordinator Kate Erickson Green. Survey was conducted in 4-meter transect across the study area, clearing vegetation with a hoe every few meters or as necessary. Visibility was mostly good, with light to moderate vegetation including low grass cover and trees and shrubs throughout the study area. Approximately 25 percent of the study area was paved; the remaining ground surface appeared to be imported fill or rock.

STUDY FINDINGS AND CONCLUSIONS

No archaeological sites were identified as a result of this study. No previously recorded sites have been identified within the study area.

OTHER RESOURCES

No other resources have been reported within the study area.

UNIDENTIFIED CULTURAL MATERIALS

If previously unidentified cultural materials are encountered during construction, it is Caltrans' policy that work be halted in that area until a qualified archaeologist can assess the significance of the find. Additional archaeological survey will be needed if project limits are extended beyond the present survey limits.

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2013 *Web Soil Survey*. USDA Natural Resources Conservation Website at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx (accessed 8 January 2013).

United States General Land Office (US-GLO)

1884 Plat of the Township 15 North, Range 12 West, Mount Diablo Meridian. United States General Land Office. National Archives, Washington, D.C.

United States Geological Survey (USGS)

1944 *Ukiah, California, Quadrangle Map.* 7.5-minute series. U.S. Geological Survey, Washington D.C.

1958 *Ukiah, California, Quadrangle Map.* 7.5-minute series. U.S. Geological Survey, Washington D.C. (photorevised 1994).

Wills, Wesley

2009a *A Cultural Resources Study for the Recycled Water and Stormwater Development Project in the City of Ukiah, Mendocino County, California.* Prepared for Winzler and Kelly Consulting Engineers, Santa Rosa, California. On file (S-36144) at the Northwest Information Center, California Historical Resources Information System, Sonoma State University, Rohnert Park, California.

2009b Archaeological Site Record for P-23-004814/CA-MEN-3454. On file at the Northwest Information Center, California Historical Resources Information System, Sonoma State University, Rohnert Park, California.

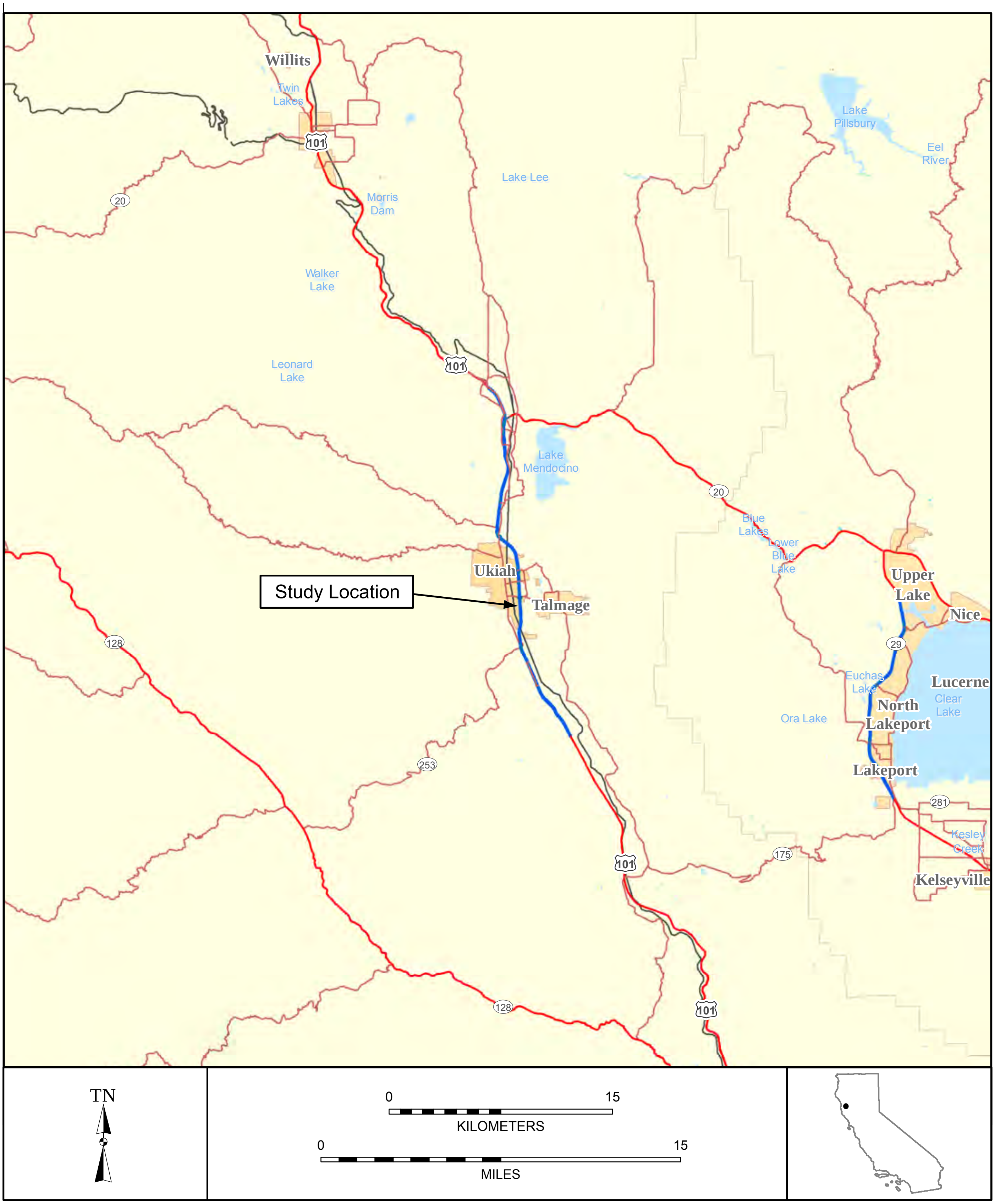
2009c Archaeological Site Record for P-23-004813/CA-MEN-3453. On file at the Northwest Information Center, California Historical Resources Information System, Sonoma State University, Rohnert Park, California.

Witter, Robert C., Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph

2006 *Map of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California*. Version 1.1 United States Geological Survey Open-file Report 2006-1037, United States Department of the Interior. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans. Available online at http://pubs.usgs.gov/of/2006/1037.

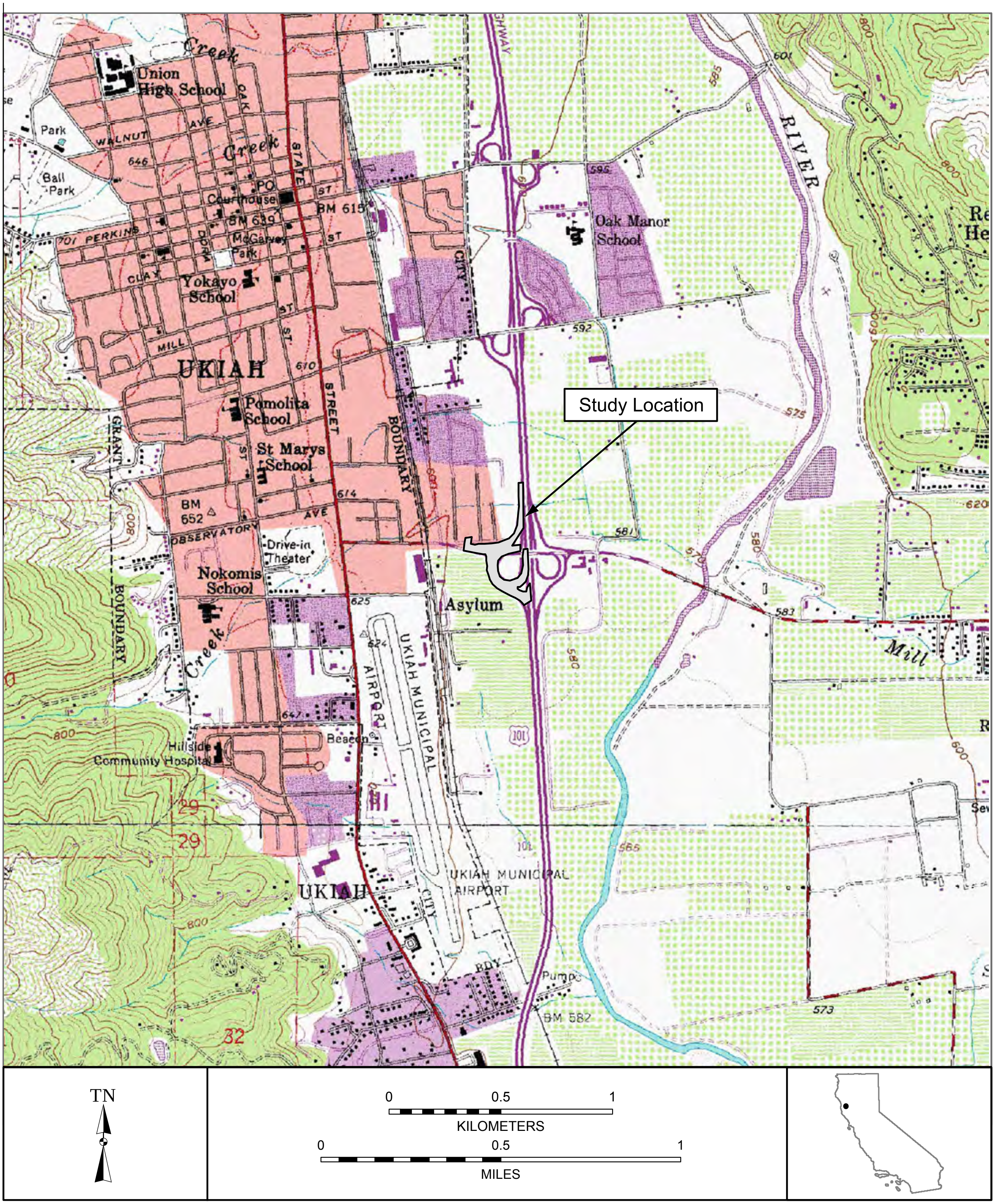
APPENDIX A: MAPS

Map 1. Study Vicinity
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County



Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

Map 2. Study Location
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County

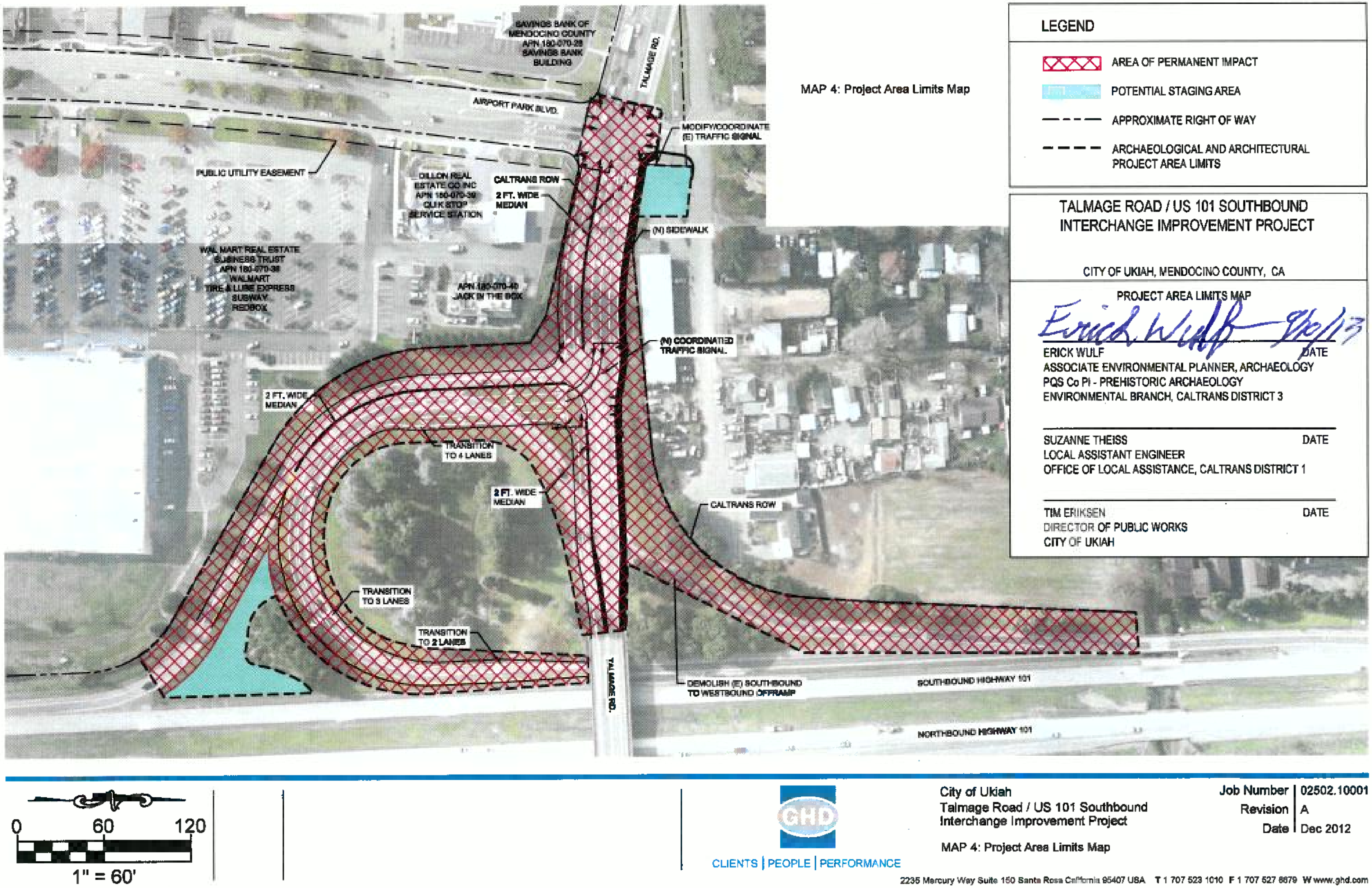


Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

Map 3. Survey Coverage Map
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County

Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

MAP 4: Project Area Limits Map



LEGEND

- AREA OF PERMANENT IMPACT
- POTENTIAL STAGING AREA
- APPROXIMATE RIGHT OF WAY
- ARCHAEOLOGICAL AND ARCHITECTURAL PROJECT AREA LIMITS

TALMAGE ROAD / US 101 SOUTHBOUND INTERCHANGE IMPROVEMENT PROJECT

CITY OF UKIAH, MENDOCINO COUNTY, CA

PROJECT AREA LIMITS MAP

Erick Wulf 9/6/13

ERICK WULF DATE
ASSOCIATE ENVIRONMENTAL PLANNER, ARCHAEOLOGY
PQS Co PI - PREHISTORIC ARCHAEOLOGY
ENVIRONMENTAL BRANCH, CALTRANS DISTRICT 3

SUZANNE THEISS DATE
LOCAL ASSISTANT ENGINEER
OFFICE OF LOCAL ASSISTANCE, CALTRANS DISTRICT 1

TIM ERIKSEN DATE
DIRECTOR OF PUBLIC WORKS
CITY OF UKIAH

CLIENTS | PEOPLE | PERFORMANCE

City of Ukiah
Talmage Road / US 101 Southbound Interchange Improvement Project

MAP 4: Project Area Limits Map

Job Number	02502.10001
Revision	A
Date	Dec 2012

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Plot Date: 26 December 2012 - 10:56 AM Cad File No: G:\02502 - City of Ukiah\02502-8410035 Talmage Interchange\06-CAD\Figures\Talmage Interchange APE Map.dwg

APPENDIX B: COMMUNICATIONS

18 December 2012

Grace Hudson Museum
431 South Main Street
Ukiah, CA 95482

Dear Grace Hudson Museum,

The Anthropological Studies Center (ASC) is conducting an archaeological study of approximately 15 acres of Caltrans Right-of-Way located on the west side of the Highway 101 on- and off-ramp at Talmage Road in southern Ukiah, CA (see attached map). This study is being conducted to address a project to improve the Talmage Road westbound interchange. The ASC's study is to determine whether cultural resources are present in the area of potential effects (APE) and whether any resources identified will be affected by the project.

We would appreciate being informed of any information or concerns that your organization may have in regards to historic-era sites within the area of potential affects. This is not, however, a request for you organization to conduct any additional research. If you have concerns, or questions, please contact us at the address above or via the email or phone number below. Thank you.

Sincerely,

Kate Erickson Green
Staff Archaeologist

kate.green@sonoma.edu
707-664-2878

ANTHROPOLOGICAL STUDIES CENTER

Sonoma State University
1801 East Cotati Avenue, Building 29
Rohnert Park, CA 94928

FAX TRANSMITTAL FORM

To: Native American Heritage Commission

Fax No.:916.657.5390
Phone No.: 916.653.4082

Date: 18 December 2012

Total Number of Pages: 2
(including cover page)

From: Kate Green
Fax No.: (707)664-4155
Phone No.: (707)664-2381
E-mail: asc@sonoma.edu

Re: Talmage Road Interchange Project

COMMENTS

Please review the sacred lands files for any Native American cultural resources that may be within or adjacent to the project area depicted on the accompanying map. The project area, near Ukiah, Mendocino County, lies within an unsectioned portion of the Yokaya Land Grant within Township 15 North and Township 12 West, as depicted on the Ukiah, Calif. 7.5' topographic map. The project area encompasses the Highway 101 and Talmage Road west on and off ramps near the intersection of Airport Park Boulevard. The study is being prepared for proposed improvementsto the Talmage Road interchange. We also request a list of Native American individuals /organizations who may have knowledge of cultural resources in the project area. Please call if you have any questions.

Thank you for your assistance.

ASC Web Site: http://www.sonoma.edu/projects/asc/

Please call as soon as possible if there are any transmission problems: (707)664-2381

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390

January 11, 2013

Kate Green
Sonoma State University
Anthropological Studies Center
1801 E. Cotati Ave., Bldg. 29
Rohnert Park, CA 94928

Sent by Fax: 707-664-4155

Number of 4

Re: Talmage Road Interchange Project, Mendocino County

Dear Ms. Green:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Katy Sanchez for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Mendocino County
January 4, 2013

Coyote Valley Band of Pomo Indians
John Feliz Jr.,Chairperson
P.O. Box 39/ 7901 Hwy 10, Pomo
Redwood Valley , CA 95470
johnfeliz21@aol.com
(707) 485-8723
(707) 485-1247 Fax

Guidiville Band of Pomo Indians
Merlene Sanchez, Chairperson
P.O. Box 339 Pomo
Talmage , CA 95481
admin@guidiville@.net
(707) 462-3682
(707) 462-9183 - Fax

Hopland Band of Pomo Indians
Shawn Padi, Chairperson
3000 Shanel Road \ 98 Shokowa
Hopland , CA 95449 Sokow
spadi@hoplandtribe.com Shanel
(707) 472-2100, Ext 1405 Pomo

(707) 744-1506 - Fax

Laytonville Rancheria/Cahto Indian Tribe
Rochard Smith, Chairperson
P.O. Box 1239 Cahto
Laytonville , CA 95454 Kato
Chairwoman @cahto.org Pomo
(707) 984-6197
(707) 984-6201 Fax

Laytonville Rancheria/Cahto Indian Tribe
Atta P. Stevenson, Cultural Resources
P.O. Box 1404 Cahto
Laytonville , CA 95454 Kato
wtalker101@yahoo.com Pomo
707-841-0058

Manchester-Point Arena Rancheria
Nelson Pinola, Chairperson
P.O. Box 623 Pomo
Point Arena , CA 95468t
manptarena@hughes.net
(707) 882-2788
(707) 882-3417 Fax

Pinoleville Pomo Nation
Leona Willams, Chairperson
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
tcouncil@pinoleville-nsn.gov
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Angela James, THPO
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Dave Edmunds, Environmental Director
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Erika Williams, Section 106 Coordinator
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Native American Contacts
Mendocino County
January 4, 2013

Potter Valley Tribe
Greg Young, Environmental Coordinator
2251 South State Street — Pomo
Ukiah, CA 95482
(707) 462-1213
(707) 462-1240 FAX

Potter Valley Tribe
Salvador Rosales, Chairperson
2251 South State Street — Pomo
Ukiah, CA 95482
pottervalleytribe@comcast.net
(707) 462-1213
(707) 462-1240 - Fax

Redwood Valley Rancheria of Pomo
Elizabeth Hansen, Chairperson
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
(707) 485-5726 - Fax

Redwood Valley Rancheria of Pomo
Zhao Qui, Cultural Resources Coordinator
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
Fax:(707) 485-5726

Redwood Valley Rancheria of Pomo
Steve Nevarez Jr., Environmental Coordinator
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
Fax:(707) 485-5726

Round Valley Reservation/Covelo Indian Community
Kenneth Wright, President
77826 Covelo Road — Yuki; Nomlaki
Covelo, CA 95428 — Pit River
(707) 983-6126 — Pomo
(707) 983-6128 - Fax — Concow
Wailaki; Wintun

She Bel Na Band of Pomo Indians
Dina Bowen-Welsh, Secretary
PO Box 1613 — Pomo
Fort Bragg, CA 95437
707-964-8126

Sherwood Valley Rancheria of Pomo
Michael Fitzgerral, Chairperson
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
svradministrator@sbcglobal.net
(707) 459-9690
(707) 459-6936 - Fax

Sherwood Valley Rancheria of Pomo
Talisha Melluish, Cultural Resource Specialist
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
(707) 459-9690
(707) 459-6936 - Fax

Sherwood Valley Rancheria of Pomo
Hillary Renick, THPO
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
(707) 459-9690
(707) 459-6936 - Fax

This list is current only as of the date of this document.

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This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Native American Contacts
Mendocino County
January 4, 2013

Stewarts Point Rancheria
Emilio Valencia, Chairperson
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
Emilio@stewartspoint.com

(707) 591-0580-voice
(707) 591-0583 - Fax

Stewarts Point Rancheria
Nina Hapner, Environmental Planning Department
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
nina@stewartspoint.org
(707) 591-0580 ext107
(707) 591-0583 FAX

Stewarts Point Rancheria THPO
Otis Parish, Tribal Historic Preservation Officer
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
Otis@stewartspoint.org
(707) 591-0580 EXT 105
(707) 591-0583 FAX

Yokayo Tribe
Chairperson
P.O. Box 362 Pomo
Talmadge , CA 95481

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Tribal Contact Log

Tribal Group	Individual	Tribal Affiliation	1st Contact	Response notes	2nd Contact	Response Notes	3rd Contact	Response Notes
Coyote Valley Band of Pomo Indians	John Feliz Jr.	Pomo	1/15/2013		11/7/2013		11/25/2013	no longer at tribe
Guideville Band of Pomo Indians	Merlene Sanchez	Pomo	1/15/2013		11/7/2013		11/26/2013	no answer, no message service
Hopland Band of Pomo Indians	Shawn Padi	Shokowa, Sokow, Shanel, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Laytonville Rancheria/Cahto Indian Tribe	Richard Smith	Cahto, Kato, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Laytonville Rancheria/Cahto Indian Tribe	Atta P. Stevenson	Cahto, Kato, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Manchester-Point Arena Rancheria	Nelson Pinola	Pomo	1/15/2013		11/7/2013		11/26/2013	individual no longer in position, no interest in project, too far from tribal territory
Pinoleville Pomo Nation	Ericka Williams	Pomo	1/15/2013		11/7/2013		11/26/2013	individual no longer in position, spoke to Erica Carson Jr., new cultural department, received letter by email 11/26/2013 stating no interest in the project location
Pinoleville Pomo Nation	Leona Williams	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Pinoleville Pomo Nation	Angela James	Pomo	1/15/2013		11/7/2013		11/26/2013	see above

Tribal Contact Log

Pinoleville Pomo Nation	Dave Edmunds	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Potter Valley Tribe	Gregg Young	Pomo	1/15/2013	letter received 1/18/2013 asking for tribe to be notified in the event of discovery of archaeological remains	11/7/2013		11/26/2013	message left on voicemail
Potter Valley Tribe	Salvador Rosales	Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Redwood Valley Rancheria of Pomo	Zhao Qui	Pomo	1/15/2013		11/7/2013		11/26/2013	report sent to tribal EPA department for review, requested to be called back in a week, all communication should be through her. 12/6/2013 called and left message
Redwood Valley Rancheria of Pomo	Elizabeth Hansen	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Redwood Valley Rancheria of Pomo	Steve Nevarez	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Round Valley Reservation/Covelo Indian Community	Kenneth Wright	Yuki, Nomlaki, Pit River, Pomo Concow, Wailaki, Wintun	1/15/2013		11/7/2013		11/26/2013	message left on voicemail

Tribal Contact Log

She Bel Na Band of Pomo Indians	Dina Bowen-Welsh	Pomo	1/15/2013		11/7/2013	report returned to sender	11/26/2013	message left on voicemail
Sherwood Valley Rancheria of Pomo	Talisha Melluish	Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail, confirmed with reception that calls should be through Talisha
Sherwood Valley Rancheria of Pomo	Hillary Renick	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Sherwood Valley Rancheria of Pomo	Michael Fitzgerral	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Stewarts Point Rancheria	Otis Parish	Pomo	1/15/2013	letter received by email 1/23/2013 stating no interest in project due to distance from tribal territory, no further contact needed				
Stewarts Point Rancheria	Emilio Valencia	Pomo	1/15/2013	see above				
Stewarts Point Rancheria	Nina Hapner	Pomo	1/15/2013	see above				
Yokayo Tribe		Pomo	1/15/2013		11/7/2013		11/26/2013	no phone number listed

15 January 2013

Dina Bowen-Welsh
Secretary
She Bel Na Band of Pomo Indians
P.O. Box 1613
Fort Bragg, CA 95437

Dear Ms. Bowen-Welsh,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

We would appreciate being informed of any information or concerns that your organization may have in regards to cultural resources within the project area. If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Yokayo Tribe
Chairperson
P.O. Box 362
Talmage, CA 95481

Dear Chairperson,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Erika Williams
Section 106 Coordinator
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. Williams,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Dave Edmunds
Environmental Director
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Mr. Edmunds,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

John Feliz Jr.
Chairperson
Coyote Valley Band of Pomo Indians
P.O. Box 39/7901 Hwy 10
Redwood Valley, CA 95470

Dear Mr. Feliz,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Michael Fitzgerral
Chairperson
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Mr. Fitzgerral,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Elizabeth Hansen
Chairperson
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Ms. Hansen,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Nina Hapner
Environmental Planning Department
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Ms. Hapner,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

We would appreciate being informed of any information or concerns that your organization may have in regards to cultural resources within the project area. If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Angela James
Tribal Historic Preservation Officer
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. James,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Talisha Melluish
Cultural Resource Specialist
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Ms. Melluish

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Steve Nevarez Jr.
Environmental Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Mr. Nevarez,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Shawn Padi
Chairperson
Hopland Band of Pomo Indians
3000 Shanel Road\98
Hopland, CA 95449

Dear Mr. Padi,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Otis Parish
Tribal Historic Preservation Officer
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Mr. Parish,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Nelson Pinola
Chairperson
Manchester-Point Arena Rancheria
P.O. Box 623
Point Arena, CA 95468

Dear Mr. Pinola,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Zhao Qui
Cultural Resources Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Ms. Qui,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Hillary Renick
Tribal Historic Preservation Officer
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Ms. Renick,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Salvador Rosales
Chairperson
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

Dear Mr. Rosales,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Merlene Sanchez
Chairperson
Guidiville Band of Pomo Indians
P.O. Box 339
Talmage, CA 95481

Dear Ms. Sanchez,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Richard Smith
Chairperson
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1239
300 Cahto Drive
Laytonville, CA 95454

Dear Mr. Smith,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Atta P. Stevenson
Cultural Resources
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1404
Laytonville, CA 95454

Dear Ms. Stevenson,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Emilio Valencia
Chairperson
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Mr. Valencia,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Leona Williams
Chairperson
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. Williams,

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Kenneth Wright
President
Round Valley Reservation/
Covelo Indian Community
77826 Covelo Road
Covelo, CA 95428

Dear Mr. Wright,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Greg Young
Environmental Coordinator
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

Dear Mr. Young,

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

Email 1/23/2013 9:09 a.m.

Dear Kate,

This is Otis Parrish here. I am the new and present THPO Officer for the Kashia Tribe. I have received your letter for consultation regarding the proposed project to improve the Talmage Road and U.S. 101 southbound on-and off-ramps Modifications.

The Kashia Tribe has no interest in any work being done outside of our aboriginal territory which is situated in Northwestern area of Sonoma County.

Thank your for your request for our consultation

Otis Parrish M.A.

Cultural and Historic Preservation Officer

THPO.

POTTER VALLEY TRIBE

2251 S. State St. ● Ukiah, California 95482 ● (707) 462-1213 ● Fax (707) 462-1240 ● E-mail: pottervalleytribe@pottervalleytribe.com

Tribal Environmental Office pvtepadirector@ pottervalleytribe.com

Date: 1/18/2013
To: Kate Erickson Green, M.A.
Fax/Email: Kate.green@sonoma.edu
Regarding Project: Cultural resources survey of Talmage road interchange
Project ID: Ukiah, Mendocino County, CA

As far as we are able to determine, the area described has no known archaeological or cultural sites of the Potter Valley Tribe. The Potter Valley Tribe moved around Mendocino County, and may have established seasonal camps or villages between the coast and inland areas. We recognize that all of Mendocino County is culturally and archaeologically sensitive, and many such sites exist and may be undiscovered at this time.

Please notify the Tribe immediately if any sites or articles of historical or archaeological nature are discovered during this project, pursuant to the National Historic Preservation Act.

There is the possibility that Native Americans currently utilize this site for the gathering of plant or animal materials for food, basketry, herbal, or ceremonial use. The use of pesticides in such areas could jeopardize the health of anyone entering, or using materials gathered from, areas with access for gathering. We request prior notification of pesticide use at this site so we can inform our Tribal members to avoid such areas and unnecessary exposure.

We would also like to be able to provide future generations of Native Americans access to artifacts and other cultural resources of the Tribe. We would ask that landowners consider donating cultural resources discovered during projects to the Potter Valley Tribe or other tribes when projects occur in their ancestral territories.

Sincerely,

Gregg Young, M.A.
Environmental Director

SONOMA STATE UNIVERSITY
ANTHROPOLOGICAL STUDIES CENTER
1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

John Feliz Jr.
Chairperson
Coyote Valley Band of Pomo Indians
P.O. Box 39/7901 Hwy 10
Redwood Valley, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Feliz,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

After my initial contact back in January 2013, I conducted a survey of the project location on 15 March 2013. No archaeological or cultural resources were observed at that time. I am including a copy of our draft Archaeological Survey Report for the project and would appreciate any comments you may have regarding the project. I will follow up with a phone call in the following weeks to confirm your receipt of the report.

If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Regards,

Kate Green, M.A., RPA
Staff Archaeologist

SONOMA STATE UNIVERSITY

ANTHROPOLOGICAL STUDIES CENTER

1801 East Cotati Avenue
Rohnert Park, CA 94928-3609

707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

Michael Fitzgerral
Chairperson
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr.Fitzgerral,

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Kate Green, M.A., RPA
Staff Archaeologist

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ANTHROPOLOGICAL STUDIES CENTER
1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

Elizabeth Hansen
Chairperson
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Hansen,

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Staff Archaeologist

SONOMA STATE UNIVERSITY
ANTHROPOLOGICAL STUDIES CENTER
1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

Dina Bowen-Welsh
Secretary
She Bel Na Band of Pomo Indians
P.O. Box 1613
Fort Bragg, CA 95437

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Secretary Bowen-Welsh,

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Regards,

Kate Green, M.A., RPA
Staff Archaeologist

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1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
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Dave Edmunds
Environmental Director
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Edmunds

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Talisha Melluish
Cultural Resource Specialist
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Melluish,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Steve Nevarez Jr.
Environmental Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Nevarez,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Shawn Padi
Chairperson
Hopland Band of Pomo Indians
3000 Shanel Road\98
Hopland, CA 95449

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Padi,

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Nelson Pinola
Chairperson
Manchester-Point Arena Rancheria
P.O. Box 623
Point Arena, CA 95468

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Pinola,

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Nina Hapner
Environmental Planning Department
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Hapner,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Angela James
Tribal Historic Preservation Officer
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. James,

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Leona Williams
Chairperson
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Williams,

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Atta P. Stevenson
Cultural Resources
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1404
Laytonville, CA 95454

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Stevenson,

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Emilio Valencia
Tribal Chairman
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

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Erika Williams
Section 106 Coordinator
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

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Kenneth Wright
President
Round Valley Reservation/
Covelo Indian Community
77826 Covelo Road
Covelo, CA 95428

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear President Wright,

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Yokayo Tribe
Chairperson
P.O. Box 362
Talmage, CA 95481

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

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Greg Young
Environmental Coordinator
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Young,

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Zhoa Qui
Cultural Resources Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Coordinator Qui,

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Hillary Renick
Tribal Historic Preservation Officer
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Renick,

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Salvador Rosales
Chairperson
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Rosales,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

After my initial contact back in January 2013, I conducted a survey of the project location on 15 March 2013. No archaeological or cultural resources were observed at that time. I am including a copy of our draft Archaeological Survey Report for the project and would appreciate any comments you may have regarding the project. I will follow up with a phone call in the following weeks to confirm your receipt of the report.

If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Regards,

Kate Green, M.A., RPA
Staff Archaeologist

SONOMA STATE UNIVERSITY
ANTHROPOLOGICAL STUDIES CENTER
1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

Merlene Sanchez
Chairperson
Guidiville Band of Pomo Indians
P.O. Box 339
Talmage, CA 95481

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Sanchez,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

After my initial contact back in January 2013, I conducted a survey of the project location on 15 March 2013. No archaeological or cultural resources were observed at that time. I am including a copy of our draft Archaeological Survey Report for the project and would appreciate any comments you may have regarding the project. I will follow up with a phone call in the following weeks to confirm your receipt of the report.

If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Regards,

Kate Green, M.A., RPA
Staff Archaeologist

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1801 East Cotati Avenue
Rohnert Park, CA 94928-3609
707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

Richard Smith
Chairperson
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1239
300 Cahto Drive
Laytonville, CA 95454

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Smith,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

After my initial contact back in January 2013, I conducted a survey of the project location on 15 March 2013. No archaeological or cultural resources were observed at that time. I am including a copy of our draft Archaeological Survey Report for the project and would appreciate any comments you may have regarding the project. I will follow up with a phone call in the following weeks to confirm your receipt of the report.

If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Regards,

Kate Green, M.A., RPA
Staff Archaeologist

U.S. HIGHWAY 101

TALMAGE ROAD INTERCHANGE PROJECT

HISTORICAL RESOURCES COMPLIANCE REPORT

01-MEN-101,
P.M. 23.44

ANTHROPOLOGICAL STUDIES CENTER
Sonoma State University
Rohnert Park, California

September 2013
Revised December 2013

HISTORICAL RESOURCES COMPLIANCE REPORT

1. PROJECT / ACTIVITY DESCRIPTION AND LOCATION

District	County	Route	Post Miles	Unit	E-FIS Project Number	Phase
01	MEN	101	23.44			

Project Description:

(*Insert project description here; refer reader to location and vicinity maps in HRCR)*

The proposed project consists of improvements to the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of existing southbound off-ramp, widening and realignment of the southbound on-ramp, and a new southbound off-ramp loop with terminus at a new signalized intersection at Talmage Road. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

The project is located on the western side of U.S. 101 southbound on-ramp/off-ramp and Talmage Road in Ukiah, Mendocino County, California. The project footprint is within an unsectioned portion of the Yokaya land grant in Township 15 North and Range 12 West, as depicted on the USGS 7.5-minute Ukiah, California quadrangle (See Map 1, 2, and 4 for project location and footprint).

2. PROJECT AREA LIMITS

The Project Area limits for the project were established in consultation with Tim Keefe, Associate Environmental Planner, Archaeology, PQS7PI – Prehistoric Archaeology District 1, Erick Wulf, Associate Environmental Planner, Archaeology, PQS Co-PI Prehistoric Archaeology District 3, and Tim Eriksen, Director of Public Works. The Project Area limits maps are located in Attachment A in this Historical Resources Compliance Report (HRCR).

The Project Area limits were established as where ground disturbance will occur. The project footprint consists of a 10-acre area surrounding the existing southbound off-ramp of U.S. 101 at Talmage Road, continuing southwest along Talmage Road to the intersection of Airport Park Boulevard on both the north and south side of the road; it continues south around the proposed circular southbound off-ramp and southbound on-ramp and is bounded by U.S. 101 on the east. The vertical extent of the project will be 3 ft. below surface.

3. CONSULTING PARTIES / PUBLIC PARTICIPATION

(For the following, check the appropriate line, list names, dates, and locations and results of contacts, as appropriate. List organizations/persons contacted and attach correspondence and summarize verbal comments received as appropriate. ***This instruction line and inapplicable lines may be deleted****)*

_ Local Government *(Head of local government, Preservation Office / Planning Department)*

-

X Native American Tribes, Groups and Individuals

- A response from Otis Parrish of the Kashia Tribe was received on 23 January 2013 stating that the project footprint is out of their aboriginal territory (See Attachment C).
- A response from Gregg Young of the Potter Valley Tribe was received on 18 January stating that no known resources significant to the tribe were known in the project vicinity. The tribe wishes to be notified of any sites or material are discovered during the project (See Attachment C).

X Native American Heritage Commission

(For the following, check the appropriate line, list names, dates, and locations and results of contacts, as appropriate. List organizations/persons contacted and attach correspondence and summarize verbal comments received as appropriate. ***This instruction line and inapplicable lines may be deleted****)*

- On 18 December 2012 a letter was sent to the Native American Heritage Commission (NAHC) requesting a search of their files to check if any sacred lands or Native American Heritage sites are known to exist within or adjacent to the project area. A letter response was received on 11 January 2013, stating that a record search of the sacred lands file had failed to indicate the presence of Native American cultural resources within or adjacent to the project area. A Native American contact list was enclosed providing the names and addresses of the tribal communities and/or individuals to contact regarding the proposed project (See Attachment B).
- On 15 January 2013, a letter was sent to each individual on the NAHC contact list. The letters provided a description and map of the project location. Two responses have been received as of the report date. See Native American Consultation and Museum correspondence (Attachment B) for responses.
- On 7 November 2013, copies of the ASR were sent to each tribal group on the NAHC contact list and follow up calls were made on 26 November 2013. A table summarizing contact can be found in Attachment B.

_ Local Historical Society / Historic Preservation Group *(also if applicable, city archives, etc.)*

- On 18 December 2012, the Grace Hudson Museum, Ukiah was contacted for information regarding historic-era occupation within the APE. No response to date.

4. SUMMARY OF IDENTIFICATION EFFORTS

X	National Register of Historic Places	Month & Year: 1979-2002 & supplements
X	California Register of Historical Resources	Year: 1992 & supplemental information to date
X	California Inventory of Historic Resources	Year: 1976
X	California Historical Landmarks	Year: 1995 & supplemental information to date
X	California Points of Historical Interest	Year: 1992 & supplemental information to date
X	State Historic Resources Commission	Year: 1980-present, minutes from quarterly meetings
X	Caltrans Historic Highway Bridge Inventory	Year: 2006 & supplemental information to date

X Archaeological Site Records [*List names of Institutions & date below*]

- Northwest Information Center of the California Historical Resource Information System record search conducted on 21 December 2012 by Kyle Rabellino of the ASC. See below.

X Other sources consulted *[e.g., historical societies, city archives, etc. List names and dates below]*

- Anthropological Studies Center files and literature.

X Results: *(provide a brief summary of records search and research results, as well as inventory findings)*

- Research at the NWIC revealed that no archaeological resources were identified within or adjacent to APE. Three prior cultural resource studies have been conducted adjacent to the project footprint, all were negative for cultural resources (Olsen 20091a, 2009b, Origer 1991, Wills 2009). Four studies have been conducted within a 1/2-mile radius of the project footprint, one of which resulted in the recording of a section of the Northwest Pacific Railroad (P-23-003663) 0.17 mile west of the APE (Jones & Stokes 2000, Nelson 2000). The remaining three studies were negative for cultural resources (Flaherty 1992a, 1992b, 1992c).
- The Caltrans Historic Highway Bridge Inventory list was consulted. The Route 222 overpass bridge lies within the project area (Bridge No. 10 0189). It was built in 1964 and listed as ineligible to the National Register. Just beyond the project footprint, the Doolin Creek crossings (Bridge No. 10 0190L and 10 0190R) built in 1964 are also listed as ineligible and require no further management.
- No archaeological resources were identified as a result of the pedestrian survey conducted on 15 March 2013 (See Attachment A, Map 3 for survey coverage).

5. EXEMPT FROM EVALUATION / NO CEQA HISTORICAL RESOURCES IDENTIFIED

*(Check all that apply. **This instruction line and findings that are not applicable may be deleted.**)*

X There are **no cultural resources** in the Project Area limits.

X Bridges listed as Category 5 in the Caltrans Historic Highway Bridge Inventory & updates and are not locally designated or otherwise identified as significant in a local survey meeting SHPO standards. Appropriate pages from the Caltrans Historic Bridge Inventory are attached

6. CEQA HISTORICAL RESOURCES IDENTIFIED

*(Check the appropriate category, list resources, or refer reader to appropriate technical study attached, according to their National Register or CEQA status. Provide, as appropriate, complete address, period and level of significance, criteria, map reference, and any existing state or local designation, including date; **identify State-owned resources as such**. Do not include resources that are not within the Project Area limits. Attach previous SHPO determinations, as applicable. **This instruction line and findings that are not applicable may be deleted.**)*

X Not applicable.

7. CEQA IMPACT FINDINGS

*(Check all that apply. Do not transmit to SHPO unless there are State-owned resources within the Project Area limits; file copy to CSO. **This instruction line and findings that are not applicable may be deleted.**)*

X Not applicable; Caltrans is not the lead agency under CEQA.

8. MITIGATION PLAN

*(List the impacted historical resource and describe its mitigation plan below or indicate below the title of the HRCR attachment that contains the description. Archaeological sites: summarize proposed data recovery. For mitigation plans that are not complete, describe the range of suitable mitigation options. **This instruction line and findings that are not applicable may be deleted**)*

X Not applicable.

9. STATE-OWNED HISTORICAL RESOURCES FINDINGS

*(Check all that apply. Copy to CSO. Transmit to SHPO if State-owned resources were evaluated or there are State-owned historical resources within the Project Area limits. **This instruction line and findings that are not applicable may be deleted.**)*

X Caltrans has evaluated and determined that the following **State-owned buildings and structures** within the project Area Limits **do NOT meet National Register and/or California Historical Landmark** eligibility criteria; and is providing notice and summary to, and seeks comments from, SHPO pursuant to PRC §5024(b).

- Bridge No. 10-0190K
- Bridge No. 10-0190L
- Bridge No. 10-0190R

10. List of Attached Documentation

(Provide the author/date and peer reviewer/date of the technical report. ***This instruction line and documentation that is not applicable may be deleted.****)*

X Project Vicinity, Location, and Project Area Limits Maps (Attachment A: Maps 1, 2, 3, and 4)
X California Historic Bridge Inventory sheet (Attachment D)
X Archaeological Survey Report (ASR)

- An Archaeological Survey for the Talmage Road Interchange Project, Ukiah, Mendocino County, California. Anthropological Studies Center, Rohnert Park, California. 2013. Kate Erickson Green (Attachment C)

X Other *(Specify below)*

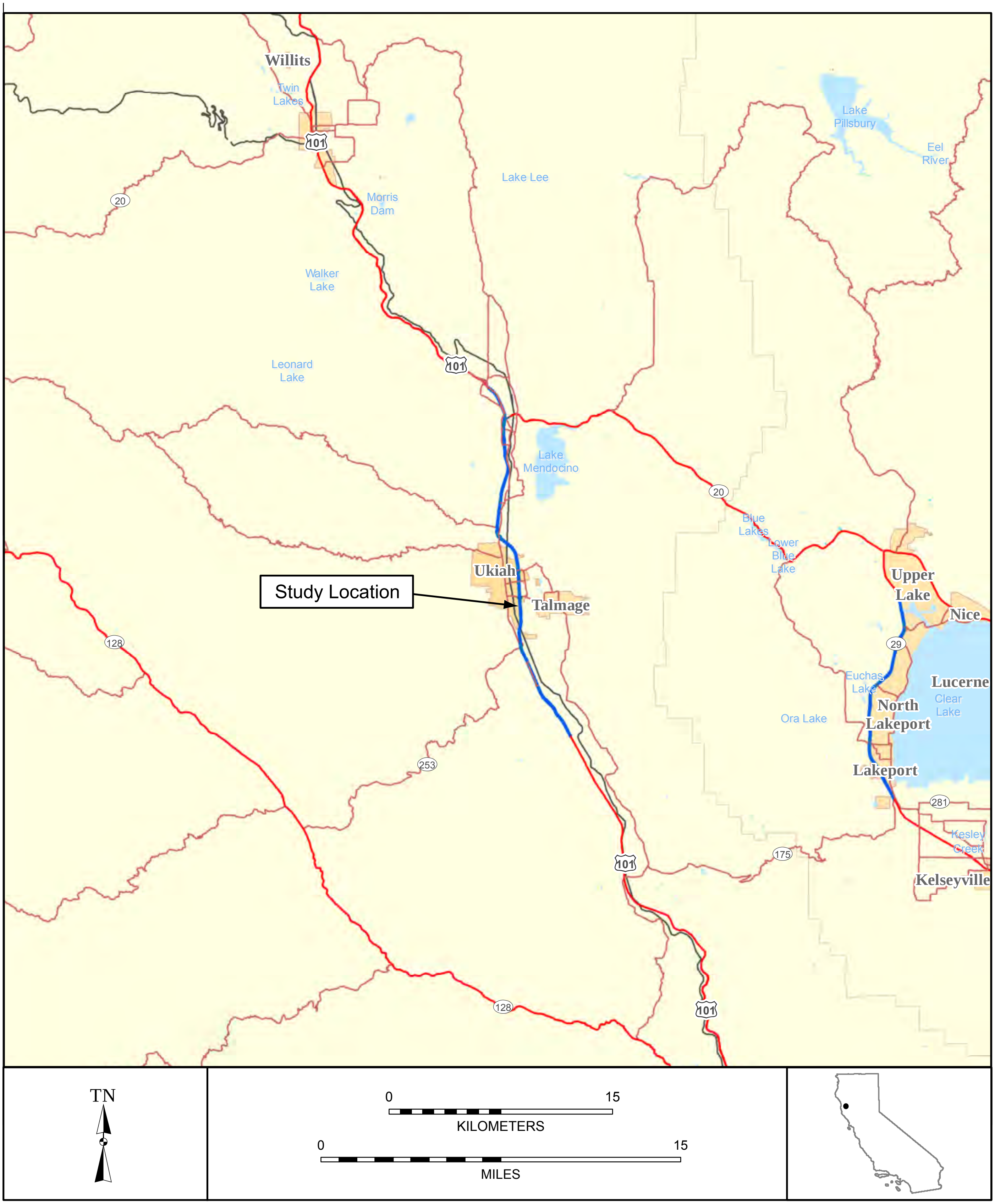
- Native American Consultation and Museum correspondence (Attachment B)

11. HRCR Preparation and Caltrans Approval

Prepared by *(sign on line)*:		
District ___ Caltrans PQS:	[Name] [PQS level and discipline]	Date
Prepared by: *(sign on line)*	Kate Eh	12/5/2013
Consultant / discipline:	Kate Erickson Green, M.A. Archaeologist	Date
Affiliation	Anthropological Studies Center, Sonoma State University Rohnert Park, CA	
Reviewed for approval by: *(sign on line)*		
District ___ Caltrans PQS discipline/level:	[Name] [PQS certification level]	Date
Approved by: *(sign on line)*		
District___ EBC:	[Name] [Environmental Branch name]	Date

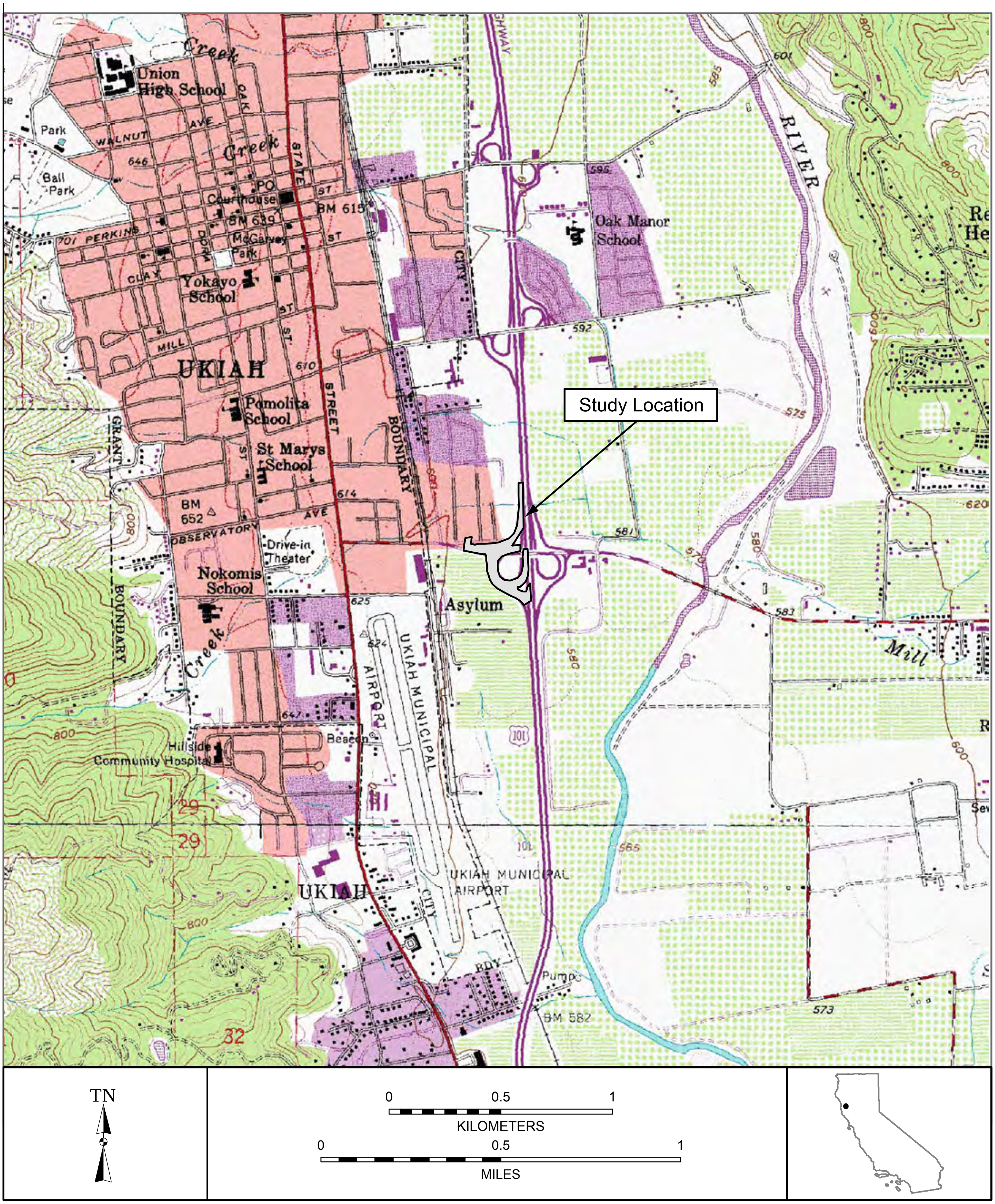
Attachment A : Maps

Map 1. Study Vicinity
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County



Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

Map 2. Study Location
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County

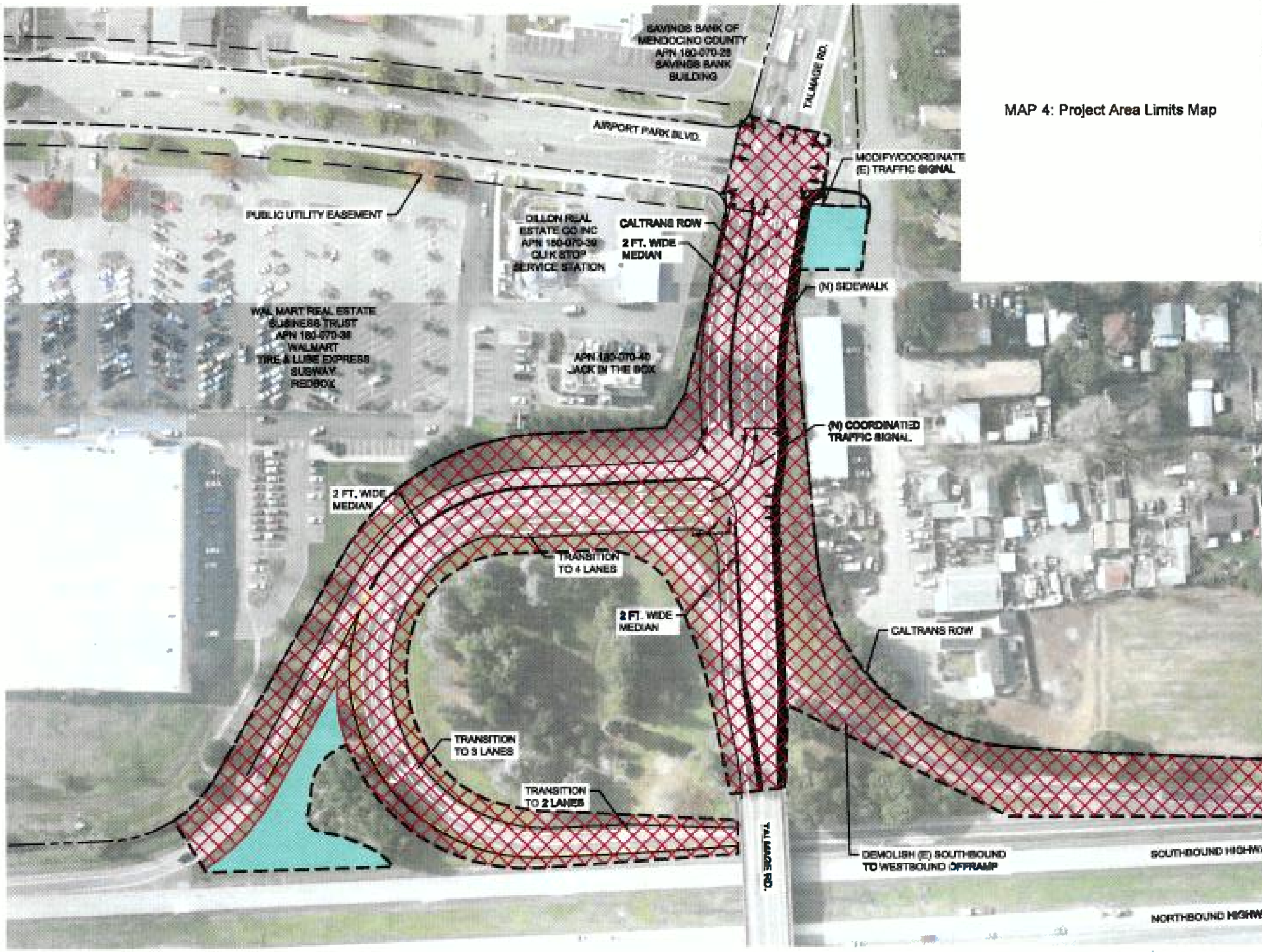


Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

Map 3. Survey Coverage Map
Talmage Road/US 101 Interchange Improvement Project
City of Ukiah, Mendocino County

Base map: USGS Ukiah, Calif. 7.5 min. ; 1958 (pr 1975)

MAP 4: Project Area Limits Map



LEGEND

- AREA OF PERMANENT IMPACT
- POTENTIAL STAGING AREA
- APPROXIMATE RIGHT OF WAY
- ARCHAEOLOGICAL AND ARCHITECTURAL PROJECT AREA LIMITS

TALMAGE ROAD / US 101 SOUTHBOUND INTERCHANGE IMPROVEMENT PROJECT

CITY OF UKIAH, MENDOCINO COUNTY, CA

PROJECT AREA LIMITS MAP

Erick Wulf 9/10/13

ERICK WULF — DATE
ASSOCIATE ENVIRONMENTAL PLANNER, ARCHAEOLOGY
PQS Co PI - PREHISTORIC ARCHAEOLOGY
ENVIRONMENTAL BRANCH, CALTRANS DISTRICT 3

SUZANNE THEISS — DATE
LOCAL ASSISTANT ENGINEER
OFFICE OF LOCAL ASSISTANCE, CALTRANS DISTRICT 1

TIM ERIKSEN — DATE
DIRECTOR OF PUBLIC WORKS
CITY OF UKIAH

0 60 120
1" = 60'

GHD
CLIENTS | PEOPLE | PERFORMANCE

City of Ukiah
Talmage Road / US 101 Southbound Interchange Improvement Project

MAP 4: Project Area Limits Map

Job Number	02502.10001
Revision	A
Date	Dec 2012

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Plot Date: 26 December 2012 - 10:36 AM Cad File No: G:\02502 - City of Ukiah\02502-8410035 Talmage Interchange\05-CAD\Figures\Talmage Interchange APE Mapping

Attachment B: Communications

18 December 2012

Grace Hudson Museum
431 South Main Street
Ukiah, CA 95482

Dear Grace Hudson Museum,

The Anthropological Studies Center (ASC) is conducting an archaeological study of approximately 15 acres of Caltrans Right-of-Way located on the west side of the Highway 101 on- and off-ramp at Talmage Road in southern Ukiah, CA (see attached map). This study is being conducted to address a project to improve the Talmage Road westbound interchange. The ASC's study is to determine whether cultural resources are present in the area of potential effects (APE) and whether any resources identified will be affected by the project.

We would appreciate being informed of any information or concerns that your organization may have in regards to historic-era sites within the area of potential affects. This is not, however, a request for you organization to conduct any additional research. If you have concerns, or questions, please contact us at the address above or via the email or phone number below. Thank you.

Sincerely,

Kate Erickson Green
Staff Archaeologist

kate.green@sonoma.edu
707-664-2878

ANTHROPOLOGICAL STUDIES CENTER
Sonoma State University
1801 East Cotati Avenue, Building 29
Rohnert Park, CA 94928

FAX TRANSMITTAL FORM

To: Native American Heritage Commission

Date: 18 December 2012

Fax No.:916.657.5390
Phone No.: 916.653.4082

Total Number of Pages: 2
(including cover page)

From: Kate Green
Fax No.: (707)664-4155
Phone No.: (707)664-2381
E-mail: asc@sonoma.edu

Re: Talmage Road Interchange Project

COMMENTS

Please review the sacred lands files for any Native American cultural resources that may be within or adjacent to the project area depicted on the accompanying map. The project area, near Ukiah, Mendocino County, lies within an unsectioned portion of the Yokaya Land Grant within Township 15 North and Township 12 West, as depicted on the Ukiah, Calif. 7.5' topographic map. The project area encompasses the Highway 101 and Talmage Road west on and off ramps near the intersection of Airport Park Boulevard. The study is being prepared for proposed improvementsto the Talmage Road interchange. We also request a list of Native American individuals /organizations who may have knowledge of cultural resources in the project area. Please call if you have any questions.

Thank you for your assistance.

ASC Web Site: http://www.sonoma.edu/projects/asc/

Please call as soon as possible if there are any transmission problems: (707)664-2381

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390

January 11, 2013

Kate Green
Sonoma State University
Anthropological Studies Center
1801 E. Cotati Ave., Bldg. 29
Rohnert Park, CA 94928

Sent by Fax: 707-664-4155

Number of 4

Re: Talmage Road Interchange Project, Mendocino County

Dear Ms. Green:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Katy Sanchez for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Mendocino County
January 4, 2013

Coyote Valley Band of Pomo Indians
John Feliz Jr.,Chairperson
P.O. Box 39/ 7901 Hwy 10, Pomo
Redwood Valley , CA 95470
johnfeliz21@aol.com
(707) 485-8723
(707) 485-1247 Fax

Guidiville Band of Pomo Indians
Merlene Sanchez, Chairperson
P.O. Box 339 Pomo
Talmage , CA 95481
admin@guidiville@.net
(707) 462-3682
(707) 462-9183 - Fax

Hopland Band of Pomo Indians
Shawn Padi, Chairperson
3000 Shanel Road \ 98 Shokowa
Hopland , CA 95449 Sokow
spadi@hoplandtribe.com Shanel
(707) 472-2100, Ext 1405 Pomo

(707) 744-1506 - Fax

Laytonville Rancheria/Cahto Indian Tribe
Rochard Smith, Chairperson
P.O. Box 1239 Cahto
Laytonville , CA 95454 Kato
Chairwoman @cahto.org Pomo
(707) 984-6197
(707) 984-6201 Fax

Laytonville Rancheria/Cahto Indian Tribe
Atta P. Stevenson, Cultural Resources
P.O. Box 1404 Cahto
Laytonville , CA 95454 Kato
wtalker101@yahoo.com Pomo
707-841-0058

Manchester-Point Arena Rancheria
Nelson Pinola, Chairperson
P.O. Box 623 Pomo
Point Arena , CA 95468t
manptarena@hughes.net
(707) 882-2788
(707) 882-3417 Fax

Pinoleville Pomo Nation
Leona Willams, Chairperson
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
tcouncil@pinoleville-nsn.gov
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Angela James, THPO
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Dave Edmunds, Environmental Director
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

Pinoleville Pomo Nation
Erika Williams, Section 106 Coordinator
500 B Pinoleville Drive Pomo
Ukiah , CA 95482
david.s.edmonds@gmail.com
(707) 463-1454
(707) 463-6601 FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Native American Contacts
Mendocino County
January 4, 2013

Potter Valley Tribe
Greg Young, Environmental Coordinator
2251 South State Street — Pomo
Ukiah, CA 95482
(707) 462-1213
(707) 462-1240 FAX

Potter Valley Tribe
Salvador Rosales, Chairperson
2251 South State Street — Pomo
Ukiah, CA 95482
pottervalleytribe@comcast.net
(707) 462-1213
(707) 462-1240 - Fax

Redwood Valley Rancheria of Pomo
Elizabeth Hansen, Chairperson
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
(707) 485-5726 - Fax

Redwood Valley Rancheria of Pomo
Zhao Qui, Cultural Resources Coordinator
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
Fax:(707) 485-5726

Redwood Valley Rancheria of Pomo
Steve Nevarez Jr., Environmental Coordinator
3250 Road I — Pomo
Redwood, CA 95470
redwoodres@pacific.net
(707)485-0361
Fax:(707) 485-5726

Round Valley Reservation/Covelo Indian Community
Kenneth Wright, President
77826 Covelo Road — Yuki ; Nomlaki
Covelo, CA 95428 — Pit River
(707) 983-6126 — Pomo
(707) 983-6128 - Fax — Concow
Wailaki; Wintun

She Bel Na Band of Pomo Indians
Dina Bowen-Welsh, Secretary
PO Box 1613 — Pomo
Fort Bragg, CA 95437
707-964-8126

Sherwood Valley Rancheria of Pomo
Michael Fitzgerral, Chairperson
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
svradministrator@sbcglobal.net
(707) 459-9690
(707) 459-6936 - Fax

Sherwood Valley Rancheria of Pomo
Talisha Melluish, Cultural Resource Specialist
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
(707) 459-9690
(707) 459-6936 - Fax

Sherwood Valley Rancheria of Pomo
Hillary Renick, THPO
190 Sherwood Hill Drive — Pomo
Willits, CA 95490
(707) 459-9690
(707) 459-6936 - Fax

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This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Native American Contacts
Mendocino County
January 4, 2013

Stewarts Point Rancheria
Emilio Valencia, Chairperson
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
Emilio@stewartspoint.com

(707) 591-0580-voice
(707) 591-0583 - Fax

Stewarts Point Rancheria
Nina Hapner, Environmental Planning Department
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
nina@stewartspoint.org
(707) 591-0580 ext107
(707) 591-0583 FAX

Stewarts Point Rancheria THPO
Otis Parish, Tribal Historic Preservation Officer
1420 Guerneville Road, Ste 1 Pomo
Santa Rosa , CA 95403
Otis@stewartspoint.org
(707) 591-0580 EXT 105
(707) 591-0583 FAX

Yokayo Tribe
Chairperson
P.O. Box 362 Pomo
Talmadge , CA 95481

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Talmage Road Interchange project, Mendocino County

Tribal Contact Log

Tribal Group	Individual	Tribal Affiliation	1st Contact	Response notes	2nd Contact	Response Notes	3rd Contact	Response Notes
Coyote Valley Band of Pomo Indians	John Feliz Jr.	Pomo	1/15/2013		11/7/2013		11/25/2013	no longer at tribe
Guideville Band of Pomo Indians	Merlene Sanchez	Pomo	1/15/2013		11/7/2013		11/26/2013	no answer, no message service
Hopland Band of Pomo Indians	Shawn Padi	Shokowa, Sokow, Shanel, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Laytonville Rancheria/Cahto Indian Tribe	Richard Smith	Cahto, Kato, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Laytonville Rancheria/Cahto Indian Tribe	Atta P. Stevenson	Cahto, Kato, Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Manchester-Point Arena Rancheria	Nelson Pinola	Pomo	1/15/2013		11/7/2013		11/26/2013	individual no longer in position, no interest in project, too far from tribal territory
Pinoleville Pomo Nation	Ericka Williams	Pomo	1/15/2013		11/7/2013		11/26/2013	individual no longer in position, spoke to Erica Carson Jr., new cultural department, received letter by email 11/26/2013 stating no interest in the project location
Pinoleville Pomo Nation	Leona Williams	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Pinoleville Pomo Nation	Angela James	Pomo	1/15/2013		11/7/2013		11/26/2013	see above

Tribal Contact Log

Pinoleville Pomo Nation	Dave Edmunds	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Potter Valley Tribe	Gregg Young	Pomo	1/15/2013	letter received 1/18/2013 asking for tribe to be notified in the event of discovery of archaeological remains	11/7/2013		11/26/2013	message left on voicemail
Potter Valley Tribe	Salvador Rosales	Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail
Redwood Valley Rancheria of Pomo	Zhao Qui	Pomo	1/15/2013		11/7/2013		11/26/2013	report sent to tribal EPA department for review, requested to be called back in a week, all communication should be through her. 12/6/2013 called and left message
Redwood Valley Rancheria of Pomo	Elizabeth Hansen	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Redwood Valley Rancheria of Pomo	Steve Nevarez	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Round Valley Reservation/Covelo Indian Community	Kenneth Wright	Yuki, Nomlaki, Pit River, Pomo Concow, Wailaki, Wintun	1/15/2013		11/7/2013		11/26/2013	message left on voicemail

Tribal Contact Log

She Bel Na Band of Pomo Indians	Dina Bowen-Welsh	Pomo	1/15/2013		11/7/2013	report returned to sender	11/26/2013	message left on voicemail
Sherwood Valley Rancheria of Pomo	Talisha Melluish	Pomo	1/15/2013		11/7/2013		11/26/2013	message left on voicemail, confirmed with reception that calls should be through Talisha
Sherwood Valley Rancheria of Pomo	Hillary Renick	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Sherwood Valley Rancheria of Pomo	Michael Fitzgerral	Pomo	1/15/2013		11/7/2013		11/26/2013	see above
Stewarts Point Rancheria	Otis Parish	Pomo	1/15/2013	letter received by email 1/23/2013 stating no interest in project due to distance from tribal territory, no further contact needed				
Stewarts Point Rancheria	Emilio Valencia	Pomo	1/15/2013	see above				
Stewarts Point Rancheria	Nina Hapner	Pomo	1/15/2013	see above				
Yokayo Tribe		Pomo	1/15/2013		11/7/2013		11/26/2013	no phone number listed

15 January 2013

Dina Bowen-Welsh
Secretary
She Bel Na Band of Pomo Indians
P.O. Box 1613
Fort Bragg, CA 95437

Dear Ms. Bowen-Welsh,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

We would appreciate being informed of any information or concerns that your organization may have in regards to cultural resources within the project area. If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Yokayo Tribe
Chairperson
P.O. Box 362
Talmage, CA 95481

Dear Chairperson,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Erika Williams
Section 106 Coordinator
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. Williams,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Dave Edmunds
Environmental Director
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Mr. Edmunds,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

John Feliz Jr.
Chairperson
Coyote Valley Band of Pomo Indians
P.O. Box 39/7901 Hwy 10
Redwood Valley, CA 95470

Dear Mr. Feliz,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Michael Fitzgerral
Chairperson
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Mr. Fitzgerral,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Elizabeth Hansen
Chairperson
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Ms. Hansen,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Nina Hapner
Environmental Planning Department
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Ms. Hapner,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Angela James
Tribal Historic Preservation Officer
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. James,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Talisha Melluish
Cultural Resource Specialist
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Ms. Melluish

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Steve Nevarez Jr.
Environmental Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Mr. Nevarez,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Shawn Padi
Chairperson
Hopland Band of Pomo Indians
3000 Shanel Road\98
Hopland, CA 95449

Dear Mr. Padi,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Otis Parish
Tribal Historic Preservation Officer
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Mr. Parish,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Nelson Pinola
Chairperson
Manchester-Point Arena Rancheria
P.O. Box 623
Point Arena, CA 95468

Dear Mr. Pinola,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Zhao Qui
Cultural Resources Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

Dear Ms. Qui,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Hillary Renick
Tribal Historic Preservation Officer
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

Dear Ms. Renick,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Salvador Rosales
Chairperson
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

Dear Mr. Rosales,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Merlene Sanchez
Chairperson
Guidiville Band of Pomo Indians
P.O. Box 339
Talmage, CA 95481

Dear Ms. Sanchez,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Richard Smith
Chairperson
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1239
300 Cahto Drive
Laytonville, CA 95454

Dear Mr. Smith,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Atta P. Stevenson
Cultural Resources
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1404
Laytonville, CA 95454

Dear Ms. Stevenson,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Emilio Valencia
Chairperson
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Dear Mr. Valencia,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

We would appreciate being informed of any information or concerns that your organization may have in regards to cultural resources within the project area. If you have concerns, or questions, please do not hesitate to give me a call at (707) 664-2381 or contact me via email at kate.green@sonoma.edu. If you prefer, please write us at the address above. We look forward to hearing from you. Thank you.

Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Leona Williams
Chairperson
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

Dear Ms. Williams,

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Kenneth Wright
President
Round Valley Reservation/
Covelo Indian Community
77826 Covelo Road
Covelo, CA 95428

Dear Mr. Wright,

The Anthropological Studies Center (ASC) is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County, as depicted on the 7.5-minute *Ukiah, California* topographic map (attached). The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

15 January 2013

Greg Young
Environmental Coordinator
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

Dear Mr. Young,

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Sincerely,

Kate Erickson Green, M.A.
Staff Archaeologist

Email 1/23/2013 9:09 a.m.

Dear Kate,

This is Otis Parrish here. I am the new and present THPO Officer for the Kashia Tribe. I have received your letter for consultation regarding the proposed project to improve the Talmage Road and U.S. 101 southbound on-and off-ramps Modifications.

The Kashia Tribe has no interest in any work being done outside of our aboriginal territory which is situated in Northwestern area of Sonoma County.

Thank your for your request for our consultation

Otis Parrish M.A.

Cultural and Historic Preservation Officer

THPO.

POTTER VALLEY TRIBE

2251 S. State St. ● Ukiah, California 95482 ● (707) 462-1213 ● Fax (707) 462-1240 ● E-mail: pottervalleytribe@pottervalleytribe.com

Chairperson	*Secretary*	*Treasurer*	*Member-At-Large & Appointed Spokesperson*
Salvador Rosales	***Rosemary Rosales***	***Losario Rosales***	***Norma Rosales***

Tribal Environmental Office pvtepadirector@ pottervalleytribe.com

Date: 1/18/2013
To: Kate Erickson Green, M.A.
Fax/Email: Kate.green@sonoma.edu
Regarding Project: Cultural resources survey of Talmage road interchange
Project ID: Ukiah, Mendocino County, CA

As far as we are able to determine, the area described has no known archaeological or cultural sites of the Potter Valley Tribe. The Potter Valley Tribe moved around Mendocino County, and may have established seasonal camps or villages between the coast and inland areas. We recognize that all of Mendocino County is culturally and archaeologically sensitive, and many such sites exist and may be undiscovered at this time.

Please notify the Tribe immediately if any sites or articles of historical or archaeological nature are discovered during this project, pursuant to the National Historic Preservation Act.

There is the possibility that Native Americans currently utilize this site for the gathering of plant or animal materials for food, basketry, herbal, or ceremonial use. The use of pesticides in such areas could jeopardize the health of anyone entering, or using materials gathered from, areas with access for gathering. We request prior notification of pesticide use at this site so we can inform our Tribal members to avoid such areas and unnecessary exposure.

We would also like to be able to provide future generations of Native Americans access to artifacts and other cultural resources of the Tribe. We would ask that landowners consider donating cultural resources discovered during projects to the Potter Valley Tribe or other tribes when projects occur in their ancestral territories.

Sincerely,

Gregg Young, M.A.
Environmental Director

SONOMA STATE UNIVERSITY

ANTHROPOLOGICAL STUDIES CENTER

1801 East Cotati Avenue
Rohnert Park, CA 94928-3609

707.664.2381 • fax 707.664.4155
www.sonoma.edu/asc

John Feliz Jr.
Chairperson
Coyote Valley Band of Pomo Indians
P.O. Box 39/7901 Hwy 10
Redwood Valley, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Feliz,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

After my initial contact back in January 2013, I conducted a survey of the project location on 15 March 2013. No archaeological or cultural resources were observed at that time. I am including a copy of our draft Archaeological Survey Report for the project and would appreciate any comments you may have regarding the project. I will follow up with a phone call in the following weeks to confirm your receipt of the report.

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Regards,

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Staff Archaeologist

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Michael Fitzgerral
Chairperson
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr.Fitzgerral,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Elizabeth Hansen
Chairperson
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Hansen,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Staff Archaeologist

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Dina Bowen-Welsh
Secretary
She Bel Na Band of Pomo Indians
P.O. Box 1613
Fort Bragg, CA 95437

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Secretary Bowen-Welsh,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Dave Edmunds
Environmental Director
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Edmunds

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Staff Archaeologist

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Talisha Melluish
Cultural Resource Specialist
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Melluish,

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Steve Nevarez Jr.
Environmental Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Nevarez,

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Shawn Padi
Chairperson
Hopland Band of Pomo Indians
3000 Shanel Road\98
Hopland, CA 95449

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Padi,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Nelson Pinola
Chairperson
Manchester-Point Arena Rancheria
P.O. Box 623
Point Arena, CA 95468

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Pinola,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Nina Hapner
Environmental Planning Department
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Hapner,

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Angela James
Tribal Historic Preservation Officer
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. James,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Leona Williams
Chairperson
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Williams,

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Atta P. Stevenson
Cultural Resources
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1404
Laytonville, CA 95454

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Stevenson,

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Regards,

Kate Green, M.A., RPA
Staff Archaeologist

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Rohnert Park, CA 94928-3609
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Emilio Valencia
Tribal Chairman
Stewarts Point Rancheria
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairman Valencia,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Erika Williams
Section 106 Coordinator
Pinoleville Pomo Nation
500 B Pinoleville Drive
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Williams

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Kenneth Wright
President
Round Valley Reservation/
Covelo Indian Community
77826 Covelo Road
Covelo, CA 95428

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear President Wright,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Staff Archaeologist

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Yokayo Tribe
Chairperson
P.O. Box 362
Talmage, CA 95481

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Staff Archaeologist

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Greg Young
Environmental Coordinator
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Mr. Young,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Zhoa Qui
Cultural Resources Coordinator
Redwood Valley Rancheria of Pomo Indians
3250 Road I
Redwood, CA 95470

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Coordinator Qui,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Hillary Renick
Tribal Historic Preservation Officer
Sherwood Valley Rancheria of Pomo Indians
190 Sherwood Hill Drive
Willits, CA 95490

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Ms. Renick,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Salvador Rosales
Chairperson
Potter Valley Tribe
2251 South State Street
Ukiah, CA 95482

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Rosales,

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Merlene Sanchez
Chairperson
Guidiville Band of Pomo Indians
P.O. Box 339
Talmage, CA 95481

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Sanchez,

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Richard Smith
Chairperson
Laytonville Rancheria/Cahto Indian Tribe
P.O. Box 1239
300 Cahto Drive
Laytonville, CA 95454

7 November 2013

Re: Talmage Road and U.S. 101 southbound intersection improvements

Dear Chairperson Smith,

The Anthropological Studies Center (ASC) on behalf of the City of Ukiah, is conducting a study of the intersection of Talmage Road and southbound Highway 101 in Ukiah, Mendocino County. The proposed project is to improve the Talmage Road and U.S. 101 southbound on- and off-ramps. Modifications include removal of the west southbound off-ramp, and widening and realignment of the east southbound off-ramp with terminus at a new signalized intersection. In addition to these improvements, Talmage Road would be widened to add a westbound through lane between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp.

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Staff Archaeologist

Attachment D: Caltrans Bridge Inventory Page

District 01

Mendocino County

Bridge Number	Bridge Name	Location	Historical Significance	Year Built	Year Wid/Ext
10 0140	JUAN CREEK	01-MEN-001-82.91	5. Bridge not eligible for NRHP	1961	
10 0141	HARDY CREEK	01-MEN-001-83.78	5. Bridge not eligible for NRHP	1959	
10 0142	SOUTH FORK COTTONEVA CREEK	01-MEN-001-87.82	5. Bridge not eligible for NRHP	1958	
10 0145	GRIZZLY CREEK SEPARATION (ROUTE 101/271 SEP)	01-MEN-101-R87.67	5. Bridge not eligible for NRHP	1967	
10 0146	BIG RIVER	01-MEN-001-50.17	2. Bridge is eligible for NRHP	1961	
10 0147	COTTONEVA CREEK	01-MEN-001-90.6	5. Bridge not eligible for NRHP	1958	
10 0149	SOUTH FORK EEL RIVER	01-MEN-001-104.96	5. Bridge not eligible for NRHP	1944	
10 0150	JACK PETERS CREEK	01-MEN-001-51.87	5. Bridge not eligible for NRHP	1939	
10 0151	RUSSIAN GULCH	01-MEN-001-52.64	2. Bridge is eligible for NRHP	1939	
10 0153	CASPAR CREEK	01-MEN-001-R54.71	5. Bridge not eligible for NRHP	1966	
10 0154	JUG HANDLE CREEK	01-MEN-001-56.73	5. Bridge not eligible for NRHP	1938	1966
10 0158	PUDDING CREEK	01-MEN-001-62.12-FBG	5. Bridge not eligible for NRHP	1959	
10 0160	BAKER CREEK	01-MEN-101-R33.52	5. Bridge not eligible for NRHP	1971	1990
10 0166	BLUE SLIDE GULCH	01-MEN-001-75	5. Bridge not eligible for NRHP	1946	1989
10 0168	CRAWFORD CREEK	01-MEN-101-14.62	5. Bridge not eligible for NRHP	1942	1970
10 0172	CUMMINGS ROAD SEPARATION (ROUTE 101/271 SEP)	01-MEN-101-R84.68	5. Bridge not eligible for NRHP	1967	
10 0175	HARE CREEK (SGT EMIL H EVENSEN MEMORIAL BRIDGE)	01-MEN-001-59.67	5. Bridge not eligible for NRHP	1947	
10 0178	LITTLE RIVER	01-MEN-001-48.05	5. Bridge not eligible for NRHP	1955	
10 0179	ARNOLD BRIDGE & OVERHEAD	01-MEN-101-57.67	5. Bridge not eligible for NRHP	1957	
10 0180	LONG VALLEY CREEK	01-MEN-101-59.9	5. Bridge not eligible for NRHP	1957	
10 0181	GUALALA RIVER	01-MEN-001-.01	5. Bridge not eligible for NRHP	1958	
10 0182	RUSSIAN RIVER BOH	01-MEN-020-33.63	5. Bridge not eligible for NRHP	1958	1991
10 0183	REDWOOD VALLEY UC	01-MEN-020-33.77	5. Bridge not eligible for NRHP	1958	1991
10 0184	EAST FORK RUSSIAN RIVER	01-MEN-020-36.36	5. Bridge not eligible for NRHP	1958	2000
10 0185	TREATMENT PLANT OC	01-MEN-101-R21.8	5. Bridge not eligible for NRHP	1964	
10 0186	ROUTE 253/101 SEPARATION	01-MEN-253-17.16	5. Bridge not eligible for NRHP	1964	
10 0187L	SOUTH UKIAH OH	01-MEN-101-R22.16	5. Bridge not eligible for NRHP	1964	
10 0187R	SOUTH UKIAH OH	01-MEN-101-R22.16	5. Bridge not eligible for NRHP	1964	
10 0188	OAK MANOR SCHOOL POC	01-MEN-101-R24.3-UKI	5. Bridge not eligible for NRHP	1968	
10 0189	ROUTE 222/101 SEPARATION	01-MEN-222-L.5	5. Bridge not eligible for NRHP	1964	
10 0190K	DOOLIN CREEK	01-MEN-101-R23.59	5. Bridge not eligible for NRHP	1964	
10 0190L	DOOLIN CREEK	01-MEN-101-R23.59	5. Bridge not eligible for NRHP	1964	
10 0190R	DOOLIN CREEK	01-MEN-101-R23.59	5. Bridge not eligible for NRHP	1964	
10 0191	GOBBI STREET OC	01-MEN-101-R24.06-UKI	5. Bridge not eligible for NRHP	1964	
10 0192L	GIBSON CREEK	01-MEN-101-R24.32-UKI	5. Bridge not eligible for NRHP	1964	
10 0192R	GIBSON CREEK	01-MEN-101-R24.32-UKI	5. Bridge not eligible for NRHP	1964	
10 0193	EAST PERKINS STREET OC	01-MEN-101-R24.53-UKI	5. Bridge not eligible for NRHP	1964	
10 0194L	ORRS CREEK	01-MEN-101-R25.01-UKI	5. Bridge not eligible for NRHP	1964	
10 0194R	ORRS CREEK	01-MEN-101-R25.01-UKI	5. Bridge not eligible for NRHP	1964	
10 0195L	PRESSWOOD OH	01-MEN-101-R25.72	5. Bridge not eligible for NRHP	1964	
10 0195R	PRESSWOOD OH	01-MEN-101-R25.72	5. Bridge not eligible for NRHP	1964	
10 0196L	NORTH STATE STREET UC	01-MEN-101-R26.16	5. Bridge not eligible for NRHP	1964	
10 0196R	NORTH STATE STREET UC	01-MEN-101-R26.16	5. Bridge not eligible for NRHP	1964	

Appendix E

Traffic Impact Study

Leonard Charles and Associates

Talmage Interchange EIR
Draft Traffic Impact Study

May 2014

TRAFFIC IMPACT STUDY
FOR TALMAGE INTERCHANGE
ENVIRONMENTAL IMPACT REPORT

Project No. 0016240-8410930

Prepared for:
Leonard Charles and Associates
7 Roble Court
San Anselmo, CA 94960

Prepared by:

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. WARGULA
No. C 76103
Exp. 6/30/2014
CIVIL
STATE OF CALIFORNIA

Matthew J. Wargula, PE, LEED AP
Project Engineer

May 29, 2014
Date

Prepared by:

REGISTERED PROFESSIONAL ENGINEER
FRANK W. PENRY
TR 2304
Exp. 6-30-15
TRAFFIC
STATE OF CALIFORNIA

Frank Penry, PE, TE, PTOE
Senior Traffic Engineer

May 29, 2014
Date

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
MATTHEW GLEN KENNEDY
No. TR 2385
Exp. 6/30/2015
TRAFFIC
STATE OF CALIFORNIA

Matthew G. Kennedy, PE, TE
Traffic Engineer

May 29, 2014
Date

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Appendices

1. Introduction

1.1 Background

The City of Ukiah (City) proposes to modify and reconstruct the southbound portion of the U.S. 101 interchange at Talmage Road (State Route 222) in Ukiah, California, to provide additional capacity in order to address future impacts associated with projected growth in the Redwood Business Park and regional growth (project). Projects which are anticipated to contribute to increased traffic volumes on Airport Park Boulevard and Talmage Road are identified in previous environmental documents. The purpose of the project is to alleviate congestion, and improve traffic operations and safety for the southbound on- and off-ramps and the Talmage Road Corridor. The Project includes improvements to the southbound on- and off-ramps to realign them and provide additional lanes and capacity, and improvements to Talmage Road within the State right-of-way in the City of Ukiah. Two interchange alternatives and five intersection alternatives were evaluated, and are described in greater detail later in this technical memorandum. The preferred alternative for the project involves a partial cloverleaf interchange configuration with a new signalized intersection at the southbound ramp terminus with Talmage Road. The new signalized intersection at Talmage Road and the southbound on/off ramps is proposed to be interconnected and coordinated with the existing signalized intersection at Talmage Road and Airport Park Boulevard. Other proposed improvements include new sidewalks, signing and striping, medians, and safety lighting. The project area generally extends from the intersection of Talmage Road and Waugh Lane in the west to the intersection of Talmage Road and Hastings Frontage Road in the east, and from the U.S. 101 southbound off ramp diverge in the north to the U.S. 101 southbound on ramp merge in the south.

The City is in the process of reviewing plans for the continued development of the Redwood Business Park, which includes the proposed construction of a new Costco Wholesale Warehouse and gas station. An *Administrative Draft Environmental Impact Report (DEIR) for the City of Ukiah Costco Wholesale Project* (City of Ukiah, 2013) (Costco DEIR) was completed in August of 2012. The Final EIR was certified in December 2013.

1.2 Purpose

To further refine the proposed Project, and in support of the preparation of an Environmental Impact Report (EIR) for the Project, this Traffic Impact Study (TIS) Report summarizes the results of a traffic impact study for the project.

The preparation of this report and associated traffic and operational analysis was closely coordinated with, reviewed and accepted by the California Department of Transportation (Caltrans) District 1 Traffic Operations and District 3 Design.

This analysis consists of a review of previous studies completed for the Project, development of a traffic model for the Talmage Road corridor and interchange and measuring traffic model outputs against operational measures of effectiveness.

1.3 Previous Studies

The Costco DEIR and other previous environmental and transportation studies have identified the need to improve the southbound U.S. 101 interchange at Talmage Road (State Route 222). These studies provided options to mitigate the anticipated transportation impacts. The following is a summary of the previously completed studies which were reviewed in the planning of this project and preparation of this Traffic Impact Study:

- Ukiah Bicycle and Pedestrian Master Plan (February 1999)
- Route 101 Corridor Interchange Study in Mendocino County, Ukiah Area (August 2005)
- Airport Industrial Park CIP Mitigation Monitoring Analysis (June 2007)
- Walmart Expansion Final EIR (October 2011)
- Costco Wholesale Project Final EIR (December 2013)

1.3.1 Ukiah Bicycle and Pedestrian Master Plan

The Ukiah Bicycle and Pedestrian Master Plan (City of Ukiah, 1999) classifies Talmage Road as a regional bicycle facility and “bicycle activity corridor,” and identifies it as a Class III connector bike route. A Class III bikeway provides for shared use with pedestrian or motor vehicle traffic. The portion of Talmage Road within the project area is not identified as a pedestrian activity area.

1.3.2 The Route 101 Corridor Interchange Study

The Route 101 Corridor Interchange Study in Mendocino County (MCOG, 2005) was prepared as a result of concerns regarding regional growth and development in the Ukiah Area, and summarizes technical analysis performed, preliminary designs and concepts for interchange improvements. The study evaluated six freeway interchanges along U.S. 101 in the Ukiah area, and included an analysis of present needs, existing (2005) and future (2025) levels of service (LOS), constraints on improvement options, right-of-way needs, and planning level improvement costs. The study identified the following concerns at the U.S. 101 interchange at Talmage Road:

- Congestion at nearby Talmage Road / Airport Park Boulevard intersection (2005 and 2025)
  - 2005 p.m. westbound left turn queue spillover – could block southbound ramp intersection
  - 2025 westbound queues could block southbound ramp intersection
- Congestion at northbound and southbound ramp intersections (2025)
- Southbound off-ramp to westbound Talmage Road – queue spillover to mainline in 2025 p.m. peak
- Excess collision rate at nearby Talmage Road / Airport Park Boulevard intersection
- Poor sight distance at both northbound and southbound ramp intersections due to sharp vertical curvature of the Talmage Road Overcrossing

The study recommended the following future (2025) improvements and options to address the identified concerns:

- Interchange Option 1 (2025): Add signals to northbound and southbound ramp intersections. This would very likely require modification of the entire interchange to a tight diamond (Type L-1) configuration, requiring additional right-of-way.
  - Interconnect coordinate new traffic signal with existing signal at Talmage Road / Airport Park Boulevard intersection.
- Interchange Option 2 (2025): Modify the existing interchange to a partial cloverleaf design utilizing existing right-of-way.
  - Coordinate new signals with optimized existing signal at Talmage Road / Airport Park Boulevard intersection.
- Overpass (2025): Widen Talmage Road Overcrossing as needed to accommodate queued vehicles at newly signalized ramp intersections.

1.3.3 Airport Industrial Park CIP Mitigation Monitoring Analysis

The Airport Industrial Park CIP Mitigation Monitoring Analysis (City of Ukiah, 2007) presents the results of a mitigation monitoring analysis for the Redwood Business Park considering the full build-out of remaining parcels and land uses and resulting impacts. The study included a LOS analysis of area intersections and a peak hour signal warrant analysis. Trip generation was estimated using the Institute of Transportation Engineers (ITE) publication Trip Generation (7th Edition). The study identified the following unacceptable operations within the project area at the build-out condition:

- Talmage Road/U.S. 101 Southbound Off-Ramps: This unsignalized intersection is projected to operate at unacceptable LOS "F" during both the AM and PM peak hour periods. This unacceptable LOS is projected to occur because of the delay experienced by vehicles on the minor street approach which is the U.S. 101 Southbound off-ramp that are waiting for gaps in the uncontrolled east/west traffic flow on Talmage Road.

From the results of the analysis, the study recommended the following build-out transportation improvements:

- Talmage Road/US 101 SB Off-Ramps: It is recommended that the Westbound approach on Talmage Road be widened to accommodate a dedicated lane for vehicles coming off of the Southbound off-ramp. Along with this mitigation, it is recommended that the Westbound approach on Talmage Road at the Airport Park Boulevard intersection be re-striped to accommodate dual left-turn lanes and a shared through-right turn lane. It is noted that any improvements recommended on State facilities will require approval from Caltrans.

1.3.4 Walmart Expansion Final EIR

The Walmart Expansion Environmental Impact Report (EIR) (City of Ukiah, 2011) was prepared by the City for expansion and alternation of the existing Walmart store in Ukiah, California. The EIR identified the following impacts and mitigation measures associated with transportation and traffic within the State right-of-way:

Environmental Impact	Mitigation Measure	Level of Significance after Mitigation
Impact 4.10-1: Implementation of the Project would increase traffic volumes on area roadways. This impact is less than significant.	**Measure 4.10-2**: The project applicant shall provide proportional-share payments to the City of Ukiah for the planned improvements and reconfiguration of the Talmage interchange, which would improve queuing to acceptable conditions (i.e., accommodated in the available storage) at Talmage Road and U.S. 101 Southbound Off-Ramp. The improvement planned by the City of Ukiah at Talmage Road / Airport Park Boulevard would need to be implemented in addition to Mitigation Measure 4.10-2.	Significant and Unavoidable
Impact 4.10-4: Implementation of the Project would increase	**Measure 4.10-4**: The project applicant shall provide	Significant and Unavoidable

Environmental Impact	Mitigation Measure	Level of Significance after Mitigation
traffic volumes on area roadways under cumulative conditions.	proportional-share payments to the City of Ukiah for the planned improvements and reconfiguration of the Talmage interchange, which would improve traffic conditions to acceptable conditions at Talmage Road / Airport Park Boulevard and Talmage Road / U.S. 101 Southbound Off-Ramp.	
Impact 4.10-5: Implementation of the Project would substantially increase potential traffic safety hazards by causing queuing backups that exceed, or by increasing the degree to which queuing backups are projected to exceed, the available storage length under 2030 No project conditions.	**Measure 4.10-5**: The project applicant providing proportional-share payments to the City of Ukiah, prior to issuance of building permits, for the planned improvements and reconfiguration of the Talmage interchange. Implementation of the measure would improve queuing to acceptable conditions.	Significant and Unavoidable

The impacts summarized above were considered *significant and unavoidable* because at the time the EIR was certified the Talmage Interchange project had not yet been officially funded through the City's Capital Improvement Program (CIP). Following certification of the EIR, the Ukiah City Council unanimously agreed to add it to the City's CIP and develop a funding program for the project. Following certification of the EIR, the project application was not approved by the City Planning Commission.

1.3.5 Costco Wholesale Project Draft EIR

The Costco Wholesale Project Draft Environmental Impact Report (DEIR) (City of Ukiah, 2013) was prepared by the City for the construction of a new Costco Wholesale warehouse in Ukiah, California. The DEIR identified the following impacts and mitigation measures associated with transportation and traffic within the State right-of-way:

Impact 3.10.5: Under Future plus Project conditions, traffic associated with the Project would contribute to inadequate queuing storage at Talmage Road/Airport Park Blvd. and Talmage Road/US 101 Southbound Off-Ramp. This impact is potentially significant.

Environmental Impact	Mitigation Measure	Level of Significance after Mitigation
Impact 3.10.1: Implementation of the Project would increase traffic volumes on area roadways. This impact is potentially significant.	**Measure 3.10.1:** Construct the Talmage Road Interchange improvements described above, including the provision of two left turn lanes on the westbound Talmage Road approach to Airport Park Blvd. The Project applicant shall contribute proportional-share	Significant and Unavoidable

Environmental Impact	Mitigation Measure	Level of Significance after Mitigation
	payments to the City of Ukiah for the improvements.	
Impact 3.10.3: Implementation of the Project would increase traffic volumes on area roadways under Near-Term conditions. This impact is potentially significant.	**Implement Mitigation Measure 3.10.1**	Significant and Unavoidable
Impact 3.10.4: Implementation of the Project would increase traffic volumes on area roadways under Future (2030) conditions. This impact is potentially significant.	**Implement Mitigation Measure 3.10.1**	Significant and Unavoidable
Impact 3.10.5: Under Future plus Project conditions, traffic associated with the Project would contribute to inadequate queuing storage at Talmage Road/Airport Park Blvd. and Talmage Road/US 101 Southbound Off-Ramp. This impact is potentially significant.	**Implement Mitigation Measure 3.10.1**	Significant and Unavoidable

The impacts summarized above were considered significant and unavoidable because the funding program for the project has not been completed at the time the DEIR was completed. The DEIR was certified by the City in December 2013. Funding for the mitigation measure has since been made available.

1.4 Study Parameters

1.4.1 Study Area Intersections and Roadway Network

The project area and project vicinity is shown in Figure 1. The area includes U.S. 101 on- and off-ramps at Talmage Road, Talmage Road and Airport Park Boulevard. The following intersections (with existing traffic control) were evaluated as part of this analysis. Intersections are numbered for ease of reference, and the agency having jurisdiction is indicated:

Intersection No. 1. Talmage Road and Airport Park Boulevard - Signalized (City of Ukiah)
Intersection No. 2. Talmage Road and Southbound Ramp - Unsignalized (Caltrans)
  a. Westbound left-turn to On-Ramp
  b. Off-Ramp right-turn to Westbound Talmage Road
  c. Off-Ramp right Turn to Eastbound Talmage Road
Intersection No. 3. Talmage Road and Northbound Ramp - Unsignalized (Caltrans)
  a. Off-ramp approach to Talmage Road

U.S. 101 is a limited access freeway and primary regional route connecting the City of Ukiah to other communities within Mendocino County and beyond. Within the City limits, U.S. 101 is a divided four-lane freeway. The posted speed limit is 65 miles per hour (mph). U.S. 101 is part of the Federal Highway Administration (FHWA) Non-Interstate Strategic Highway Network (STRAHNET).

Talmage Road - State Route 222 (SR 222) is a major urban arterial that provides access to U.S. 101 via an existing Type L-9 interchange (Caltrans, 2012). Talmage Road provides access to the Redwood Business Park and to the southern limits of the City by connection to South State Street. Talmage Road is a State facility between the eastern edge of the intersection of Talmage Road / Airport Boulevard in the west and the town of Talmage in the east. The typical roadway section varies from undivided two-lane road to four lanes divided by a two-way left-turn lane. The face of curb to face of curb width at the westbound approach to Airport Park Boulevard is approximately 70 feet. Eight foot wide shoulders are general present within the project limits and State right-of-way. The posted speed limit is 35 mph.

Airport Park Boulevard is an urban arterial serving the Redwood Business Park. Airport Park Boulevard extends from just north of Talmage Road in the north to its terminus at Airport Road near the Mendocino Brewing Company. The typical road section includes two-travel lanes in each direction separated by a raised median. The posted speed limit is 30 mph.

The existing intersection lane geometry and traffic controls are shown on Figure 2.

1.4.2 Pedestrians and Bicyclists

The Ukiah Bicycle and Pedestrian Master Plan (City of Ukiah, 1999) classifies Talmage Road as a regional bicycle facility and "bicycle activity corridor," and identifies it as a Class III connector bike route. A Class III bikeway provides for shared use with pedestrian or motor vehicle traffic. The portion of Talmage Road within the project area is not identified as a pedestrian activity area.

Existing pedestrian facilities in the study area include concrete sidewalks on the east and west sides of Airport Park Boulevard, with no sidewalks on the east side of the street along Wal-Mart’s roadway frontage. Sidewalk is present on the north side of Talmage Road. Curb ramps and marked crossings exist at Intersection No. 1 and across the off-ramp right-turn to westbound Talmage Road. There are no dedicated bicycle facilities within the study area, but striped shoulders do exist on Talmage Road which may be used by bicyclists.

1.4.3 Public Transit

The Mendocino Transit Authority (MTA) is a joint powers agency formed by Mendocino County, Fort Bragg, Point Arena, Willits, and Ukiah to provide public transportation services to citizens in Mendocino County. MTA operates demand-responsive services, as well as 10 fixed routes serving various parts of the Ukiah Valley. Bicycles can be carried on most MTA buses, with space available on a first come, first serve basis.

MTA Local Route 9 provides loop service to destinations throughout the City and stops on Commerce Drive at 1-hour headways, Monday through Friday between 7:00 a.m. and 8:30 p.m., and Saturdays between 10:00 a.m. and 5:00 p.m.

MTA Regional Routes 20 and 75 provide service from Ukiah to destinations in Willits and the South Mendocino County Coast and stops on Commerce Drive with approximately 1-hour to 3 hour headways, Monday through Friday between 7:00 a.m. and 6:30 p.m.

MTA Paratransit provides dial-a-ride service for individuals who are unable to independently use the public transit system because of physical or mental disabilities.

1.4.4 Study Periods

The study periods included in the traffic impact assessment include daily (24 hour) traffic classification, weekday a.m. and p.m. peak conditions and Saturday midday peak conditions.

The weekday a.m. peak hour generally occurs between 7:00 a.m. and 9:00 a.m. and the p.m. peak hour generally occurs between 4:00 p. m. and 6:00 p.m., while the weekend (Saturday) mid-day peak hour generally occurs between 11:00 a.m. and 1:00 p.m. Pedestrian and bicycle volumes were also included in the analysis for the peak conditions.

1.5 Study Scenarios

Two scenarios are included in the analysis; Existing (2012) Condition and Future (2032) Condition.

The Existing (2012) Condition was determined using current traffic counts, including bicycles and pedestrians, on Talmage Road and at the study intersections during the peak month of September while school is in session.

The Future (2032) Condition was developed by applying a 20-year growth factor of 1.3 to existing peak hour traffic volumes, as required and confirmed by Caltrans District 1 (Caltrans, 2006).

1.6 Level of Service Methodology

Level of Service (LOS) is a qualitative measure used to rank traffic operation on various transportation facility types using a series of letter grade designations ranging from A to F. Generally, LOS A represents free-flow conditions and LOS F represents forced flow or breakdown conditions. The LOS designation for intersections is generally accompanied by a unit of measure which indicates a level of delay.

The focus on the LOS analysis is automobile traffic and the effect implementation of project alternatives has at study intersections. The analysis uses delay-based methodology for both signalized and unsignalized intersections from the Highway Capacity Manual (Transportation Research Board, 2000), also referred to as HCM2000. Delay is defined as the total elapsed time from when a vehicle stops at the stop line of the intersection or behind a queue until the vehicle leaves from the stop bar. In the case of a vehicle in a queue, the total delay time includes the time required for the vehicle to travel from the last queue position to the stop bar. Average total delay is a function of the traffic volumes, green time for each movement, phasing, signal coordination, pedestrian activity, intersection geometry, capacity of the approach, and the volume of conflicting movements.

The LOS concept for signalized and unsignalized intersections is a measure of average operating conditions at intersections during a span of an hour, and is based on measurements of the average vehicular delay in seconds per vehicle. Tables 1 and 2 summarize the ranges of delay associated with the various levels of service for signalized and unsignalized intersections as defined by the HCM2000.

Table 1 – HCM2000 Signalized Level of Service

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

Table 2 – HCM2000 Unsignalized Level of Service

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

While this study uses HCM2000 methodology, it is acknowledged that the Transportation Research Board has recently released an update to the LOS methodology for interrupted flow facilities, including signalized intersections and unsignalized intersections. This update is included in the Highway Capacity Manual 2010 (HCM2010). The HCM2010 methodology includes LOS determinations for separate modes at signalized and unsignalized intersections, including for automobiles, non-automobiles, and pedestrian modes of travel. The automobile mode methodology provides for essentially the same delay-based thresholds as under HCM2000. For non-automobiles (bicycles) and pedestrians, the methodology produces a perception-based LOS score. Although the LOS analysis of bicycles and pedestrians was not included in this study, it is expected that the LOS for both bicycles and pedestrians would be improved after implementation of the Project.

Synchro 8 with SimTraffic was used to analyze the study intersections and report HCM2000 LOS results and vehicle queuing, which was approved by Caltrans District 1 Traffic Operations.

1.7 Thresholds of Significance

All of the study intersections are located within the City of Ukiah, and two intersections are within the State right-of-way. The analysis methods used for the City of Ukiah and State facilities are described in the following sections.

1.7.1 City of Ukiah

The Ukiah Valley General Plan and Growth Management Plan (City of Ukiah, 2004) *Section 5 Circulation and Transportation*, contains Level of Service standards for *Segment Level of Service and Intersection Level of Servic*e. The following measure contains the City's Intersection Level of Service standard:

- Implementation Measure CT-16.4(e): Adopt the following intersection Level of Service standards on an **interim basis** until the citywide traffic model is completed:
  a) At intersections with signals or four-way stop signs: operation at LOS D,
  b) At intersection with stop signs on side streets only: operation at LOS E, except where side streets have very low traffic volumes, in which case LOS F conditions may be acceptable.

1.7.2 Caltrans

Caltrans is responsible for the maintenance and operations of state routes and highways. Within the project study area, Caltrans' facilities include:

- Talmage Road and Southbound Ramp - Unsignalized
  a) Westbound left-turn to On-Ramp
  c) Right-turn to Westbound Talmage Road
  d) Right Turn to Eastbound Talmage Road
- Talmage Road and Northbound Ramp - Unsignalized
  a) Off-ramp approach to Talmage Road

The Guide for the Preparation of Traffic Impact Studies (Caltrans, 2002) is intended to provide preparers of traffic studies for projects with a consistent basis for evaluating traffic impacts to State facilities. Caltrans strives to maintain service levels at the threshold between LOS C and LOS D. In cases where this LOS is not feasible the lead agency should consult with Caltrans to establish an appropriate LOS threshold. If an existing state highway facility is operating worse than the appropriate LOS threshold, the existing Measure of Effectiveness (MOE) should be maintained.

1.8 Assumptions

This assessment of traffic was prepared in coordination with Caltrans District 1 Traffic Operations and District 3 Design. The Caltrans standard modeling and study guidelines were followed along with input and coordination from District 1 Traffic Operations. These guidelines are the Caltrans Guide for the Preparation of Traffic Impact Studies (Caltrans, 2002), and the *Caltrans – District 1 Traffic Signals on State Highways, Supplement and Addendum to Guide for the Preparation of Traffic Impact Studies for New and Existing Traffic Signals Serving Proposed and Existing Developments* (Caltrans, 2008).

2. Traffic Data Collection and Analysis

2.1 Traffic Data Collection

Existing traffic counts in the project study area were collected in September 2012 as required by and in coordination with Caltrans District 1 Traffic Operations staff. Traffic conditions during the month of September are generally considered the worst case "peak" traffic conditions when school is in session, and meet the Caltrans requirements for corridor planning and analysis for the project. Caltrans District 1 required new traffic counts during the peak months of August or September be collected and used in this analysis. In an August 18, 2011 comment letter on the Walmart Draft EIR from Caltrans District 1 to the City of Ukiah, Caltrans expressed concerns with the traffic volumes. It is recognized by the preparers of this study that the traffic counts collected and used for this study differ from counts collected and used in previous EIR traffic studies. The traffic volumes used in this analysis have been accepted by Caltrans and the City of Ukiah as representative of existing traffic conditions at the study intersections.

Traffic volume data collection included both average daily traffic (ADT) counts with Federal Highway Administration (FHWA) vehicle classifications and peak hour intersection turning movement counts. Bicycle and pedestrian counts were also collected at the study intersections during peak periods. Figure 1 "Project Vicinity and Location Map" shows the study intersections and ADT count locations.

2.1.1 24-hour Vehicle Counts

The 24-hour ADT and vehicle classification counts were collected for five consecutive days between Tuesday, September 11, 2012 and Saturday, September 15, 2012. These traffic counts were collected at the following locations:

Count Location No. 1. Talmage Road; east of (e/o) Airport Park Boulevard
Count Location No. 2. U.S. 101 Southbound On-Ramp
Count Location No. 3. U.S. 101 Southbound Off-Ramp (to eastbound Talmage Road)
Count Location No. 4. U.S. 101 Southbound Off-Ramp (to westbound Talmage Road)
Count Location No. 5. U.S. 101 Northbound On-Ramp (from westbound Talmage Road)
Count Location No. 6. U.S. 101 Northbound On-Ramp (from eastbound Talmage Road)
Count Location No. 7. U.S. 101 Northbound Off-Ramp
Count Location No. 8. Talmage Road; e/o U.S. 101

2.1.2 Intersection Turning Movement Counts

Intersection turning movement counts, including vehicles, pedestrians and bicycles, were collected during the A.M. and P.M. peak hours during a non-holiday week on Tuesday, September 11 while school was in-session. Weekend midday peak hour turning movement counts were collected on Saturday, September 15. Peak hour intersection turning movement counts were collected at the following locations:

Intersection No. 1. Talmage Road and Airport Park Boulevard
Intersection No. 2. Talmage Road and U.S. 101 Southbound Ramps
Intersection No. 3. Talmage Road and U.S. 101 Northbound Ramps

The pedestrian and bicycle volumes were also collected. The peak hour factors obtained from these traffic volume counts were also used in the analysis of the existing condition.

2.2 Traffic Data Inputs

Existing traffic signal timing for the signalized intersection of Talmage Road and Airport Park Boulevard was obtained from the City of Ukiah for input into the traffic model for the existing condition.

Existing lane geometry, roadway configurations and speed limits were collected in the field and input into the model for the existing condition analysis.

Traffic signal timing/analysis requirements summarized in the Caltrans District 1 Supplement to Guide for the Preparation of Traffic Impact Studies (Caltrans, 2008) were input into the Synchro 8 with SimTraffic modeling software for the analysis, including:

- Pedestrian WALK time: 7.0 seconds.
- Pedestrian DON'T WALK time: 3.5 feet/sec pedestrian walk speed.
- All-Red Time: 2.0 seconds.
- Yellow Change Interval: Values per CA MUTCD. Used 3.2 seconds min.
- Initial Green Time: 5.0 seconds.
- Lead/Lag Option: Protected left-turns are leading phase.
- Min. Green Recall Phases: Phase 2 and 6 (through movements) on S.R. 53.
- Min. Green Time: 8 seconds.
- Saturation Flow Rate: 1750 vehicle/hour (maximum) for each lane.
- Ensure SimTraffic run times are long enough for the network to fully load.

2.3 Traffic Data Analysis

2.3.1 Existing (2012) Traffic Volumes

ADT Traffic Volumes

The 2012 ADT traffic volumes are summarized in Table 3.

Table 3 – Average Daily Traffic Count Summary (September 11 – September 15, 2012)

No.	Location	Weekday (5-day Average)			Weekday (Peak)		
		EB/NB	WB/SB	Total	EB/NB	WB/SB	Total
1	Talmage Road, east of Airport Park Blvd	9,424	9,076	18,500	10,216	9,518	19,734
2	U.S. 101 Southbound On-Ramp	-	1,560	1,560	-	2,190	2,190
3	U.S. 101 Southbound Off-Ramp (to eastbound Talmage Rd)	1,334	-	1,334	1,709	-	1,709
4	U.S. 101 Southbound Off-Ramp (to westbound Talmage Rd)	-	5,494	5,494	-	5,891	5,891
5	U.S. 101 Northbound On-Ramp (from westbound Talmage Rd)	1,988	-	1,988	2,054	-	2,054
6	U.S. 101 Northbound On-Ramp (from eastbound Talmage Rd)	-	5,104	5,104	-	5,522	5,522
7	U.S. 101 Northbound Off-Ramp	1,670	-	1,670	1,921	-	1,921
8	Talmage Road , east of U.S. 101	5,127	5,151	10,278	5,324	5,333	10,657

These ADT counts were compared to counts previously conducted in February, 2010 The comparison showed that count volumes were very similar.

Existing Intersection Turning Movement Traffic Volumes

Existing intersection traffic volumes that were collected during the weekday A.M. and P.M., and the weekend midday peak hours are shown on Figure 3.

Existing Pedestrian and Bicycle Volumes

Existing pedestrian and bicycle traffic was collected with the peak hour intersection turning movement counts. Table 4 summarizes the peak hour pedestrian and bicycle counts at the study intersections.

Table 4 – Peak Hour Pedestrian and Bicycle Counts at Study Intersections

No.	Time	NB	SB	EB	WB	Total
1	AM Peak Hour	2 (3)	3 (0)	2 (2)	6 (3)	13 (8)
	PM Peak Hour	0 (3)	1 (2)	0 (6)	4 (2)	5 (13)
	Midday Peak Hour	3 (2)	3 (3)	0 (1)	7 (0)	13 (6)
2	AM Peak Hour	2 (0)	4 (0)	0 (2)	0 (2)	6 (4)
	PM Peak Hour	1 (4)	0 (0)	0 (4)	0 (4)	1 (12)
	Midday Peak Hour	2 (0)	1 (0)	0 (2)	0 (0)	3 (2)
3	AM Peak Hour	0 (0)	3 (0)	0 (2)	0 (2)	3 (4)
	PM Peak Hour	0 (0)	0 (0)	0 (4)	0 (4)	0 (8)
	Midday Peak Hour	3 (0)	1 (0)	0 (2)	0 (0)	4 (2)

Note: Bicycles indicated in parenthesis.

2.3.2 Traffic Collision Data

Traffic collision data was obtained from the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS). Collision history data for the study intersections was reviewed for the 10-year time period between January 1, 2001 and December 30, 2011. Collision statistics for the Talmage Road corridor (between the intersection of Talmage Road/Airport Park Boulevard and Talmage Road/U.S. 101 interchange) are presented together and separated by intersection to compare collision rates against State-wide averages. The summary statistics presented include:

- The primary collision types for those reported in the Talmage Road study corridor were:
  1. Rear-end 40%
  2. Broadside 30%
  3. Sideswipe 20%
  4. Head-on 7%

- Primary factors of the collisions for those reported in the Talmage Road study corridor were:
  1. Unsafe Speed 29%
  2. Improper Driving 17%
  3. Automobile Right-of-Way 17%
  4. Traffic Signals & Signs 17%

The most prominent type of collision at the intersection of Talmage Road and Airport Park Boulevard was the rear-end type, while the most prominent type of collision at the Talmage Road and U.S. 101 interchange was the broadside type.

Table 5 and Table 6 summarize the number of traffic collisions by severity and type, respectively.

Table 5 – Traffic Collision Severity

Severity	Number
Fatal	0
Injury	12
Property Damage Only	18
Total Collisions	30

Table 6 – Traffic Collision Type

Type	Number
Vehicle vs. Pedestrian	0
Vehicle vs. Bicycle	2
Head-On	2
Broadside	9
Sideswipe	6
Rear-end	12
Other	1

Crash rates are typically considered better indicators of accident risk than crash frequencies alone because they account for differences in traffic volumes, which is exposure. Crash rates for intersections are normally expressed in crashes per 1 million entering vehicles (MEV). To estimate the number of entering vehicles over a 24-hour period, it was assumed that the peak hour accounts for 10% of the daily entering traffic volume. The corresponding average 10-year collision rate for each intersection in the Talmage Road study corridor includes:

Talmage Road and Airport Park Boulevard (Signal Controls)	0.32 per MEV
Talmage Road and U.S. 101 Interchange (Stop and Yield Signs)	0.08 per MEV

Based on comparison against statewide averages of 0.43 per MEV for an urban intersection with signal controls and 0.14 for urban intersections with stop and yield control, both intersections are below the statewide averages. Statewide crash rates can be found in the *2007 Collision Data on California State Highways* (Caltrans, 2007).

It is noted that during the years 2002 and 2004, the intersection of Talmage Road and Airport Park Boulevard was above the statewide average with collisions rates of 0.66 per MEV and 0.53 per MEV, respectively.

Traffic collisions analysis and calculations are included in Appendix A.

2.3.3 Future (2032) Traffic Volumes

Future traffic volumes were projected using the Caltrans District 1, 20-year growth factors (Caltrans, 2006). These growth factor targets were developed based on the "California Motor Vehicle Stock, Travel and Fuel Forecast" (CMVSTAFF) dated December 30, 2005 using Annual Vehicle Miles

Traveled (AVMT) comparisons. Twenty-year growth factors for individual routes were based on historic growth and constrained by growth factor targets.

The published traffic growth was projected based on the U.S. 101 growth factor of 1.3 in the area of the Project (southern Mendocino County). In December 2013 Caltrans revised the published growth factor for southern Mendocino County down from 1.5 to 1.3. Future (2032) traffic volumes were projected from the base year (2012) existing traffic count data and multiplying existing volumes by the 1.3 growth factor. The distribution of future traffic volumes at study intersections was adjusted to align the volume projections with trip distribution estimates developed by the City of Ukiah (2013) for the Costco Wholesale Project DEIR.

For reference, the 2006 District 1 20-year Growth Factors are included in Appendix B.

3. Existing Geometry Operational Analysis

Under existing conditions analysis, the existing geometric configurations for all intersections evaluated are maintained.

3.1 Existing Traffic Operational Analysis (2012)

3.1.1 Level of Service

The results of the intersection level of service analysis for the Existing (2012) conditions are summarized in Table 7. The results show that, measured against the level of service standards, all intersections currently operate at LOS D or better during the weekday A.M., P.M. and Saturday midday peak hours, except the southbound right turn at Intersection No. 2 which operates at LOS F during the AM peak hour. Existing conditions operational analysis (2012) LOS calculations are included in Appendix C.

Table 7 – Existing (2012) Intersection Level of Service (Existing Geometry)

No.	Intersection	Existing (2012)		
		AM	**PM**	**SAT**
		Delay/LOS	**Delay/LOS**	**Delay/LOS**
1	Talmage Rd/Airport Park Blvd (signal)[1]	23.6/C	29.8/C	31.5/C
2	Talmage Rd/Southbound Ramp (unsignalized)[2]			
	Westbound left-turn to On-ramp	8.9/A	11.1/B	10.0/B
	Southbound Right-turn (4)	**50.8/F**	**25.4/D**	**27.8/D**
	Northbound Right-turn (5)	13.0/B	24.2/C	14.0/B
3	Talmage Rd/Northbound Ramp (unsignalized)[2]			
	Northbound Off-ramp approach	15.7/C	15.5/C	13.4/B

Notes: [1]LOS based on HCM method of operational analysis for Signalized Intersections
[2]LOS based on HCM method for operational analysis for Unsignalized Intersections
Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
BOLD = LOS D or worse

3.1.2 Peak Hour Signal Warrant 3 for Intersection No. 3

Traffic Signal Warrant 3 for the peak hour of traffic is based on the California Manual on Uniform Traffic Control Devices (CAMUTCD) (Caltrans, 2012). The Warrant has two Parts, A and B that must be met to justify the potential need for a signal based on the peak hour. Part A contains three conditions, which are:

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for one-lane approach, or five vehicle-hours for a two-lane approach; AND
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vehicles per hour (vph) for one moving lane of traffic of 150 vph for two moving lanes; AND

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.

Part B of the Traffic Signal Warrant 3 contains figures that plot minor street versus major street approaches for urban and rural areas. The Signal Warrant 3 calculations are included in Appendix C.

Intersection No. 3 meets the definition of “urban” and has single lane approaches in all directions. Based on review of Signal Warrant 3 for the existing peak hour volumes, Intersection No. 3 does not meet either condition Part A or Part B of this Warrant. However, this intersection may meet other Signal Warrants, which would require further study to find if these Warrants are met. The satisfaction of a single traffic signal warrant or warrants does not in itself require the installation of a traffic signal.

The Traffic Signal Warrant 3 calculations are included in Appendix D.

3.2 Future Traffic Operational Analysis (2032)

As previously discussed, the future (2032) traffic volumes were derived by applying a growth factor of 1.5 to all movements at all study intersections. Existing intersection geometries are used in this analysis of future traffic volumes. Future traffic volumes are shown on Figure 3.

3.2.1 Level of Service

The results of the intersection level of service analysis using existing intersection geometries and future (2032) traffic volumes are summarized in Table 8. The results show that, measured against the level of service standards, all intersections operate unacceptably (LOS D or worse) at one or more peak hour(s) during the A.M., P.M. or Saturday midday periods. Future conditions operational analysis (2032) LOS calculations are included in Appendix D.

Table 8 – Future (2032) Peak Hour Intersection Level of Service (Existing Geometry)

		Future (2032)		
		AM	PM	SAT
No.	**Intersection**	**Delay/LOS**	**Delay/LOS**	**Delay/LOS**
1	Talmage Rd/Airport Park Blvd (Signal)[1]	28.0/C	**55.2/E**	**45.2/D**
2	Talmage Rd/Southbound Ramp (Unsignalized)[2]			
	Westbound left-turn	9.4/A	14.5/B	11.4/B
	Southbound Right-turn	**>50/F**	**>50/F**	**>50/F**
	Northbound Right-turn	14.9/B	**>50/F**	17.8/C
3	Talmage Rd/Northbound Ramp (Unsignalized)[2]			
	Northbound Off-ramp approach	18.4/C	22.8/C	15.8/C

Notes: [1]LOS based on HCM2000 method of operational analysis for Signalized Intersections
[2]LOS based on HCM2000 method for operational analysis for Unsignalized Intersections
Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
BOLD = less than LOS D

3.2.2 Peak Hour Signal Warrant No. 3 for Intersection No. 3

As stated earlier under Existing Traffic Operation Analysis (2012), the peak hour Traffic Signal Warrant 3 was evaluated. Intersection No. 3 meets the definition of "urban" and has single lane approaches in all directions. Based on review of Signal Warrant 3 for the existing peak hour volumes, Intersection No. 3 does not meet either Condition Part A or Part B of this Warrant. However, this intersection may meet other Signal Warrants, which would require further study to find if these Warrants are met. The satisfaction of a single traffic signal warrant or warrants does not in itself require the installation of a traffic signal.

3.2.3 Queuing Analysis

An analysis of vehicle queues and available storage was performed for the 50th and 95th percentile queue lengths based on HCM 2000 methodology. Results of the queuing analysis show that, for the future condition with existing geometry, there is inadequate available storage length at Intersection No. 1 and generally adequate storage length at the other two intersections in the State right-of-way, with the exception of two approaches. The queue length calculations are summarized in Tables 9, 10, and 11. The queuing analysis results are included in Appendix E.

Table 9 – Future (2032) PM Peak Hour Vehicle Queuing (Existing Geometry) – Intersection No. 1

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
EBL	27	50	26/74#
EBT	772	500	388/465
EBTR		500	379/494
WBL	601	165	219#/247#
WBT	474	175	266#/338#
WBTR		370	110/238
NBL	370	85	147#/253#
NBL		600	219/384
NBR	761	600	324/569
SBL	35	50	39/80#
SBTR	87	200	60/97

Notes: # queue exceeds capacity, queue may be longer.

Table 10 – Future (2032) PM Peak Hour Vehicle Queuing (Existing Geometry) – Intersection No. 2

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	FT
WBL	51	71	43/122#
SBR (4)	619	500	413/454
NBR (5)	203	1000	885/909

Notes: # queue exceeds capacity, queue may be longer.

Table 11 – Future (2032) PM Peak Hour Vehicle Queuing (Existing Geometry) – Intersection No. 3

Movement	**Peak Hour Volume**	**Available Storage Length**	**Queue Length - Average/95th (feet/feet)**
		FT	**PM**
NBL	121	300	48/89
NBR	74	25	40#/65#

Notes: # queue exceeds capacity, queue may be longer.

3.2.4 Summary

Based on the analysis results summarized in Table 7 and Table 8, and with the concurrence of Caltrans District 1 Traffic Operations, the P.M. peak hour only was selected as the worst case peak hour condition for the analysis of the project.

4. Alternatives Analysis

In addition to the two interchange configuration alternatives evaluated by GHD, Caltrans and the City, GHD (and other consultants) evaluated a total of five alternatives for the Talmage Road (SR 222) / U.S. 101 southbound on/off-ramp intersection.

4.1 Interchange Alternatives

The two interchange configuration alternatives, Option 1 and Option 2 shown on Figure 4 and Figure 5, respectively, were described in detail in the *Route 101 Corridor Interchange Study in Mendocino County* (MCOG, 2005), and are summarized below:

- Interchange Option 1 (2025): Add signals to northbound and southbound ramp intersections and widen the overcrossing structure. This would very likely require modification of the entire interchange to a tight diamond (Type L-1) configuration, requiring additional right-of-way.
  - Interconnect coordinate new traffic signal with existing signal at Talmage Road / Airport Park Boulevard intersection.
- Interchange Option 2 (2025): Modify the existing interchange to a partial cloverleaf design utilizing existing right-of-way, and widen the existing overcrossing structure.
  - Coordinate new signals with optimized existing signal at Talmage Road / Airport Park Boulevard intersection.

These two interchange options were evaluated for the selection of the MCOG preferred alternative based on design complexity, temporary and permanent impacts to the existing U.S. 101 mainline facility, temporary and permanent impacts to the existing City and State transportation facilities, right-of-way and property acquisition requirements, and overall project cost. A qualitative analysis was performed and it was determined that the Interchange Option 2 is preferred because it is compatible with, meets the goals of the project, and:

- The configuration is less complex;
- It has significantly fewer impacts to the existing U.S. 101 mainline facility;
- It has significantly fewer impacts to the existing City and State transportation facilities;
- It requires no additional right-of-way or property acquisition; and
- It has a lower overall project cost.

While the project is compatible with the MCOG preferred interchange alternative (Option 2), the project does not include the entire Option 2 interchange improvement (i.e. widening of the overcrossing structure and signalizing of the northbound on- and off-ramps.

4.1.1 Southbound Ramp Intersection Alternatives

The five alternatives evaluated for the Talmage Road (SR 222) / U.S. 101 southbound on/off-ramp intersection are:

- Alternative 1: Signalized intersection with three left turn lanes (Figure 6)
- Alternative 2: Signalized intersection with two left turn lanes (Figure 7)
- Alternative 3: Two-lane three-leg roundabout intersection (Figure 8)
- Alternative 4: One-lane four-leg roundabout intersection (Figure 9)
- Caltrans Alternative: Signalized SB to WB Talmage Rd. and realign SB to EB Talmage Road (Figure 10)

4.1.2 Alternative 1: Signalized Intersection (Triple Left)

This interchange improvement would remove the existing U.S. 101 southbound off-ramp to westbound Talmage Road from use, and widen the existing U.S. 101 southbound loop off-ramp to eastbound Talmage Road from one lane to four lanes south of the Talmage Road overpass. The loop ramp would be modified to terminate at Talmage Road with a more standard 90-degree angle. With this configuration all southbound traffic exiting U.S. 101 at Talmage Road would use the loop off-ramp terminating at a new signalized intersection. Three left turn lanes would direct traffic to westbound Talmage Road and a single right turn lane would direct traffic to eastbound Talmage Road. Phasing of the new traffic signal would include right-turn overlaps for the eastbound Talmage Road right-turn on to southbound U.S. 101 on-ramp and the U.S. 101 southbound off-ramp right-turn lane on to eastbound Talmage Road would also be widened to accommodate dual westbound left turn lanes at Airport Park Boulevard and two westbound through lanes. Protected left-turn phasing would also be provided for the westbound Talmage Road approach. The new traffic signal would be interconnected and coordinated with the traffic signal at the intersection of Airport Park Boulevard and Talmage Road. Figure 6 shows the proposed layout for Alternative 1. Implementation of Alternative 1 requires no additional right-of-way or property acquisition.

4.1.3 Alternative 2: Signalized Intersection (Dual Left)

Alternative 2 is very similar to Alternative 1. The primary difference is that Alternative 2 contains only two left turn lanes to westbound Talmage Road at the loop off-ramp terminating at a new signalized intersection. Figure 7 shows the proposed layout for Alternative 2. Implementation of Alternative 2 requires no additional right-of-way or property acquisition.

4.1.4 Alternative 3: Two-Lane Roundabout

The two-lane roundabout would consist of two-lanes and three legs. Depending on final geometric design it could be a partial two-lane roundabout. The existing U.S. 101 southbound off-ramp to westbound Talmage Road would be removed, and the existing U.S. 101 southbound loop off-ramp to eastbound Talmage Road would be widened from one lane to two lanes south of the Talmage Road overpass. The loop ramp would be modified to terminate and connect to the roundabout at an appropriate angle encouraging traffic to enter and circulate at safe speeds. With this configuration all southbound traffic exiting U.S. 101 at Talmage Road would use the loop off-ramp terminating at the new roundabout. The approach lane geometry on Talmage Road would also be modified to force traffic to enter and circulate at safe speeds and to provide adequate maneuverability for the large vehicles expected to travel through the intersection. Design speeds for a two-lane roundabout are generally between 20 and 25 mph.

Figure 8 is a preliminary layout for the two-lane roundabout. This preliminary design presents a concept for a two-lane roundabout that represents the approximate size, potential lane configuration, and connections to adjacent roadways. It is important to note that it is likely that partial acquisition of the parcel between Talmage Road and Munson Frontage Road (Triple S Tires) may be required to construct this alternative roundabout. Significant fill, a retaining wall and/or sloped embankments may also be required.

4.1.5 Alternative 4: One-Lane Roundabout

The one-lane roundabout would be smaller in diameter than the Alternative 3 roundabout, having a single circulatory lane with four legs. Two of the roundabout legs are the eastbound and westbound approaches of Talmage Road, which would be two-way. The north leg of the roundabout would be the southbound U.S. 101 off-ramp. This leg would have two southbound (one-way) approach lanes. One lane would enter the roundabout while the other lane would bypass the roundabout where vehicles would merge on to westbound Talmage Road. The south leg of the roundabout would be the southbound U.S. 101 on-ramp (one-way), and would be a single lane exiting the roundabout to U.S. 101 south. A bypass lane would also be provided on eastbound Talmage Road before the roundabout for vehicles wishing to enter U.S. 101 southbound without having to enter the roundabout. With this alternative, the existing southbound loop off-ramp would be removed from service and demolished. Similar to Alternative 3, the approach lane geometry must be designed to force traffic to enter and circulate at safe speeds and to provide adequate maneuverability for the large vehicles expected to travel through the intersection. Design speeds for a single-lane roundabout like Option B are generally between 17 mph and 23 mph.

Figure 9 shows a preliminary layout for the one-lane roundabout alternative. The roundabout would be located relatively close to the existing Talmage Road / U.S. 101 overpass structure, which presents challenges for merging, sight distance, and recommended lengths for splitter islands, bay tapers and lane transitions. One of the primary operational challenges with this alternative is the creation of a “double merge” on westbound Talmage Road west of the roundabout. Vehicles destined for the Redwood Business Park ultimately need to be in one of the two right-turn lanes at the westbound approach to Airport Park Boulevard. Vehicles using the southbound off-ramp bypass lane must therefore merge left across at least one lane of traffic to enter one of the right-turn lanes, while westbound vehicles whose destination lies west of Airport Park Boulevard must navigating the roundabout and merge right to one of the two through lanes. Vehicles destined for the Redwood Business Park using the southbound off-ramp could be less likely to use the bypass lane because of the double merge, reducing its utilization and potentially increasing vehicle queue lengths and congestion. The creation of a double merge condition reduces the operational safety of this alternative because it increases the likelihood of vehicular conflict in this merge area. It also requires pedestrians to cross two lanes of potentially heavy traffic at the southbound off-ramp approach.

4.1.6 Caltrans Alternative

The Caltrans Alternative consists of the modification and realignment of the existing southbound on- and off-ramps, signalization of the southbound off-ramp to westbound Talmage Road intersection, and construction of a raised center median on Talmage Road to channelize traffic in the eastbound and westbound directions. The new traffic signal would not be interconnected and coordinated with the traffic signal at the intersection of Airport Park Boulevard and Talmage Road. Provisions to interconnect these two signals would be provided if this alternative is selected as the environmentally superior alternative. This alternative maintains most of the interchange geometry and adds lanes to provide capacity for the anticipated increases in traffic volumes. Figure 10 shows a preliminary layout for the Caltrans Alternative.

4.1.7 Preferred Alternative

The five southbound ramp intersection alternatives described above were based, in part, on recommendations made in the Walmart Expansion Final EIR (City of Ukiah, 2011) and Costco Wholesale Project DEIR (City of Ukiah, 2013), and were developed further with assistance from Caltrans as a part of this alternatives evaluation and traffic analysis. Each of these alternatives is compatible with the MCOG preferred interchange alternative (Option 2). However, these improvements have independent utility, and the full interchange improvement is separate from this analysis.

The two roundabout alternatives (Alternatives 3 and 4) were eliminated from consideration due to operational and safety issues, right-of-way requirements and cost. The two signal alternatives (Alternatives 1 and 2) and the Caltrans Alternative were evaluated further with the assistance of Caltrans District 1 Traffic Operations. Through this evaluation process Alternative 2 was eliminated because of excessive vehicle queuing and delay issues related to the dual left turn lanes. Alternative 1 (triple left turn lanes) was analyzed in detail by GHD and Caltrans and determined to be the Preferred Alternative for the following reasons:

- 95th percentile vehicle queue lengths on the southbound off-ramp approach to Talmage Road are generally maintained within available storage lengths.
- The triple-left turn configuration from the southbound off-ramp to Talmage Road reduces merge/diverge maneuvers on the westbound Talmage Road approach to Airport Park Boulevard.
- The triple-left turn configuration from the southbound off-ramp to Talmage Road improves lane utilization and flow of traffic to destinations compared with dual-left configuration.
- The triple-left turn configuration from the southbound off-ramp to Talmage Road improves signal timing and reduces control delays when compared with dual-left configuration.

Additional details of the Preferred Alternative (Alternative 1) are summarized below. Required Caltrans mandatory or advisory design exceptions will be obtained, as required.

- Widening and realignment of the southbound off-ramp to eastbound Talmage Road and providing new curb and gutter and shoulder. The realigned off-ramp would terminate at a new signalized intersection with Talmage Road. Standard width lanes and shoulders will be provided. Appropriate advanced signing and striping on the southbound off-ramp will be used to inform drivers of the appropriate lane to queue in based on destination. This improvement would be designed to Caltrans Standards. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this geometric improvement.
- Realigning the southbound on-ramp and providing new curb and gutter and shoulder. Standard width lanes and shoulders will be provided. This improvement would be designed to Caltrans Standards. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this geometric improvement.
- Widening Talmage Road to provide two westbound left-turn lanes at Airport Park Boulevard, constructing a new raised center median on Talmage Road between the new off-ramp intersection and Airport Park Boulevard. This improvement would be designed to Caltrans Standards within State Right-of-Way. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this geometric improvement.
- Constructing new curb and gutter along the south side of Talmage Road between Airport Park Boulevard and the southbound on-ramp. This improvement would be designed to Caltrans Standards within State Right-of-Way. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this improvement.
- Widening Talmage Road east of the new off-ramp intersection and constructing a new raised center median. This improvement would be designed to Caltrans Standards within State Right-of-Way. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this geometric improvement.
- Providing two eastbound lanes with a merge before the overcrossing structure on Talmage Road east of the new off-ramp intersection. This improvement requires an advisory design exception because the standard distance for a tapered lane drop is not available.

Discussions with Caltrans District 3 Design indicate that this design exception will be approved.

- Providing new standard width lanes and shoulders on Talmage Road within State Right-of-Way. This improvement requires a mandatory design exception because existing shoulder widths at the eastbound overcrossing structure approach do not meet current Caltrans Standards. Discussions with Caltrans District 3 Design indicate that this design exception will be approved.
- Constructing a new signalized intersection at Talmage Road and the realigned southbound on/off ramps. The new signalized intersection would be interconnected and coordinated with the existing signalized intersection at Talmage Road/Airport Park Boulevard due to their close proximity. This improvement requires a mandatory design exception. Discussions with Caltrans District 3 Design indicate that this design exception will be approved.
- Constructing new sidewalk and curb and gutter along the north side of Talmage Road between Airport Park Boulevard and the western edge of the overcrossing structure. A small retaining wall may be required along a portion of Talmage Road due to existing grades on the north side. This improvement would be designed to Caltrans Standards within State Right-of-Way. Discussions with Caltrans District 1 Traffic Operations and District 3 Design indicate no design exception is required for this improvement.
- Constructing new fill slopes along the edge of the realigned southbound on-ramp. These improvements will require an advisory design exception for the embankment slope and distance from the Right-of-Way to the fill slope catch point. Discussions with Caltrans District 3 Design indicate that this design exception will be approved.
- A mandatory design exception will be required to address the existing vertical curve stopping sight distance on the Talmage Road U.S. 101 overcrossing until the structure is widened and improved, as discussed in the next section.
- Providing guard rails at appropriate locations to eliminate safety hazards.
- Installing new vehicle detectors where required for signal actuation.
- Installing new safety lighting, as required.

The detailed level of service analysis of the preferred alternative includes an operational analysis of the Talmage Road corridor for the 2032 traffic volume condition. The analysis and results are described in detail in the next section.

5. Caltrans Alternative Operational Analysis

The analysis of the operational conditions for the Caltrans Alternative utilized the proposed corridor and intersection geometrics as shown in Figure 10. The existing and the future (2032) P.M. peak hour traffic volumes are shown on Figure 3. The P.M. peak hour condition was selected as the worst case peak hour condition for the analysis of the Caltrans Alternative.

Based on the analysis of the existing Talmage Road corridor previously described, and in coordination with Caltrans District 1 Traffic Operations, the P.M. peak hour was selected for the evaluation of the Caltrans Alternative because it represents the worst case traffic conditions. The analysis of the Caltrans Alternative was conducted in close coordination with District 1 Traffic Operations, and included a detailed evaluation of approach level of service and delay for each lane, queuing analysis, and simulations to address operational concerns and achieve concurrence and approval of the design concept.

5.1 Caltrans Alternative Traffic Operational Analysis (Existing)

5.1.1 Level of Service

The results of the intersection level of service analysis for the Caltrans Alternative geometry using the existing condition are summarized in Table 12. The results show that, measured against the level of service standards, all intersections operate acceptably. The Caltrans Alternative operational analysis and LOS calculations are included in Appendix E.

Table 12 – Existing PM Peak Hour Intersection Level of Service (Caltrans Alternative Geometry)

No.	Intersection	PM	
		Delay (sec)	LOS
1	Talmage Rd/Airport Park Blvd (Signal)[1]	24.7	C
2	Talmage Rd/Southbound Ramp *Westbound left-turn (Unsignalized)*[2] *Northbound Right-turn (Unsignalized)*[2] *Southbound Right-turn (Signalized)*[1]	 9.3 11.2 5.0	 A B A
3	Talmage Rd/Northbound Ramp (Unsignalized)[2] *Northbound Off-ramp approach*	 15.5	 C

Notes: [1]LOS based on HCM2000 method of operational analysis for Signalized Intersections
[2]LOS based on HCM2000 method for operational analysis for Unsignalized Intersections
Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
BOLD = less than LOS D

5.1.2 Peak Hour Signal Warrant No. 3 for Intersection No. 3

The Traffic Signal Warrant 3 for peak hour traffic conditions for Intersection No. 3 was evaluated and was not met for the existing condition. While the existing interchange northbound on- and off-ramps do not meet the LOS standards for the future condition, their operation and performance should be monitored once traffic volumes reach the anticipated 2032 traffic volumes to assess when signalization of this intersection may be needed.

5.1.3 Queuing Analysis

An analysis of vehicle queues and available storage was performed for the 50th and 95th percentile queue lengths based on the HCM 2000 methodology. The results of the queuing analysis show that for the existing condition Caltrans Alternative there is generally adequate storage length at all intersections, except the northbound No. 1 left turn lane at Intersection No. 1 which is about 1 car length short. The queue length calculations are summarized in Tables 13, 14 and 15. The queuing analysis results are included in Appendix E.

Table 13 – Existing PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 1

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
EBL	19	50	24/66
EBT	565	500	120/179
EBTR			131/201
WBL	325	255	81/133
WBL		400	91/136
WBT	745	400	124/209
WBTR		255	56/162
NBL	206	85	81/116
NBL		600	80/134
NBR	455	600	91/130
SBL	22	50	19/51
SBTR	58	200	41/78

Notes: # queue exceeds capacity, queue may be longer.

Table 14 – Existing PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 2

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	FT
WBL	35	245	16/42
WBT	356	1000 (Overcrossing)	61/108
WBT		100	69/113
NBR	144	1000	6/34
SBR	430	500	62/107
SBR		275	71/120

Notes: # queue exceeds capacity, queue may be longer.

Table 15 – Existing PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 3

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
NBL	90	500	39/72
NBR	52	25	33/59

Notes: # queue exceeds capacity, queue may be longer.

5.2 Caltrans Alternative Traffic Operational Analysis (2032)

5.2.1 Level of Service

The results of the intersection level of service analysis for the Caltrans Alternative are summarized in Table 12. The results show that, measured against the level of service standards, all intersections operate acceptably. The Caltrans Alternative operational analysis and LOS calculations are included in Appendix E.

Table 16 – Future (2032) PM Peak Hour Intersection Level of Service (Caltrans Alternative Geometry)

No.	Intersection	PM	
		Delay (sec)	LOS
1	Talmage Rd/Airport Park Blvd (Signal)[1]	31.7	C
2	Talmage Rd/Southbound Ramp *Westbound left-turn (Unsignalized)[2]* *Northbound Right-turn (Unsignalized)[2]* *Southbound Right-turn (Signalized)[1]*	 10.9 15.2 5.3	 B C A
3	Talmage Rd/Northbound Ramp (Unsignalized)[2] *Northbound Off-ramp approach*	 22.8	 C

Notes: [1]LOS based on HCM2000 method of operational analysis for Signalized Intersections
[2]LOS based on HCM2000 method for operational analysis for Unsignalized Intersections
Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
BOLD = less than LOS D

5.2.2 Peak Hour Signal Warrant No. 3 for Intersection No. 3

The Traffic Signal Warrant 3 for peak hour traffic conditions for Intersection No. 3 was evaluated and was not met for the future condition. While the existing interchange northbound on- and off-ramps do not meet the LOS standards for the future condition, their operation and performance should be monitored once traffic volumes reach the anticipated 2032 traffic volumes to assess when signalization of this intersection may be needed.

5.2.3 Queuing Analysis

An analysis of vehicle queues and available storage was performed for the 50th and 95th percentile queue lengths based on the HCM 2000 methodology. The results of the queuing analysis show that for the future condition Caltrans Alternative there is generally adequate storage length at all intersections, except the northbound No. 1 left turn lane at Intersection No. 1 which is about 1 car length short. The queue length calculations are summarized in Tables 17, 18 and 19. The queuing analysis results are included in Appendix E.

Table 17 – Future (2032) PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 1

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
EBL	27	50	28/63#
EBT	772	500	209/325
EBTR			226/328
WBL	601	255	197/265#
WBL		400	210/276
WBT	474	400	142/229
WBTR		255	60/155
NBL	370	85	107#/113#
NBL		600	476/573
NBR	761	600	473/581
SBL	35	50	28/58#
SBTR	87	200	53/90

Notes: # queue exceeds capacity, queue may be longer.

Table 18 – Future (2032) PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 2

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	FT
WBL	51	245	24/58
WBT	493	1000 (Overcrossing)	84/133
WBT		100	69/123#
NBR	203	1000	13/54
SBR	625	500	118/184
SBR		275	78/149

Notes: # queue exceeds capacity, queue may be longer.

Table 19 – Future (2032) PM Peak Hour Vehicle Queuing (Caltrans Alternative) – Intersection No. 3

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
NBL	121	500	57/116
NBR	74	25	41#/58#

Notes: # queue exceeds capacity, queue may be longer.

6. Preferred Alternative Operational Analysis

The analysis of the operational conditions for the Preferred Alternative utilized the proposed corridor and intersection geometrics are shown in Figure 6. The existing and the future (2032) P.M. peak hour traffic volumes are shown on Figure 3. Based on the analysis of the existing Talmage Road corridor previously described, and in coordination with Caltrans District 1 Traffic Operations, the P.M. peak hour was selected for the evaluation of the Preferred Alternative because it represents the worst case traffic conditions. The analysis of the Preferred Alternative was conducted in close coordination with District 1 Traffic Operations and includes a detailed evaluation of approach level of service for each lane, queuing analysis, and simulations to address operational concerns and achieve concurrence and approval of the design concept.

6.1 Preferred Alternative Traffic Operational Analysis (Existing)

6.1.1 Level of Service

The results of the intersection level of service analysis for the Preferred Alternative using the existing condition are summarized in Table 20. The results show that, measured against the level of service standards, all intersections operate acceptably. The Preferred Alternative operational analysis and LOS calculations are included in Appendix E.

Table 20 – Existing PM Peak Hour Intersection Level of Service (Preferred Alternative Geometry)

No.	Intersection	PM	
		Delay (sec)	LOS
1	Talmage Rd/Airport Park Blvd (Signal)	28.1	C
2	Talmage Rd/Southbound Ramp (Signal)	21.9	C
3	Talmage Rd/Northbound Ramp (Unsignalized) *Off-ramp approach*	14.8	B

6.1.2 Peak Hour Signal Warrant No.3 for Intersection No. 3

The Traffic Signal Warrant 3 for peak hour traffic conditions for Intersection No. 3 was evaluated and was not met for the existing condition. While the existing interchange northbound on- and off-ramps do not meet the LOS standards for the future condition, their operation and performance should be monitored once traffic volumes reach the anticipated 2032 traffic volumes to assess when signalization of this intersection may be needed.

6.1.3 Queuing Analysis

An analysis of vehicle queues and available storage was performed for the 50th and 95th percentile queue lengths based on the HCM 2000 methodology. The results of the queuing analysis show that for the existing condition there is generally adequate available storage length at all intersections within the State right-of-way. The queue length calculations are summarized in Tables 21, 22 and 23. The queuing analysis results are included in Appendix E.

Table 21 – Existing PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 1

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
EBL	19	50	22/55
EBT	565	500	163/268
EBTR		500	176/284
WBL	325	255	103/163
WBL		255	93/151
WBT	745	255	167/261
WBTR		255	76/190
NBL	206	85	96/117
NBL		600	156/253
NBR	445	600	152/240
SBL	22	50	31/68
SBTR	58	200	56/100

Notes: # queue exceeds capacity, queue may be longer.

Table 22 – Existing PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 2

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	FT
EBT	767	255	187/306
EBT		255	211/327
EBR	109	85	59/171
WBL	35	160	31/71
WBT	356	1000 (Overcrossing)	39/84
WBT		200	102/172
NBL	430	700	84/146
NBL		700	49/111
NBL		700	98/211
NBR	144	200	72/154

Notes: # queue exceeds capacity, queue may be longer.

Table 23 – Existing) PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 3

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
NBL	90	300	37/61
NBR	52	25	31/59

Notes: # queue exceeds capacity, queue may be longer.

6.2 Preferred Alternative Traffic Operational Analysis (2032)

6.2.1 Level of Service

The results of the intersection level of service analysis for the Preferred Alternative are summarized in Table 24. The results show that, measured against the level of service standards, all intersections operate acceptably. The Preferred Alternative operational analysis and LOS calculations are included in Appendix E.

Table 24 – Future (2032) PM Peak Hour Intersection Level of Service (Preferred Alternative Geometry)

No.	Intersection	PM	
		Delay (sec)	LOS
1	Talmage Rd/Airport Park Blvd (Signal)	32.1	C
2	Talmage Rd/Southbound Ramp (Signal)	20.9	C
3	Talmage Rd/Northbound Ramp (Unsignalized) *Off-ramp approach*	24.0	C

6.2.2 Peak Hour Signal Warrant No.3 for Intersection No. 3

The Traffic Signal Warrant 3 for peak hour traffic conditions for Intersection No. 3 was evaluated and was not met for the future condition. While the existing interchange northbound on- and off-ramps do not meet the LOS standards for the future condition, their operation and performance should be monitored once traffic volumes reach the anticipated 2032 traffic volumes to assess when signalization of this intersection may be needed.

6.2.3 Queuing Analysis

An analysis of vehicle queues and available storage was performed for the 50th and 95th percentile queue lengths based on the HCM 2000 methodology. The results of the queuing analysis show that for the future condition there is generally adequate available storage length at all intersections within the State right-of-way. The queue length calculations are summarized in Tables 25, 26 and 27. The queuing analysis results are included in Appendix E.

Table 25 – Future (2032) PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 1

Movement	**Peak Hour Volume**	**Available Storage Length**	**Queue Length - Average/95th (feet/feet)**
		FT	**PM**
EBL	27	50	31/71#
EBT	772	500	216/343
EBTR		500	237/346
WBL	601	255	258#/271#
WBL		255	253#/270#
WBT	474	255	198/311
WBTR		255	109/257#
NBL	370	85	109/111#
NBL		600	525/543
NBR	761	600	529/549
SBL	35	50	15/50
SBTR	87	200	56/93

Notes: # queue exceeds capacity, queue may be longer.

Table 26 – Future (2032) PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 2

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	FT
EBT	1141	255	163/264#
EBT		255	181/276#
EBR	152	85	64/176#
WBL	51	160	72/186#
WBT	449	1000 (Overcrossing)	518/797
WBT		200	143/317#
NBL	619	700	204/293
NBL		700	184/282
NBL		700	131/210
NBR	203	200	100/181

Notes: # queue exceeds capacity, queue may be longer.

Table 27 – Future (2032) PM Peak Hour Vehicle Queuing (Preferred Alternative) – Intersection No. 3

Movement	Peak Hour Volume	Available Storage Length	Queue Length - Average/95th (feet/feet)
		FT	PM
NBL	121	300	89/217
NBR	74	25	38#/68#

Notes: # queue exceeds capacity, queue may be longer.

7. Summary and Conclusions

7.1 Summary

This traffic analysis was prepared for the modification and reconstruction the southbound U.S. 101 interchange at Talmage Road (State Route 222) in Ukiah, California. The purpose of the project is to alleviate congestion, and improve traffic operations and safety for the southbound on- and off-ramps and the Talmage Road Corridor. The Project includes improvements to the southbound on- and off-ramps to realign them and provide additional lanes and capacity, and improvements to Talmage Road within the State right-of-way in the City of Ukiah.

Two interchange alternatives and five intersection alternatives were evaluated. The Caltrans Alternative for the project involves the widening and realignment of the existing ramps, and a new signal at the southbound off-ramp to westbound Talmage Road. The preferred alternative for the project involves a partial cloverleaf interchange configuration with a new signalized intersection at the southbound ramp terminus with Talmage Road. The new signalized intersection at Talmage Road and the southbound on/off ramps is proposed to be coordinated with the existing signalized intersection at Talmage Road and Airport Park Boulevard.

7.2 Conclusions

The analysis of the Caltrans Alternative and the Preferred Alternative was executed in close coordination with Caltrans District 1 Traffic Operations and District 3 Design. The pertinent conclusions of the analysis are summarized below:

- All study intersections are anticipated to operate at an acceptable level of service for the future (2032) traffic conditions.
- An evaluation of the widening and improvement of the existing Talmage Road overcrossing structure and evaluation of Intersection No. 3 for signalization is not warranted until the end of the planning horizon (2032).
- The results of the queuing analysis for the Caltrans Alternative show that there is adequate available storage length within one vehicle length (approximately 25 feet) at all intersections within the State right-of-way. Where available storage is exceeded, queues are not anticipated to cause safety or operational issues.
- The results of the queuing analysis for the Preferred Alternative show that there is adequate available storage length within one vehicle length (approximately 25 feet) at all intersections within the State right-of-way, with the exception of the No. 2 westbound through lane at Intersection No. 2. Where available storage is exceeded, queues are not anticipated to cause safety or operational issues.
- Approvals of all anticipated design exceptions shall be obtained from Caltrans prior to construction.

General concurrence with the results of this study and approval of the Preferred Alternative by Caltrans District 1 Office of Regional and Community Planning was provided in the April 15, 2013 Costco Wholesale Project Draft EIR comment letter to the City of Ukiah. A copy of the letter is included as Appendix F. Caltrans has also provided approval of the Caltrans Alternative.

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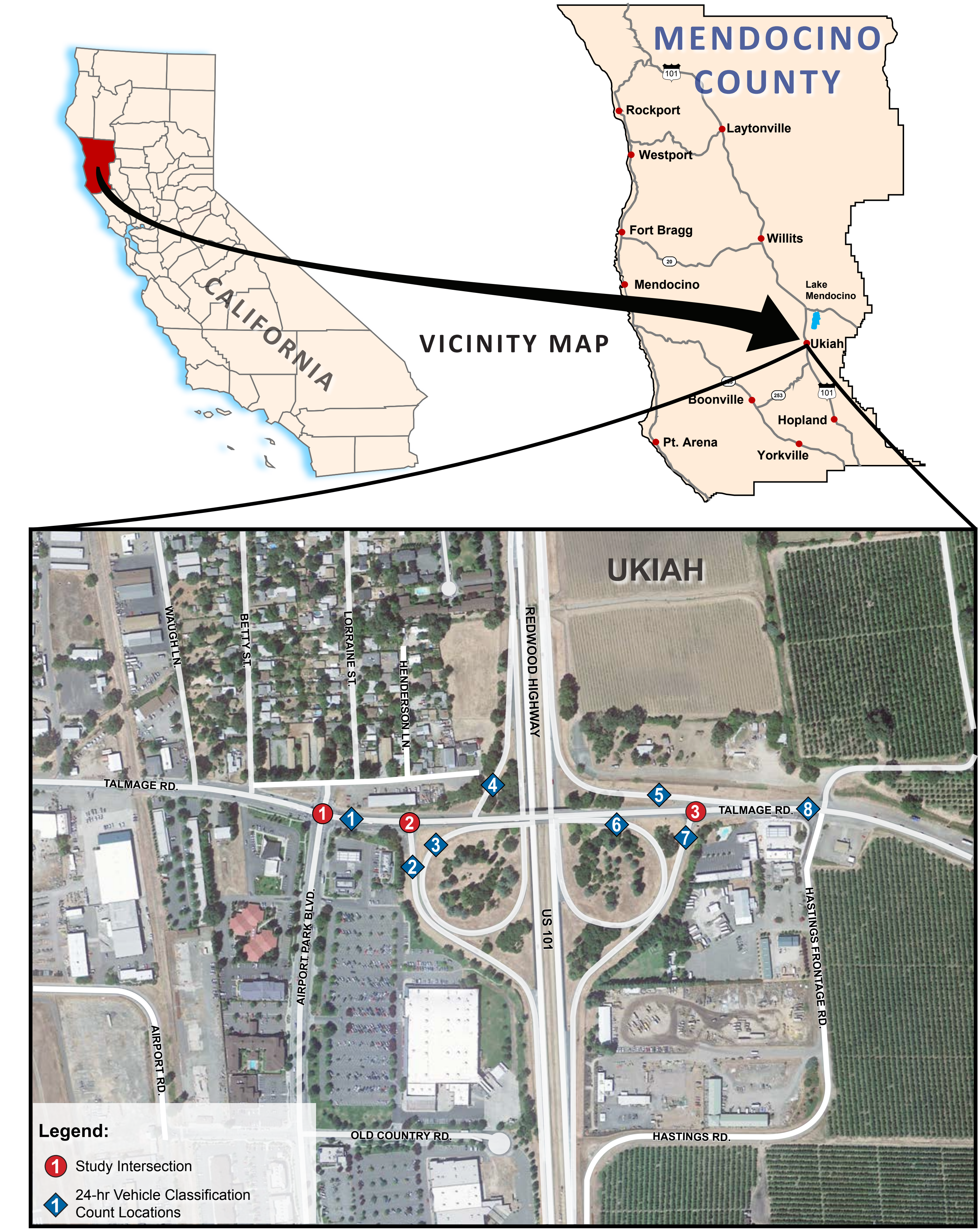
FIGURES



N
N.T.S.

City of Ukiah
Talmage Southbound Interchange Realignment Project

Project Vicinity &
Location Map

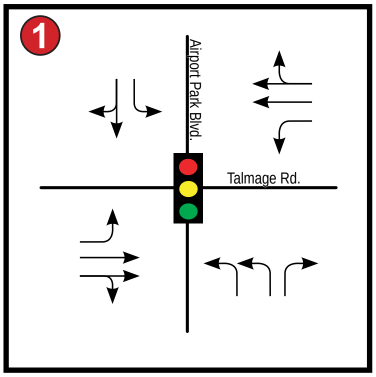
Job Number	8410035
Revision	A
Date	Feb 204

Figure 1

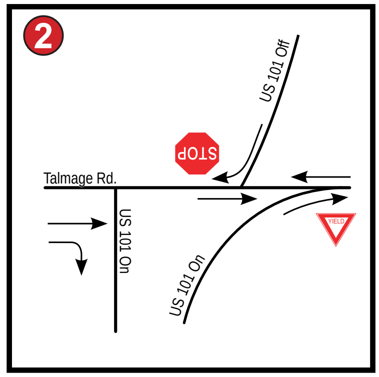
2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Existing (2012) Geometry and Traffic Controls

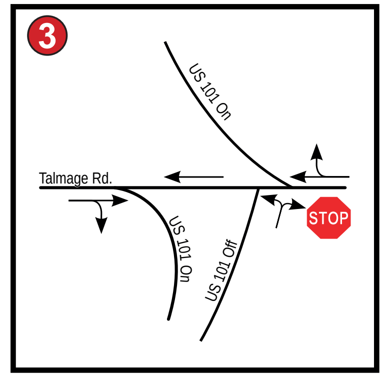
Talmage Rd./Airport Park Blvd.



Talmage Rd./US 101
Southbound Ramps



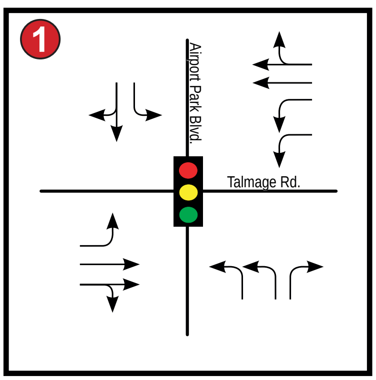
Talmage Rd./US 101
Northbound Ramps



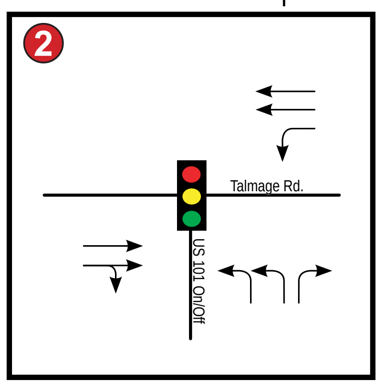
Future (2032) Geometry and Traffic Controls

Alternative 2 (Dual-Left)

Talmage Rd./Airport Park Blvd.

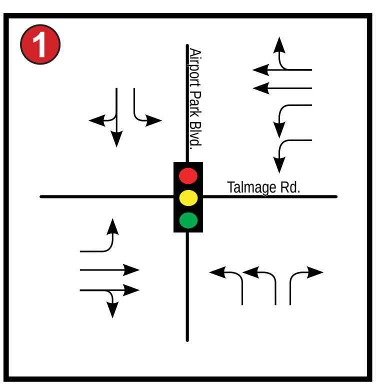


Talmage Rd./US 101
Southbound Ramps

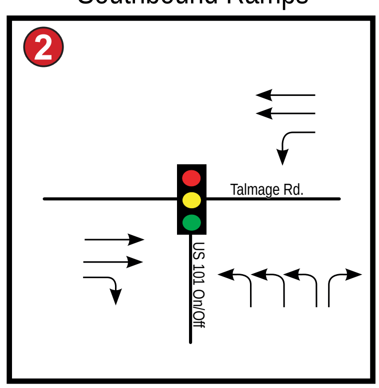


Alternative 1 (Triple-Left)

Talmage Rd./Airport Park Blvd.



Talmage Rd./US 101
Southbound Ramps



Legend:

1 Study Intersection

Signalized Intersection

STOP Stop Sign

Yield Sign

N

GHD

City of Ukiah
Talmage Southbound Interchange Realignment Project

Intersection Lane Geometry &
Traffic Controls

Job Number	8410035
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Figure 2

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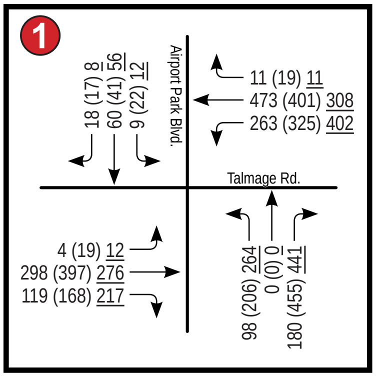
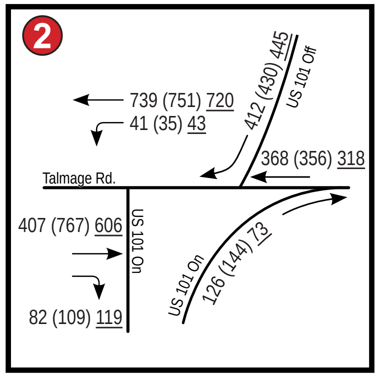
Existing Geometry Conditions

Existing (2012) Traffic Volumes

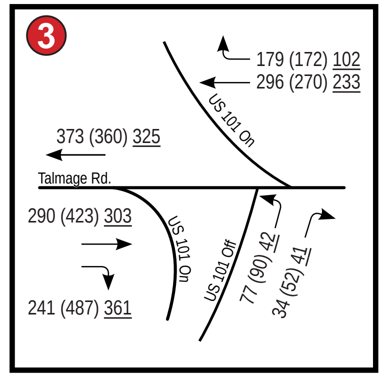
Talmage Rd./Airport Park Blvd.



Talmage Rd./US 101 Southbound Ramps

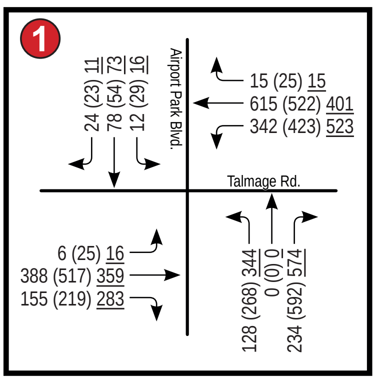


Talmage Rd./US 101 Northbound Ramps

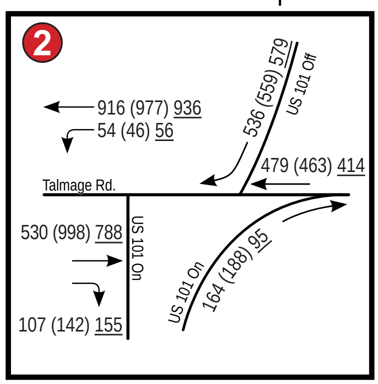


Future (2032) Traffic Volumes

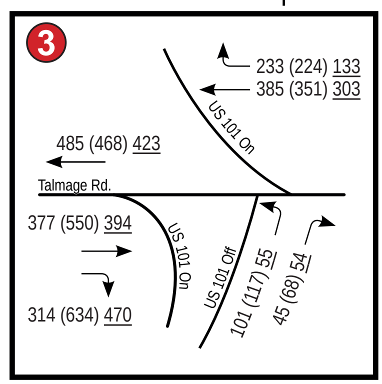
Talmage Rd./Airport Park Blvd.



Talmage Rd./US 101 Southbound Ramps



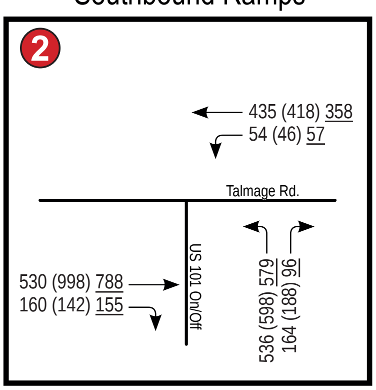
Talmage Rd./US 101 Northbound Ramps



Future Geometry Conditions

Alternative 1 (Dual-Left) and Alternative 2 (Triple-Left)

Talmage Rd./US 101 Southbound Ramps



Legend:

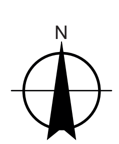
1 Study Intersection

xxxx Weekday AM Peak Hour Volume

(xxxx) Weekday PM Peak Hour Volume

xxxx Saturday Midday Peak Hour Volume

Source: MCOG (2005)



City of Ukiah
Talmage Southbound Interchange Realignment Project

Job Number	8410035
Revision	A
Date	Feb 2014

Talmage Interchange Option 1

Figure 4

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Source: MCOG (2005)

N

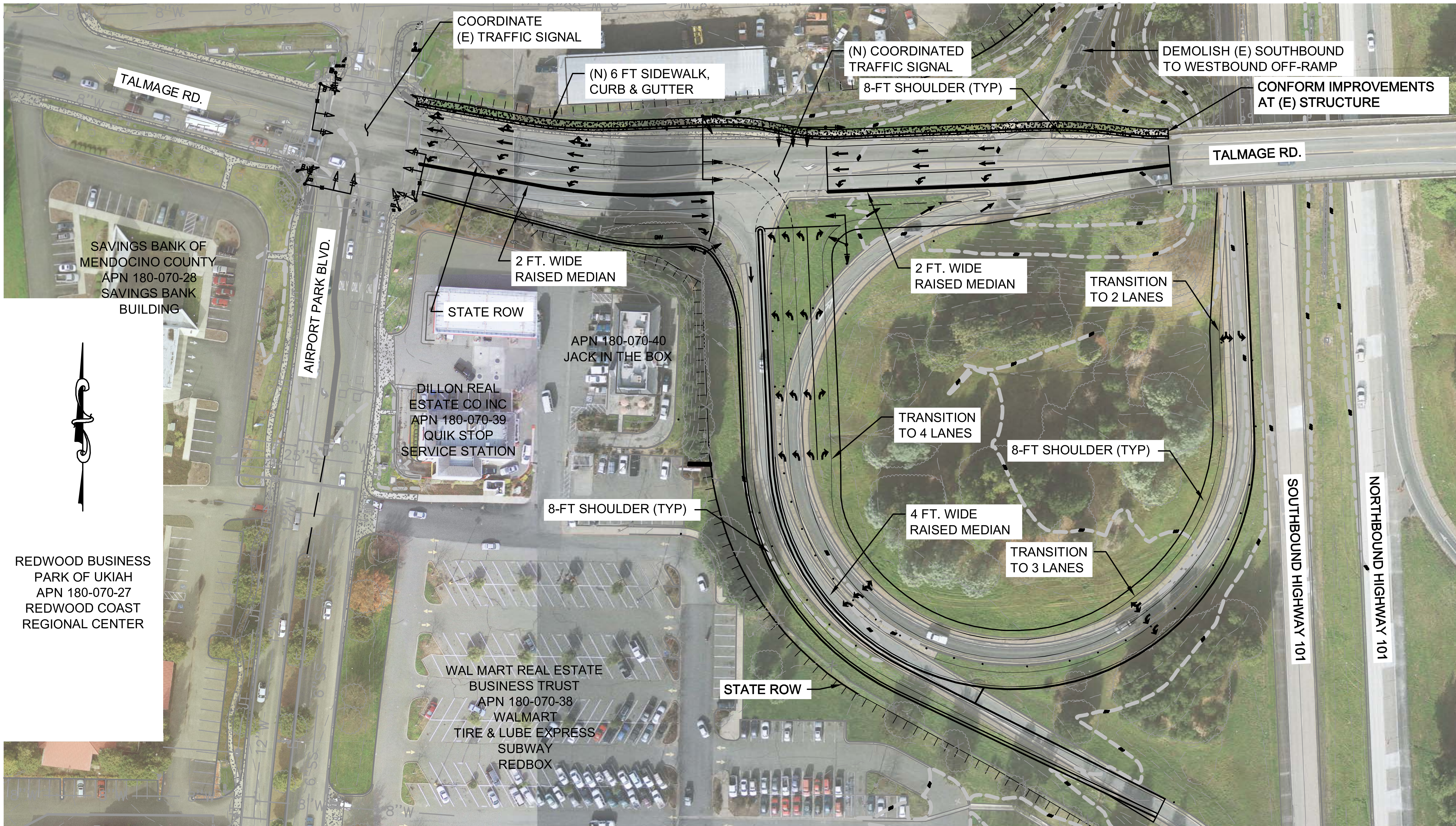
City of Ukiah
Talmage Southbound Interchange Realignment Project

Job Number	8410035
Revision	A
Date	Feb 2014

Talmage Interchange Option 2

Figure 5

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com



City of Ukiah
Talmage Southbound Interchange
Realignment Project

INTERSECTION ALTERNATIVE 1
(SIGNALIZED - TRIPLE LEFT)

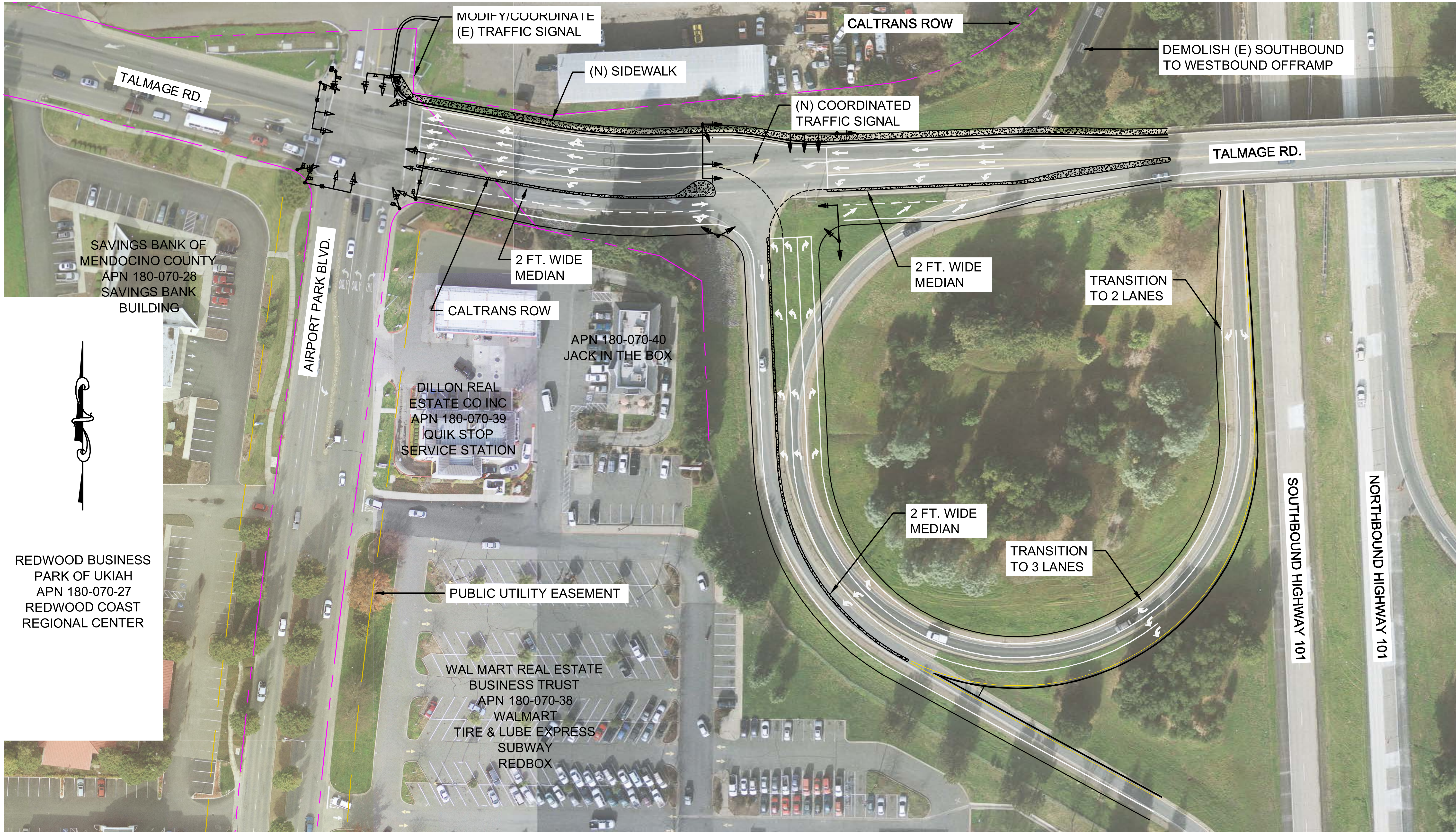
Job Number | 8410035
Revision | A
Date | Feb 2014

Figure 6

GHD

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA **T** 1 707 523 1010 **F** 1 707 527 8679 **W** www.ghd.com

Plot Date: 21 June 2013 - 9:40 AM Cad File No: \\srosvr1\projects\02502 - City of Ukiah\02502-8410035 Talmage Interchange\06-CAD\Figures\Exhibits\Interchange Option A - Signal - Alt_2 - Triple Left.dwg



0 40 80
1" = 40'

City of Ukiah
Talmage Southbound Interchange
Realignment Project

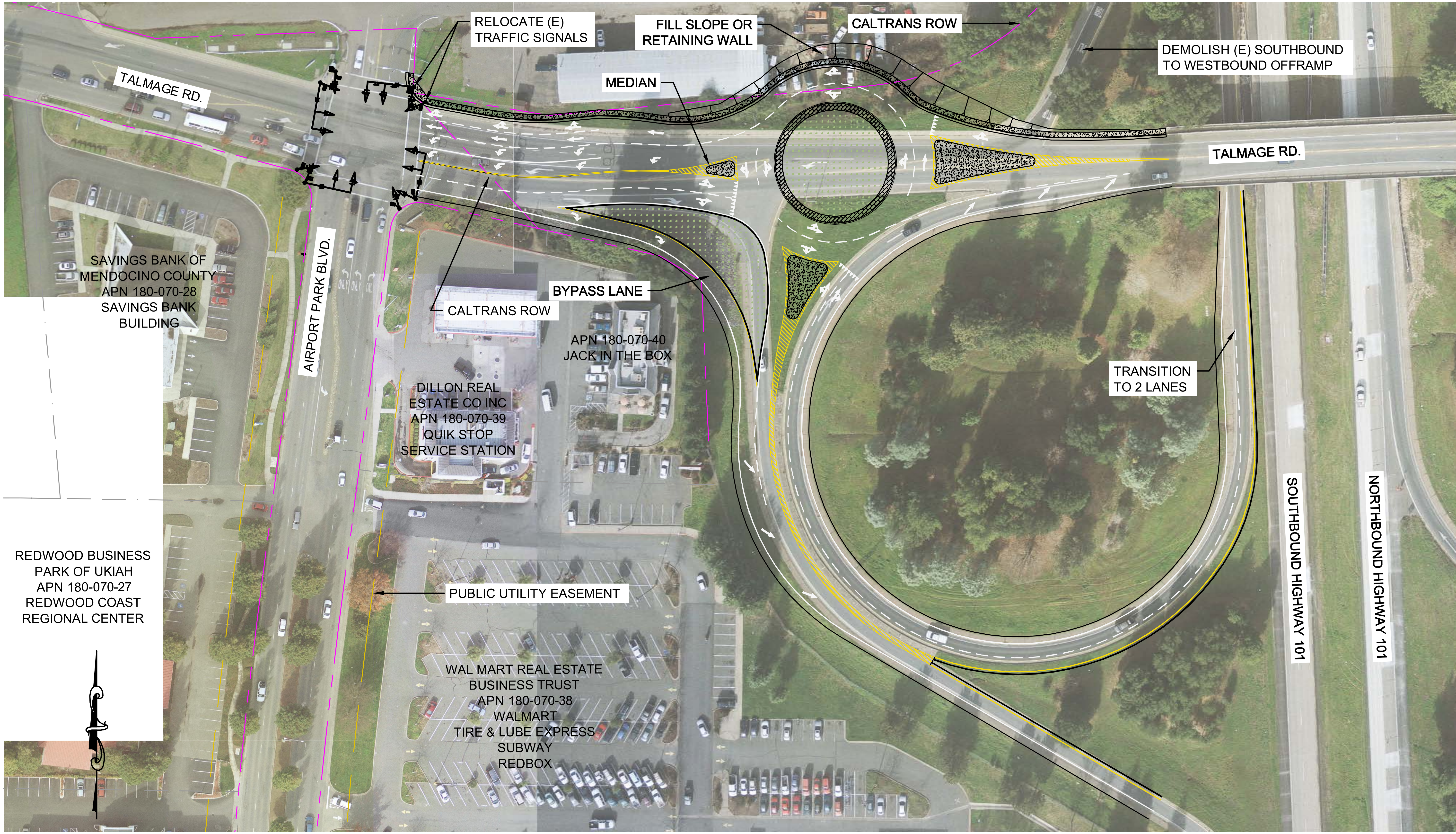
INTERSECTION ALTERNATIVE 2
(SIGNALIZED - ALT 1 DUAL LEFT)

Job Number | 8410035
Revision | A
Date | Feb 2014

Figure 7

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Plot Date: 21 June 2013 - 9:49 AM Cad File No: \\srosvr1\projects\02502 - City of Ukiah\02502-8410035 Talmage Interchange\06-CAD\Figures\Exhibits\Interchange Option A - Signal - Alt_1 - Dual Left.dwg



1" = 80'

0 80

GHD

City of Ukiah
Talmage Southbound Interchange
Realignment Project

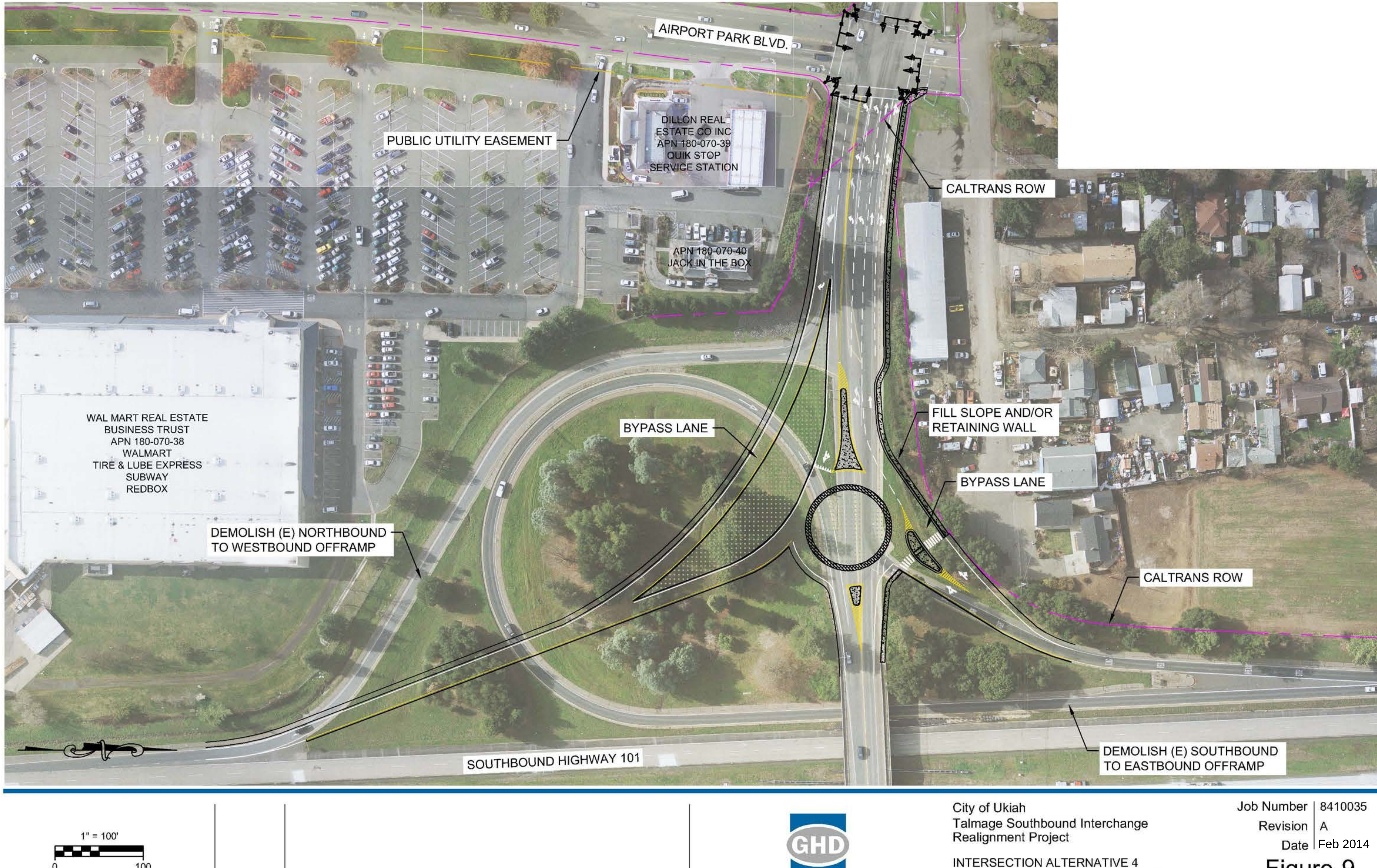
INTERSECTION ALTERNATIVE 3
(THREE LEG - TWO LANE ROUNDABOUT)

Job Number	8410035
Revision	A
Date	Feb 2014

Figure 8

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Plot Date: 21 June 2013 - 11:04 AM Cad File No: \\srosvr1\projects\02502 - City of Ukiah\02502-8410035 Talmage Interchange\06-CAD\Figures\Exhibits\Interchange Option A - Roundabout.dwg



City of Ukiah
Talmage Southbound Interchange
Realignment Project

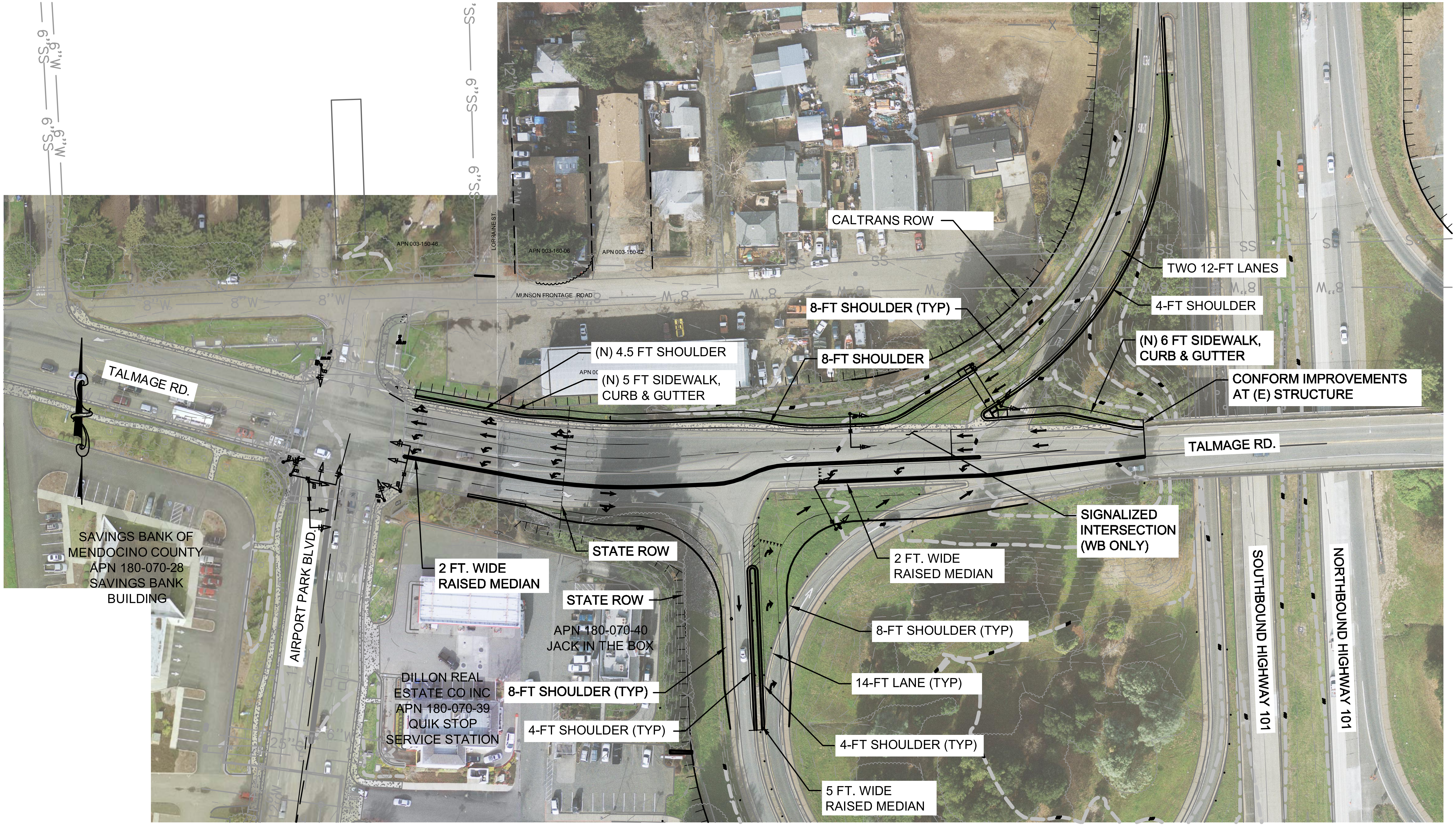
INTERSECTION ALTERNATIVE 4
(FOUR LEG - ONE LANE ROUNDABOUTT)

Job Number	8410035
Revision	A
Date	Feb 2014

Figure 9

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

Plot Date: 21 June 2013 - 11:06 AM Cad File No: \\srosvr1\projects\02502 - City of Ukiah\02502-8410035 Talmage Interchange\06-CAD\Figures\Exhibits\Interchange Option B - Roundabout.dwg



City of Ukiah
Talmage Southbound Interchange
Realignment Project

INTERSECTION ALTERNATIVE
CALTRANS ALTERNATIVE

Job Number	8410035
Revision	A
Date	Feb 2014

Figure 10

GHD

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

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Appendices

Appendix A - Traffic Collision Data and Analysis

Intersection Crash Rates

Intersection	Year	State Avg. Crash Rate (per MEV)	Crash Rate (per MEV)	Peak Hour (veh/hr)	24-hr Total Entering Volume (based on 10% of (E)	Total All Collisions	Type of Collision: Head-On (A)	Sideswipe (B)	Rear End (C.)	Broadside (D)	Hit Object (E)	Overturned (F)	Vehicle/Pedestrian (G)	Other (H)	Collision Severity: Fatal (1)	Severe (2)	Other Visible (3)	Compliant of Pain (4)	PDO	Motor Vehicle Involved With…: Pedestrians (B)	Motor Vehicles (C D E)	Train (F)	Bicycle (G)	Animal (H)	Fixed or Other Object (J)	Non-Collisions or not stated (A -)
Talmage Road and Airport Park Boulevard	2001	0.43	0.00			0																				
	2002	0.43	**0.66**			5		1	3	1								2	3		5					
	2003	0.43	0.26			2			2										2		2					
	2004	0.43	**0.53**			4		1	3									3	1		4					
	2005	0.43	0.40			3		1	1	1								2	1		3					
	2006	0.43	0.26	2,070	20,700	2			1	1								1	1		2					
	2007	0.43	0.13			1	1												1		1					
	2008	0.43	0.40			3		2		1							1		2		3					
	2009	0.43	0.13			1			1										1		1					
	2010	0.43	0.40			3		1		2								1	2		2		1			
	2011	0.43	0.00			0																				
Talmage Road and U.S. 101 Interchange	2001	0.19	0.00			0																				
	2002	0.19	0.00			0																				
	2003	0.19	0.07			1	1											1			1					
	2004	0.19	0.15			2				1	1								2		1				1	
	2005	0.19	0.00			0																				
	2006	0.19	0.15	3,755	37,550	2				2							1		1		1		1			
	2007	0.19	0.07			1			1										1		1					
	2008	0.19	0.00			0																				
	2009	0.19	0.00			0																				
	2010	0.19	0.00			0																				
	2011	0.19	0.00			0																				

Notes:

State Avg. Crash Rates are based on: 2007 Collision Data on California State Highways (road miles, travel, collisions, collision rates), 2007, Caltrans, Basic Average Accident Rate Table for Intersections

Appendix B - Caltrans District 1 Growth Factor Map

Memorandum

Flex your power!
Be energy efficient!

To: CHARLIE FIELDER
JANA HOLLIFIELD
MATT BRADY
MARK SUCHANEK

Date: February 3, 2014

File: Growth Factors

From: BRAD METTAM
Deputy District Director,
Planning and Local Assistance

Subject: 2014 Growth Factors

Attached are the 2014 District 1 growth factor summary, the 2014 District Growth Factor Map, and a "Using D1 Growth Factors" tutorial.

Prior to 1984, Caltrans District 1 projected future traffic volumes based solely on historical growth. Future volumes were calculated using an annual percent increase that was derived from historical traffic volumes. We found that this method produced acceptable results in the short to mid-term, but due to compounding, long-range predictions (20 years or more) tended to be overestimated.

In 1984, in order to eliminate that long-range distortion noted above, we began calculating growth factors as a 20-year straight-line determinant. For example, a segment of highway with a growth factor of 1.4 is predicted to have a 40% increase in traffic over the next 20-years. Likewise, it is predicted to have a 20% increase over 10 years.

Historically, District staff has developed growth factors based on both projected travel trends and historical growth from two data sources—the "California Motor Vehicle Stock Travel and Fuel Forecast" (CMVSTAFF) and historical Average Vehicle Mile Traveled (AVMT) comparisons from "Traffic Volumes on the California State Highway System." Since CMVSTAFF was not available for the 2014 growth factor update, county growth factor targets were developed based on California Air Resources Board traffic growth projections and historic traffic growth data.

Our growth factors are applied over highway segments that were determined using observed conditions; these segments vary in length, but they are not longer than fifty miles. Traffic volumes over segments are based on a calculated weighted average of volumes (Annual Average Daily Traffic) for the entire segment. While actual growth at the local level can vary considerably, we are looking at overall growth over the long-term. If more specific data or information are available for a particular location (actual counts, planned growth, etc.) it may be advisable to calculate a location-specific rate. However, for the purposes of facility design (20-year design-life) our generalized segment growth factors are appropriate. It should be noted that our growth factors forecast traffic growth only for the mainline (State Routes); local streets should be examined separately.

District planning staff reviews growth factors every two years, and typically revise them every two to four years. Growth factors were not updated for several years following 2006, since MVSTAFF data supported higher growth rates at a time when traffic counts were generally level or declining. The most recent MVSTAFF has been removed from the Division of Transportation Planning, Office of Transportation Forecasting and Analysis website, and they recommended using the use of the Air Resources Board EMFAC database as a substitute. Therefore, we based our 20-year District vehicle miles of travel target on ARB data. District staff would prefer to use county travel demand models to project traffic growth, or the MVSTAFF to develop growth factor targets, and we hope to do so in the future. However, neither of these data sources is currently supportable.

If you have any questions regarding the growth factors, please call Rex Jackman at (707) 445-6412 or Chris Dosch at (707) 441-4542.

Attachments:
2014 Growth Factor Summary
2014 Growth Factor Map
Using District 1 Growth Factors Tutorial

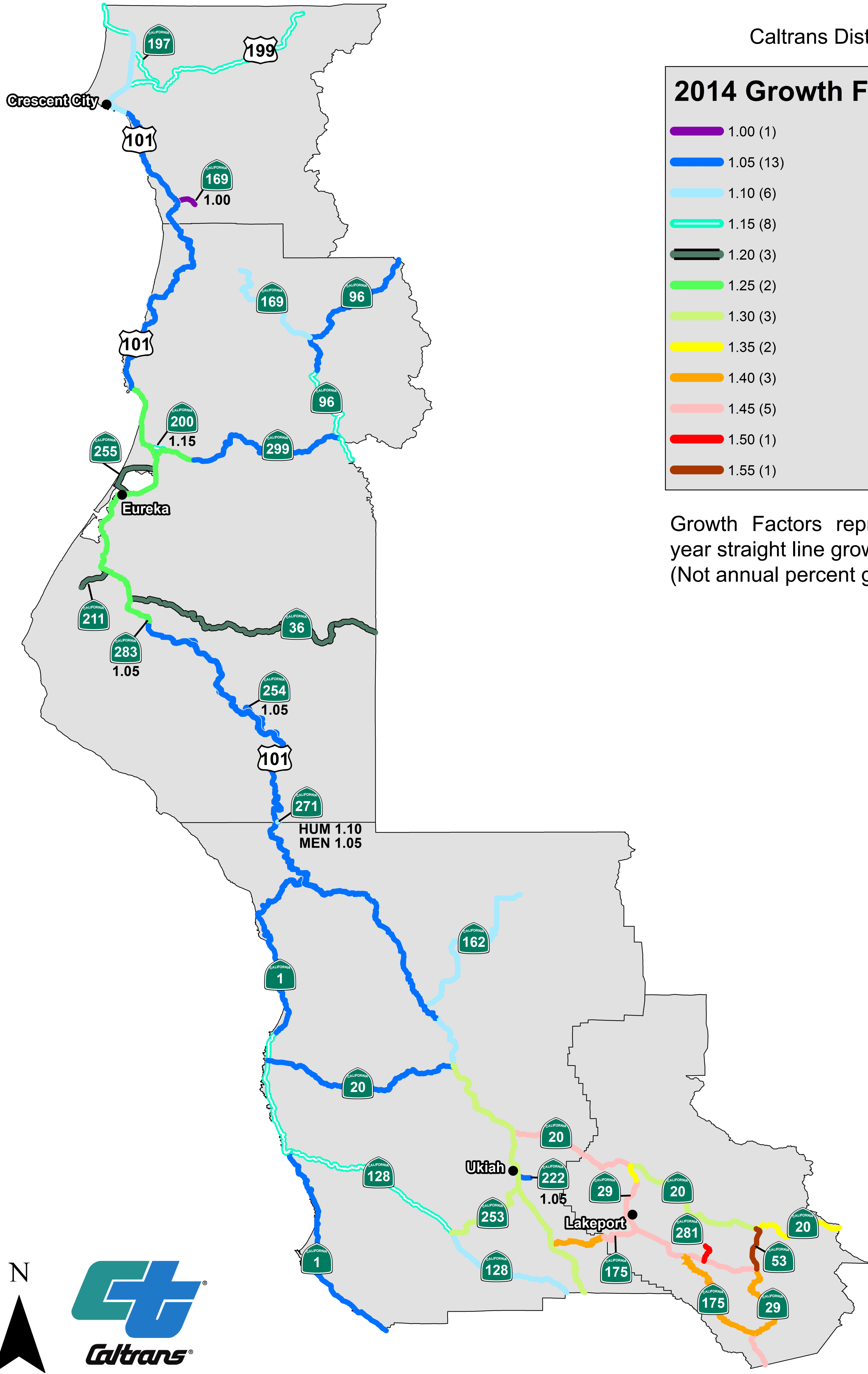
c: TROY ARSENEAU
DAVID MORGAN
JOHN CARSON
RALPH MARTINELLI
GARRY BANDUCCI
SANDRA ROSAS
STEVE HUGHES
SUSAN ZANCHI
ROYAL McCARTHY
REX JACKMAN

Caltrans District 1

2014 Growth Factor Map

- 1.00 (1)
- 1.05 (13)
- 1.10 (6)
- 1.15 (8)
- 1.20 (3)
- 1.25 (2)
- 1.30 (3)
- 1.35 (2)
- 1.40 (3)
- 1.45 (5)
- 1.50 (1)
- 1.55 (1)

Growth Factors represent a 20 year straight line growth pattern. (Not annual percent growth)



DISTRICT 1 - GROWTH FACTOR SUMMARY

20 YEAR GROWTH FACTORS

SEGMENT	2/2014 G.F.
MEN-1-0.00/40.27	1.05
MEN-1-40.27/64.86	1.15
MEN-1-64.86/105.57	1.05
MEN-20-0.00/33.16	1.05
MEN-20-33.22/44.11	1.45
LAK-20-0.00/8.34	1.45
LAK-20-8.34/31.62	1.30
LAK-20-31.62/46.48	1.35
LAK-29-0.00/5.81	1.45
LAK-29-5.81/20.31	1.40
LAK-29-20.31/48.40	1.45
LAK-29-48.40/52.54	1.35
HUM-36-0.00/45.68	1.20
LAK-53-0.00/7.45	1.55
HUM-96-0.00/16.00	1.15
HUM-96-16.00/44.98	1.05
MEN-101-0.10/47.27	1.30
MEN-101-47.27/55.90	1.10
MEN-101-55.90/104.15	1.05
HUM-101-0.00/51.84	1.05
HUM-101-51.84/100.71	1.25
HUM-101-100.71/137.14	1.05
DN-101-0.00/23.85	1.05
DN-101-23.85/39.98	1.10
DN-101-39.98/46.49	1.15
MEN-128-0.00/29.58	1.15
MEN-128-29.58/50.90	1.10
MEN-162-0.00/34.05	1.10
DN-169-0.0/3.52	1.00
HUM-169-13.20/33.84	1.10
MEN-175-0.00/9.85	1.40
LAK-175-0.00/8.19	1.45
LAK-175-8.25/28.04	1.40
DN-197-0.00/7.08	1.15
DN-199-0.51/36.41	1.15
HUM-200-0.00/2.68	1.15
HUM-211-73.20/79.16	1.20
MEN-222-0.00/2.15	1.05
MEN-253-0.00/17.18	1.30
HUM-254-0.00/46.53	1.05
HUM-255-0.0/8.80	1.20
MEN-271-0.0/22.72	1.05
HUM-271-0.00/0.31	1.10
LAK-281-14.00/17.00	1.50
HUM-283-0.00/0.36	1.05
HUM-299-0.00/5.93	1.25
HUM-299-5.93/38.83	1.05
HUM-299-38.83/43.04	1.15
DISTRICT GROWTH FACTOR (Weighted Average)	1.24

Using District 1 Growth Factors

- To project volumes **<u>20 years</u>** into the future, multiply the base year traffic volume by the growth factor (GF).

  Formula: (GF)*(Base Year Volume) = Projected Volume

  Example: The base year volume (2012) is 1500 AADT. The 20-year growth factor for that segment of highway is 1.3. What is the 2032 volume?

  (1.3)*(1500) = 1950 The projected 2032 traffic volume (AADT) for this segment is 1950.

- To project volumes **<u>Less than or greater than 20 years</u>** into the future, use the following formula:

  Formula: $[1 + \frac{(\mathrm{GF}-1)*(\#\text{ of years into future})}{20}] * (\text{starting volume}) = \text{Projected Volume}$

  Example: The Base year volume in 2012 is 700 AADT. The 20- year growth factor is 1.4.

  A) What is the volume in 27 years?

  $\left[1 + \left(\frac{(1.4-1)*(27)}{20}\right)\right] * (700) = 1078$ The projected volume in 2039 is 1078.

  B) What is the volume in 7 years?

  $\left[1 + \left(\frac{(1.4-1)*(7)}{20}\right)\right] * (700) = 798$ The projected volume in 2019 is 798.

Appendix C - Existing Conditions Existing Geometry Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	298	119	263	473	11	98	0	180	9	30	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		*0.97		1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00		0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3106		1630	3247		3162		1458	1630	1594	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.56	0.84	0.73	0.72	0.79	0.69	0.82	0.50	0.73	0.45	0.75	0.50
Adj. Flow (vph)	16	355	163	365	599	16	120	0	247	20	40	36
RTOR Reduction (vph)	0	41	0	0	1	0	0	0	0	0	31	0
Lane Group Flow (vph)	16	477	0	365	614	0	120	0	247	20	45	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	1.3	22.4		21.8	42.9		6.7		28.5	6.6	6.6	
Effective Green, g (s)	1.3	22.4		21.8	42.9		6.7		28.5	6.6	6.6	
Actuated g/C Ratio	0.02	0.28		0.28	0.54		0.08		0.36	0.08	0.08	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	26	879		449	1761		267		550	136	133	
v/s Ratio Prot	0.01	c0.15		c0.22	0.19		0.04		0.12	0.01	c0.03	
v/s Ratio Perm									c0.04			
v/c Ratio	0.62	0.54		0.81	0.35		0.45		0.45	0.15	0.34	
Uniform Delay, d1	38.7	24.0		26.7	10.2		34.4		19.3	33.6	34.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	36.3	0.7		10.8	0.1		1.2		0.6	0.5	1.5	
Delay (s)	74.9	24.7		37.5	10.3		35.6		19.9	34.1	35.7	
Level of Service	E	C		D	B		D		B	C	D	
Approach Delay (s)		26.2			20.5			25.0			35.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	79.1	Sum of lost time (s)	21.6
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	407	82	41	739	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.89	0.79	0.68	0.97	0.97
Hourly flow rate (vph)	473	92	52	1087	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.87		0.87	0.87
vC, conflicting volume			565		1664	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			425		1688	319
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			986		85	627

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	473	92	52	1087
Volume Left	0	0	52	0
Volume Right	0	92	0	0
cSH	1700	1700	986	1700
Volume to Capacity	0.28	0.05	0.05	0.64
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	8.9	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.4	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	290	0	0	296	77	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.67	0.67	0.71	0.71
Hourly flow rate (vph)	312	0	0	442	108	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			312		754	312
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			312		754	312
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		71	93
cM capacity (veh/h)			1249		377	728

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	312	442	156
Volume Left	0	0	108
Volume Right	0	0	48
cSH	1700	1700	493
Volume to Capacity	0.18	0.26	0.32
Queue Length 95th (ft)	0	0	34
Control Delay (s)	0.0	0.0	15.7
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.7
Approach LOS			C

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Volume (veh/h)	0	407	368	0	0	412
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.68	0.68	0.82	0.82
Hourly flow rate (vph)	0	473	541	0	0	502
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		558				
pX, platoon unblocked					0.88	
vC, conflicting volume	541				1014	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	541				949	541
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	7
cM capacity (veh/h)	1027				255	541

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	473	541	502
Volume Left	0	0	0
Volume Right	0	0	502
cSH	1700	1700	541
Volume to Capacity	0.28	0.32	0.93
Queue Length 95th (ft)	0	0	288
Control Delay (s)	0.0	0.0	50.8
Lane LOS			F
Approach Delay (s)	0.0	0.0	50.8
Approach LOS			F

Intersection Summary			
Average Delay	16.8		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↱
Volume (veh/h)	407	0	0	368	0	126
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.68	0.68	0.73	0.73
Hourly flow rate (vph)	473	0	0	541	0	173
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			473		1014	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			345		954	345
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	72
cM capacity (veh/h)			1079		255	620

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	473	541	173
Volume Left	0	0	0
Volume Right	0	0	173
cSH	1700	1700	620
Volume to Capacity	0.28	0.32	0.28
Queue Length 95th (ft)	0	0	28
Control Delay (s)	0.0	0.0	13.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	397	168	325	401	19	206	0	455	22	41	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00		0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3109		1630	3232		3162		1458	1630	1638	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.79	0.93	0.88	0.89	0.85	0.68	0.86	0.42	0.96	0.61	0.73	0.71
Adj. Flow (vph)	24	427	191	365	472	28	240	0	474	36	56	24
RTOR Reduction (vph)	0	41	0	0	3	0	0	0	265	0	15	0
Lane Group Flow (vph)	24	577	0	365	497	0	240	0	209	36	65	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	2.8	24.8		21.1	43.1		11.9		33.0	7.4	7.4	
Effective Green, g (s)	2.8	24.8		21.1	43.1		11.9		33.0	7.4	7.4	
Actuated g/C Ratio	0.03	0.29		0.24	0.50		0.14		0.38	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	52	888		396	1604		433		594	138	139	
v/s Ratio Prot	0.01	c0.19		c0.22	0.15		c0.08		0.09	0.02	c0.04	
v/s Ratio Perm									0.05			
v/c Ratio	0.46	0.65		0.92	0.31		0.55		0.35	0.26	0.47	
Uniform Delay, d1	41.3	27.2		32.0	13.0		35.0		19.2	37.1	37.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.4	1.6		26.6	0.1		1.5		0.4	1.0	2.5	
Delay (s)	47.6	28.8		58.6	13.1		36.5		19.6	38.2	40.3	
Level of Service	D	C		E	B		D		B	D	D	
Approach Delay (s)		29.5			32.3			25.3			39.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	86.8	Sum of lost time (s)	21.6
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	767	109	35	751	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.85	0.80	0.85	0.89	0.89
Hourly flow rate (vph)	852	128	44	884	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			980		1823	852
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			866		1894	710
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		100	100
cM capacity (veh/h)			637		59	356

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	852	128	44	884
Volume Left	0	0	44	0
Volume Right	0	128	0	0
cSH	1700	1700	637	1700
Volume to Capacity	0.50	0.08	0.07	0.52
Queue Length 95th (ft)	0	0	6	0
Control Delay (s)	0.0	0.0	11.1	0.0
Lane LOS			B	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.94	0.81
Hourly flow rate (vph)	498	0	0	310	96	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			498		808	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			498		808	498
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		73	89
cM capacity (veh/h)			1066		350	573

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	498	310	160
Volume Left	0	0	96
Volume Right	0	0	64
cSH	1700	1700	500
Volume to Capacity	0.29	0.18	0.32
Queue Length 95th (ft)	0	0	34
Control Delay (s)	0.0	0.0	15.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.5
Approach LOS			C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	767	356	0	0	430
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.85	0.85	0.91	0.91
Hourly flow rate (vph)	0	852	419	0	0	473
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked					0.82	
vC, conflicting volume	419				1271	419
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419				1221	419
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	26
cM capacity (veh/h)	1140				163	634

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	852	419	473
Volume Left	0	0	0
Volume Right	0	0	473
cSH	1700	1700	634
Volume to Capacity	0.50	0.25	0.74
Queue Length 95th (ft)	0	0	165
Control Delay (s)	0.0	0.0	25.4
Lane LOS			D
Approach Delay (s)	0.0	0.0	25.4
Approach LOS			D

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (veh/h)	767	0	0	356	0	144
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.85	0.85	0.84	0.84
Hourly flow rate (vph)	852	0	0	419	0	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			852		1271	852
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			711		1221	711
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	52
cM capacity (veh/h)			729		163	355

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	852	419	171
Volume Left	0	0	0
Volume Right	0	0	171
cSH	1700	1700	355
Volume to Capacity	0.50	0.25	0.48
Queue Length 95th (ft)	0	0	63
Control Delay (s)	0.0	0.0	24.2
Lane LOS			C
Approach Delay (s)	0.0	0.0	24.2
Approach LOS			C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	276	217	402	308	11	264	0	441	12	56	8
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.93		1.00	0.99		1.00		0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3027		1630	3239		3162		1458	1630	1679	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.75	0.91	0.79	0.89	0.84	0.69	0.90	0.44	0.88	0.75	0.78	0.67
Adj. Flow (vph)	16	303	275	452	367	16	293	0	501	16	72	12
RTOR Reduction (vph)	0	128	0	0	2	0	0	0	269	0	5	0
Lane Group Flow (vph)	16	450	0	452	381	0	293	0	232	16	79	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	2.8	23.0		31.4	51.6		14.3		45.7	8.3	8.3	
Effective Green, g (s)	2.8	23.0		31.4	51.6		14.3		45.7	8.3	8.3	
Actuated g/C Ratio	0.03	0.23		0.32	0.52		0.15		0.46	0.08	0.08	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	46	706		519	1695		458		718	137	141	
v/s Ratio Prot	0.01	c0.15		c0.28	0.12		c0.09		0.10	0.01	c0.05	
v/s Ratio Perm									0.05			
v/c Ratio	0.35	0.64		0.87	0.22		0.64		0.32	0.12	0.56	
Uniform Delay, d1	47.0	34.0		31.7	12.7		39.7		16.7	41.8	43.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	4.5	1.9		14.8	0.1		2.9		0.3	0.4	4.7	
Delay (s)	51.5	35.9		46.5	12.8		42.7		17.0	42.1	48.1	
Level of Service	D	D		D	B		D		B	D	D	
Approach Delay (s)		36.4			31.0			26.4			47.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	21.6
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	606	119	43	720	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.78	0.60	0.81	0.96	0.96
Hourly flow rate (vph)	638	153	72	889	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.86		0.86	0.86
vC, conflicting volume			790		1670	638
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			673		1698	496
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			788		79	493

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	638	153	72	889
Volume Left	0	0	72	0
Volume Right	0	153	0	0
cSH	1700	1700	788	1700
Volume to Capacity	0.38	0.09	0.09	0.52
Queue Length 95th (ft)	0	0	7	0
Control Delay (s)	0.0	0.0	10.0	0.0
Lane LOS			B	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	303	0	0	233	92	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.88	0.88	0.92	0.79
Hourly flow rate (vph)	333	0	0	265	100	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			333		598	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			333		598	333
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		79	93
cM capacity (veh/h)			1226		465	709

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	333	265	152
Volume Left	0	0	100
Volume Right	0	0	52
cSH	1700	1700	707
Volume to Capacity	0.20	0.16	0.21
Queue Length 95th (ft)	0	0	20
Control Delay (s)	0.0	0.0	13.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.4
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	606	318	0	0	445
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.81	0.81	0.86	0.86
Hourly flow rate (vph)	0	638	393	0	0	517
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		558				
pX, platoon unblocked					0.89	
vC, conflicting volume	393				1030	393
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	393				970	393
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	21
cM capacity (veh/h)	1166				249	656

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	638	393	517
Volume Left	0	0	0
Volume Right	0	0	517
cSH	1700	1700	656
Volume to Capacity	0.38	0.23	0.79
Queue Length 95th (ft)	0	0	193
Control Delay (s)	0.0	0.0	27.8
Lane LOS			D
Approach Delay (s)	0.0	0.0	27.8
Approach LOS			D

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↱
Volume (veh/h)	606	0	0	318	0	73
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.81	0.81	0.83	0.83
Hourly flow rate (vph)	638	0	0	393	0	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.90		0.90	0.90
vC, conflicting volume			638		1030	638
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			541		978	541
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	82
cM capacity (veh/h)			924		250	486

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	638	393	88
Volume Left	0	0	0
Volume Right	0	0	88
cSH	1700	1700	486
Volume to Capacity	0.38	0.23	0.18
Queue Length 95th (ft)	0	0	16
Control Delay (s)	0.0	0.0	14.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	14.0
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Existing Geometry - Existing Conditions (2012)

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)

WARRANT 2 - Four Hour Vehicular Volume **SATISFIED* YES ☐ NO ☐**

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	Hour	Hour	Hour	Hour
Both Approaches - Major Street						
Higher Approach - Minor Street						

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes ☐	No ☐
OR, All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes ☐	No ☐

WARRANT 3 - Peak Hour **SATISFIED YES ☐ NO ☒**
(Part A or Part B must be satisfied)

PART A **SATISFIED YES ☐ NO ☒**

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; AND	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

PART B **SATISFIED YES ☐ NO ☒**

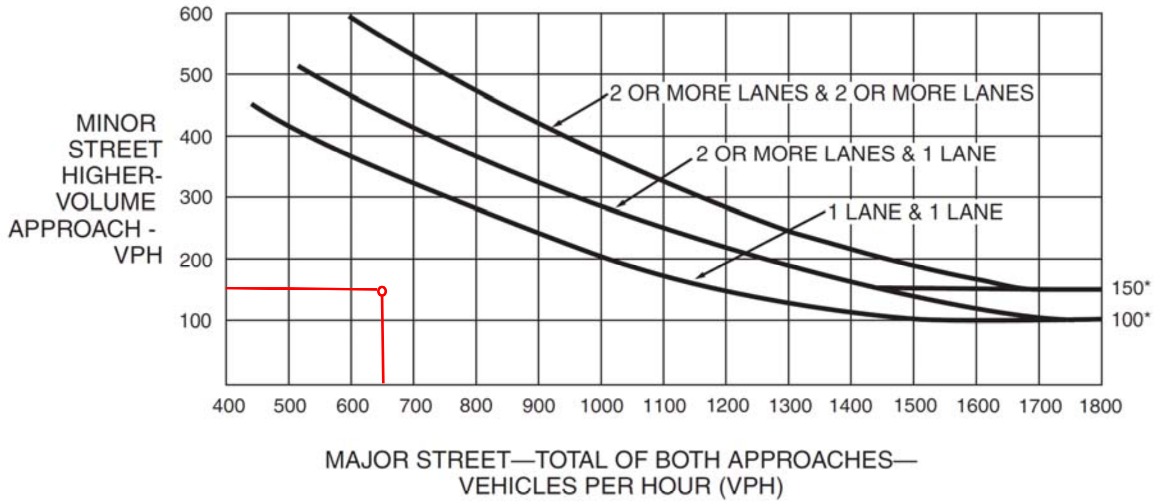
APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	663		
Higher Approach - Minor Street	142		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
OR, The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Existing Geometry - Existing Conditions (2012)

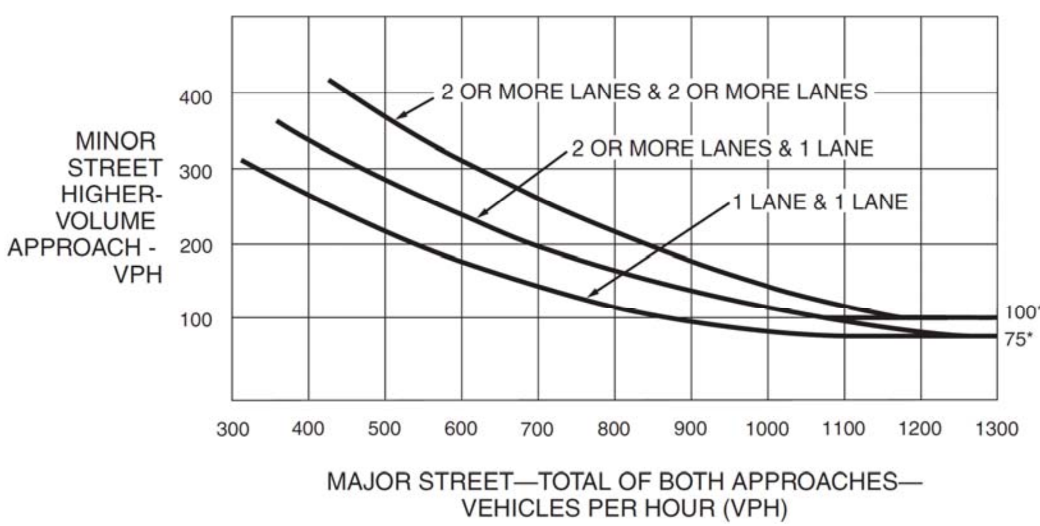
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix D - Future Conditions Existing Geometry Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	285	132	293	443	11	109	0	198	9	30	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00		0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3098		1630	3247		3162		1458	1630	1609	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.78	0.92	0.86	0.86	0.89	0.84	0.91	0.75	0.86	0.73	0.88	0.75
Growth Factor (vph)	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	15	403	200	443	647	17	156	0	299	16	44	31
RTOR Reduction (vph)	0	45	0	0	1	0	0	0	172	0	22	0
Lane Group Flow (vph)	15	558	0	443	663	0	156	0	127	16	53	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	1.4	26.7		31.0	56.3		10.3		41.3	7.3	7.3	
Effective Green, g (s)	1.4	26.7		31.0	56.3		10.3		41.3	7.3	7.3	
Actuated g/C Ratio	0.01	0.28		0.32	0.58		0.11		0.43	0.08	0.08	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	23	853		521	1886		336		652	122	121	
v/s Ratio Prot	0.01	c0.18		c0.27	0.20		c0.05		0.06	0.01	c0.03	
v/s Ratio Perm									0.02			
v/c Ratio	0.65	0.65		0.85	0.35		0.46		0.20	0.13	0.44	
Uniform Delay, d1	47.5	31.0		30.8	10.7		40.7		17.4	41.8	42.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	50.9	1.8		12.6	0.1		1.0		0.1	0.5	2.5	
Delay (s)	98.4	32.8		43.4	10.8		41.7		17.5	42.3	45.3	
Level of Service	F	C		D	B		D		B	D	D	
Approach Delay (s)		34.4			23.8			25.8			44.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	21.6
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	407	82	41	746	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.95	0.89	0.84	0.95	0.95
Hourly flow rate (vph)	569	112	60	1155	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.83		0.83	0.83
vC, conflicting volume			681		1843	569
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			517		1912	382
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		100	100
cM capacity (veh/h)			874		58	554

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	569	112	60	1155
Volume Left	0	0	60	0
Volume Right	0	112	0	0
cSH	1700	1700	874	1700
Volume to Capacity	0.33	0.07	0.07	0.68
Queue Length 95th (ft)	0	0	6	0
Control Delay (s)	0.0	0.0	9.4	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	290	0	0	296	77	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.90	0.84	0.84	0.86	0.85
Hourly flow rate (vph)	393	0	0	458	116	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			393		851	393
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			393		851	393
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		65	92
cM capacity (veh/h)			1166		330	656

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	393	458	168
Volume Left	0	0	116
Volume Right	0	0	52
cSH	1700	1700	434
Volume to Capacity	0.23	0.27	0.39
Queue Length 95th (ft)	0	0	45
Control Delay (s)	0.0	0.0	18.4
Lane LOS			C
Approach Delay (s)	0.0	0.0	18.4
Approach LOS			C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Volume (veh/h)	0	407	375	0	0	412
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.84	0.84	0.91	0.91
Hourly flow rate (vph)	0	569	580	0	0	589
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		558				
pX, platoon unblocked					0.84	
vC, conflicting volume	580				1149	580
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	580				1082	580
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	994				202	514

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	569	580	589
Volume Left	0	0	0
Volume Right	0	0	589
cSH	1700	1700	514
Volume to Capacity	0.33	0.34	1.15
Queue Length 95th (ft)	0	0	506
Control Delay (s)	0.0	0.0	113.0
Lane LOS			F
Approach Delay (s)	0.0	0.0	113.0
Approach LOS			F

Intersection Summary			
Average Delay	38.3		
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (veh/h)	407	0	0	375	0	126
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.89	0.84	0.87	0.87
Hourly flow rate (vph)	569	0	0	580	0	188
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.84		0.84	0.84
vC, conflicting volume			569		1149	569
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			395		1084	395
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	66
cM capacity (veh/h)			980		202	551

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	569	580	188
Volume Left	0	0	0
Volume Right	0	0	188
cSH	1700	1700	551
Volume to Capacity	0.33	0.34	0.34
Queue Length 95th (ft)	0	0	38
Control Delay (s)	0.0	0.0	14.9
Lane LOS			B
Approach Delay (s)	0.0	0.0	14.9
Approach LOS			B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	346	219	439	318	19	265	0	574	22	41	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00		0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3068		1630	3230		3162		1458	1630	1639	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.90	0.96	0.94	0.95	0.93	0.84	0.93	0.71	0.98	0.81	0.87	0.85
Growth Factor (vph)	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	27	469	303	601	445	29	370	0	761	35	61	26
RTOR Reduction (vph)	0	69	0	0	3	0	0	0	180	0	11	0
Lane Group Flow (vph)	27	703	0	601	471	0	370	0	581	35	76	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	4.6	33.5		45.5	74.4		20.2		65.7	11.7	11.7	
Effective Green, g (s)	4.6	33.5		45.5	74.4		20.2		65.7	11.7	11.7	
Actuated g/C Ratio	0.03	0.25		0.34	0.56		0.15		0.50	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	56	775		559	1813		482		767	143	144	
v/s Ratio Prot	0.02	c0.23		c0.37	0.15		c0.12		0.26	0.02	c0.05	
v/s Ratio Perm									0.12			
v/c Ratio	0.48	0.91		1.08	0.26		0.77		0.76	0.24	0.53	
Uniform Delay, d1	62.8	48.0		43.5	14.9		53.9		27.0	56.3	57.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.4	14.2		59.8	0.1		7.2		4.3	0.9	3.5	
Delay (s)	69.2	62.1		103.3	15.0		61.1		31.2	57.2	61.2	
Level of Service	E	E		F	B		E		C	E	E	
Approach Delay (s)		62.4			64.4			41.0			60.1	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	132.5	Sum of lost time (s)	21.6
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	834	109	35	778	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.93	0.90	0.93	0.95	0.95
Hourly flow rate (vph)	1141	152	51	1088	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.76		0.76	0.76
vC, conflicting volume			1294		2330	1141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1228		2596	1026
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		100	100
cM capacity (veh/h)			430		18	216

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	1141	152	51	1088
Volume Left	0	0	51	0
Volume Right	0	152	0	0
cSH	1700	1700	430	1700
Volume to Capacity	0.67	0.09	0.12	0.64
Queue Length 95th (ft)	0	0	10	0
Control Delay (s)	0.0	0.0	14.5	0.0
Lane LOS			B	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.97	0.91
Hourly flow rate (vph)	598	0	0	377	121	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			598		975	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			598		975	598
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		57	85
cM capacity (veh/h)			979		279	502

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	598	377	195
Volume Left	0	0	121
Volume Right	0	0	74
cSH	1700	1700	393
Volume to Capacity	0.35	0.22	0.50
Queue Length 95th (ft)	0	0	67
Control Delay (s)	0.0	0.0	22.8
Lane LOS			C
Approach Delay (s)	0.0	0.0	22.8
Approach LOS			C

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Volume (veh/h)	0	834	356	0	0	457
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	0	1141	498	0	0	619
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked					0.76	
vC, conflicting volume	498				1639	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	498				1682	498
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	1066				79	573

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1141	498	619
Volume Left	0	0	0
Volume Right	0	0	619
cSH	1700	1700	573
Volume to Capacity	0.67	0.29	1.08
Queue Length 95th (ft)	0	0	460
Control Delay (s)	0.0	0.0	87.7
Lane LOS			F
Approach Delay (s)	0.0	0.0	87.7
Approach LOS			F

Intersection Summary			
Average Delay	24.0		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↱
Volume (veh/h)	834	0	0	356	0	144
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	1141	0	0	498	0	203
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.77		0.77	0.77
vC, conflicting volume			1141		1639	1141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1031		1681	1031
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	6
cM capacity (veh/h)			516		80	217

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	1141	498	203
Volume Left	0	0	0
Volume Right	0	0	203
cSH	1700	1700	217
Volume to Capacity	0.67	0.29	0.94
Queue Length 95th (ft)	0	0	199
Control Delay (s)	0.0	0.0	92.9
Lane LOS			F
Approach Delay (s)	0.0	0.0	92.9
Approach LOS			F

Intersection Summary			
Average Delay	10.3		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	276	217	402	308	11	264	0	441	12	56	8
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.93		1.00	0.99		1.00		0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1630	3037		1630	3241		3162		1458	1630	1680	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3500		1750	3500		3500		1750	1750	1750	
Peak-hour factor, PHF	0.88	0.95	0.89	0.94	0.92	0.84	0.95	0.72	0.94	0.88	0.89	0.83
Growth Factor (vph)	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	18	378	317	556	435	17	361	0	610	18	82	13
RTOR Reduction (vph)	0	99	0	0	2	0	0	0	218	0	5	0
Lane Group Flow (vph)	18	596	0	556	450	0	361	0	392	18	90	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	3.0	31.5		48.6	77.1		20.0		68.6	12.5	12.5	
Effective Green, g (s)	3.0	31.5		48.6	77.1		20.0		68.6	12.5	12.5	
Actuated g/C Ratio	0.02	0.23		0.36	0.57		0.15		0.51	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	36	712		590	1862		471		788	151	156	
v/s Ratio Prot	0.01	c0.20		c0.34	0.14		c0.11		0.18	0.01	c0.05	
v/s Ratio Perm									0.07			
v/c Ratio	0.50	0.84		0.94	0.24		0.77		0.50	0.12	0.58	
Uniform Delay, d1	64.9	48.9		41.4	14.1		54.9		21.5	55.8	58.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	10.5	8.4		23.6	0.1		7.3		0.5	0.4	5.1	
Delay (s)	75.4	57.3		65.1	14.2		62.2		22.0	56.2	63.5	
Level of Service	E	E		E	B		E		C	E	E	
Approach Delay (s)		57.8			42.2			36.9			62.3	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	45.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	134.2	Sum of lost time (s)	21.6
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	606	119	43	720	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.89	0.80	0.90	0.95	0.95
Hourly flow rate (vph)	804	174	70	1040	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			978		1984	804
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			843		2109	624
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		100	100
cM capacity (veh/h)			630		40	386

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	804	174	70	1040
Volume Left	0	0	70	0
Volume Right	0	174	0	0
cSH	1700	1700	630	1700
Volume to Capacity	0.47	0.10	0.11	0.61
Queue Length 95th (ft)	0	0	9	0
Control Delay (s)	0.0	0.0	11.4	0.0
Lane LOS			B	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Volume (veh/h)	303	0	0	226	92	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.96	0.89
Hourly flow rate (vph)	410	0	0	313	125	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			410		723	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			410		723	410
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		68	91
cM capacity (veh/h)			1149		393	641

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	410	313	184
Volume Left	0	0	125
Volume Right	0	0	60
cSH	1700	1700	516
Volume to Capacity	0.24	0.18	0.36
Queue Length 95th (ft)	0	0	40
Control Delay (s)	0.0	0.0	15.8
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.8
Approach LOS			C

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Volume (veh/h)	0	606	318	0	0	445
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.90	0.90	0.93	0.93
Hourly flow rate (vph)	0	804	459	0	0	622
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		558				
pX, platoon unblocked					0.81	
vC, conflicting volume	459				1263	459
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	459				1208	459
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	1102				164	602

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	804	459	622
Volume Left	0	0	0
Volume Right	0	0	622
cSH	1700	1700	602
Volume to Capacity	0.47	0.27	1.03
Queue Length 95th (ft)	0	0	415
Control Delay (s)	0.0	0.0	71.8
Lane LOS			F
Approach Delay (s)	0.0	0.0	71.8
Approach LOS			F

Intersection Summary			
Average Delay	23.7		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (veh/h)	606	0	0	318	0	73
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	804	0	0	459	0	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	664					
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			804		1263	804
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			648		1210	648
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	73
cM capacity (veh/h)			766		165	384

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	804	459	103
Volume Left	0	0	0
Volume Right	0	0	103
cSH	1700	1700	384
Volume to Capacity	0.47	0.27	0.27
Queue Length 95th (ft)	0	0	27
Control Delay (s)	0.0	0.0	17.8
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.8
Approach LOS			C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

Intersection: 1: Airport Park Boulevard & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	L	R	L	TR
Maximum Queue (ft)	74	428	444	225	323	273	224	547	542	88	90
Average Queue (ft)	26	388	379	219	266	110	147	219	324	39	60
95th Queue (ft)	74	465	494	247	338	238	253	384	569	80	97
Link Distance (ft)		392	392		268	268		508	508	73	73
Upstream Blk Time (%)		47	48		15	0		3	11	6	14
Queuing Penalty (veh)		0	0		77	1		0	0	0	0
Storage Bay Dist (ft)	50			200			200				
Storage Blk Time (%)	15	76		30	4		0	9			
Queuing Penalty (veh)	34	20		63	27		0	16			

Intersection: 2: SB On-Ramp & Talmage Road

Movement	WB	WB
Directions Served	L	T
Maximum Queue (ft)	174	204
Average Queue (ft)	43	110
95th Queue (ft)	122	234
Link Distance (ft)		187
Upstream Blk Time (%)	0	1
Queuing Penalty (veh)	0	16
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		4
Queuing Penalty (veh)		2

Intersection: 3: NB Off-Ramp & Talmage Road

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	116	50
Average Queue (ft)	48	40
95th Queue (ft)	89	65
Link Distance (ft)	236	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		25
Storage Blk Time (%)	24	11
Queuing Penalty (veh)	17	13

Intersection: 4: Talmage Road & SB Off-Ramp

Movement	EB	WB	SB	B14
Directions Served	T	T	R	T
Maximum Queue (ft)	54	31	275	222
Average Queue (ft)	2	3	233	180
95th Queue (ft)	18	19	254	200
Link Distance (ft)	187	30	156	159
Upstream Blk Time (%)		0	100	100
Queuing Penalty (veh)		2	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: SB Off-Ramp & Talmage Road

Movement	EB	WB	NE	B17
Directions Served	T	T	R	T
Maximum Queue (ft)	49	30	242	653
Average Queue (ft)	2	1	238	647
95th Queue (ft)	17	10	249	660
Link Distance (ft)	30	295	168	638
Upstream Blk Time (%)	0		100	97
Queuing Penalty (veh)	2		0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 290

Existing Geometry - Future Conditions

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)

WARRANT 2 - Four Hour Vehicular Volume **SATISFIED* YES ☐ NO ☐**

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	Hour	Hour	Hour	Hour
Both Approaches - Major Street						
Higher Approach - Minor Street						

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes ☐	No ☐
<u>OR</u>, All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes ☐	No ☐

WARRANT 3 - Peak Hour **SATISFIED YES ☐ NO ☒**
(Part A or Part B must be satisfied)

<u>PART A</u> **SATISFIED YES ☐ NO ☒**
(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	Yes ☐	No ☒
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes ☒	No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☒	No ☐

<u>PART B</u> **SATISFIED YES ☐ NO ☒**

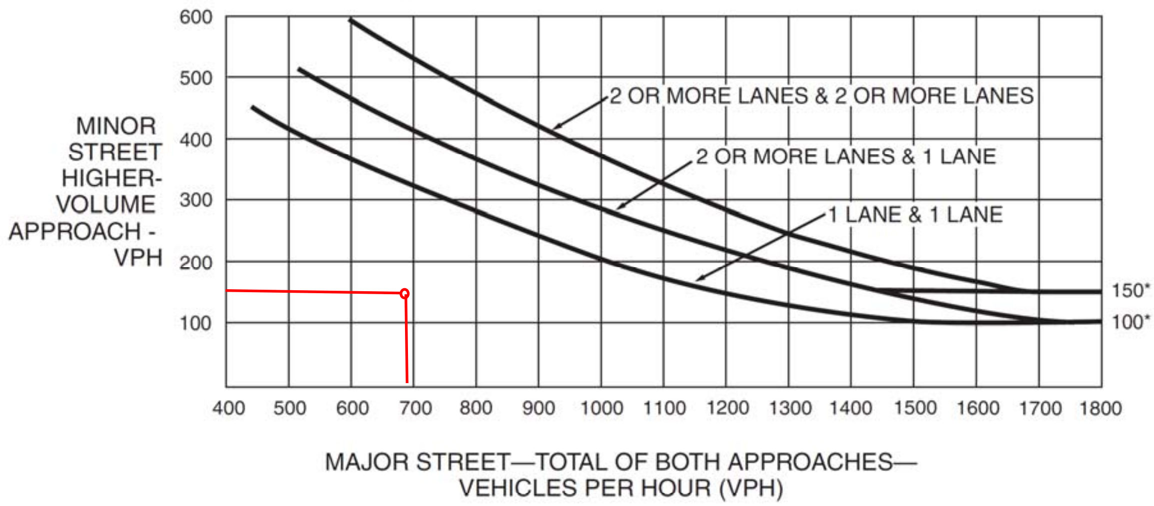
APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street	693		
Higher Approach - Minor Street	142		

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐	No ☒
<u>OR</u>, The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐	No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Existing Geometry - Future Conditions

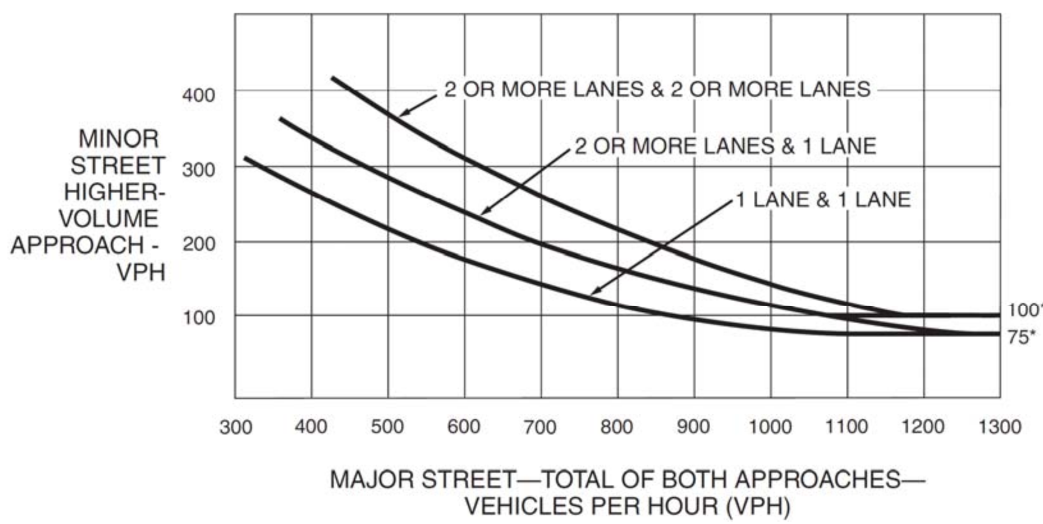
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix E - Caltrans Alternative and Preferred Alternative Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	397	168	325	401	19	206	0	455	22	41	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00		0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1770	3375		3433	3509		3433		1583	1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3375		3433	3500		3433		1583	1750	1750	
Peak-hour factor, PHF	0.79	0.93	0.88	0.89	0.85	0.68	0.86	0.42	0.96	0.61	0.73	0.71
Adj. Flow (vph)	24	427	191	365	472	28	240	0	474	36	56	24
RTOR Reduction (vph)	0	44	0	0	3	0	0	0	285	0	14	0
Lane Group Flow (vph)	24	574	0	365	497	0	240	0	189	36	66	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	2.5	19.3		19.3	36.1		13.2		32.5	8.2	8.2	
Effective Green, g (s)	2.5	19.3		19.3	36.1		13.2		32.5	8.2	8.2	
Actuated g/C Ratio	0.03	0.24		0.24	0.44		0.16		0.40	0.10	0.10	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	54	798		811	1552		555		630	177	178	
v/s Ratio Prot	0.01	c0.17		c0.11	0.14		c0.07		0.07	0.02	c0.04	
v/s Ratio Perm									0.05			
v/c Ratio	0.44	0.72		0.45	0.32		0.43		0.30	0.20	0.37	
Uniform Delay, d1	38.9	28.7		26.6	14.8		30.8		16.8	33.7	34.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	5.7	3.1		0.4	0.1		0.5		0.3	0.6	1.3	
Delay (s)	44.6	31.8		27.0	14.9		31.4		17.0	34.3	35.6	
Level of Service	D	C		C	B		C		B	C	D	
Approach Delay (s)		32.3			20.0			21.9			35.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	21.6
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	767	109	35	751	0	144
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.85	0.80	0.85	0.84	0.84
Hourly flow rate (vph)	852	128	44	884	0	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334			245		
pX, platoon unblocked			0.89		0.92	0.89
vC, conflicting volume			852		1446	490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			575		961	167
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	77
cM capacity (veh/h)			880		222	751

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	568	412	44	442	442	171
Volume Left	0	0	44	0	0	0
Volume Right	0	128	0	0	0	171
cSH	1700	1700	880	1700	1700	751
Volume to Capacity	0.33	0.24	0.05	0.26	0.26	0.23
Queue Length 95th (ft)	0	0	4	0	0	22
Control Delay (s)	0.0	0.0	9.3	0.0	0.0	11.2
Lane LOS			A			B
Approach Delay (s)	0.0		0.4			11.2
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.94	0.81
Hourly flow rate (vph)	498	0	0	310	96	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	781					
pX, platoon unblocked						
vC, conflicting volume			498		808	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			498		808	498
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		73	89
cM capacity (veh/h)			1066		350	573

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	498	310	160
Volume Left	0	0	96
Volume Right	0	0	64
cSH	1700	1700	500
Volume to Capacity	0.29	0.18	0.32
Queue Length 95th (ft)	0	0	34
Control Delay (s)	0.0	0.0	15.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.5
Approach LOS			C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	911	356	0	0	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	5.6			5.6
Lane Util. Factor		0.95	*0.88			0.88
Frt		1.00	1.00			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3278			2787
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3278			2787
Peak-hour factor, PHF	0.90	0.90	0.85	0.85	0.91	0.91
Adj. Flow (vph)	0	1012	419	0	0	473
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1012	419	0	0	473
Turn Type		NA	NA			custom
Protected Phases		2 4	6			7
Permitted Phases						
Actuated Green, G (s)		43.2	11.4			20.6
Effective Green, g (s)		43.2	11.4			20.6
Actuated g/C Ratio		1.00	0.26			0.48
Clearance Time (s)			5.6			5.6
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)		3539	865			1328
v/s Ratio Prot		c0.29	c0.13			0.17
v/s Ratio Perm						
v/c Ratio		0.29	0.48			0.36
Uniform Delay, d1		0.0	13.4			7.1
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		0.0	0.4			0.7
Delay (s)		0.0	13.8			7.9
Level of Service		A	B			A
Approach Delay (s)		0.0	13.8		7.9	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	43.2	Sum of lost time (s)	11.2
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: Airport Park Boulevard & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	L	R	L	TR
Maximum Queue (ft)	75	205	199	151	141	273	235	110	138	141	77	81
Average Queue (ft)	24	120	131	81	91	124	56	81	80	91	19	41
95th Queue (ft)	66	179	201	133	136	209	162	116	134	130	51	78
Link Distance (ft)		367	367		267	267			502	502	66	66
Upstream Blk Time (%)						0					1	3
Queuing Penalty (veh)						2					0	0
Storage Bay Dist (ft)	50			250			275	85				
Storage Blk Time (%)	6	43				0		14	4			
Queuing Penalty (veh)	13	9				1		16	4			

Intersection: 2: SB On-Ramp & Talmage Road

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	R
Maximum Queue (ft)	59	52	112	55
Average Queue (ft)	7	16	0	6
95th Queue (ft)	32	42	0	34
Link Distance (ft)	267		194	229
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		175		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: NB Off-Ramp & Talmage Road

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	108	50
Average Queue (ft)	39	33
95th Queue (ft)	72	59
Link Distance (ft)	236	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		25
Storage Blk Time (%)	14	8
Queuing Penalty (veh)	8	8

Intersection: 4: Talmage Road & SB Off-Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	T	R	R
Maximum Queue (ft)	134	116	162	125	130	138
Average Queue (ft)	26	23	61	69	62	71
95th Queue (ft)	81	71	108	113	107	120
Link Distance (ft)	194	194	393		701	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				100		275
Storage Blk Time (%)			1	1		
Queuing Penalty (veh)			2	1		

Zone Summary

Zone wide Queuing Penalty: 64

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	397	168	325	401	19	206	0	455	22	41	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00		0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1770	3375		3433	3509		3433		1583	1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3375		3433	3500		3433		1583	1750	1750	
Peak-hour factor, PHF	0.79	0.93	0.88	0.89	0.85	0.68	0.86	0.42	0.96	0.61	0.73	0.71
Adj. Flow (vph)	24	427	191	365	472	28	240	0	474	36	56	24
RTOR Reduction (vph)	0	50	0	0	3	0	0	0	243	0	16	0
Lane Group Flow (vph)	24	568	0	365	497	0	240	0	231	36	64	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	3.2	22.9		37.0	56.7		14.7		51.7	9.8	9.8	
Effective Green, g (s)	3.2	22.9		37.0	56.7		14.7		51.7	9.8	9.8	
Actuated g/C Ratio	0.03	0.22		0.35	0.53		0.14		0.49	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	53	729		1198	1876		476		772	163	164	
v/s Ratio Prot	0.01	c0.17		c0.11	0.14		c0.07		0.10	0.02	c0.04	
v/s Ratio Perm									0.04			
v/c Ratio	0.45	0.78		0.30	0.27		0.50		0.30	0.22	0.39	
Uniform Delay, d1	50.5	39.2		25.1	13.4		42.3		16.3	44.6	45.3	
Progression Factor	1.00	1.00		0.71	0.93		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.0	5.3		0.7	0.3		0.8		0.2	0.7	1.5	
Delay (s)	56.6	44.4		18.6	12.8		43.1		16.5	45.3	46.8	
Level of Service	E	D		B	B		D		B	D	D	
Approach Delay (s)		44.9			15.3			25.5			46.3	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	21.6
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	767	109	35	356	430	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	5.6	5.6	5.6
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	4990	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3500	1583	1750	3500	4990	1583
Peak-hour factor, PHF	0.90	0.85	0.80	0.85	0.91	0.84
Adj. Flow (vph)	852	128	44	419	473	171
RTOR Reduction (vph)	0	27	0	0	0	91
Lane Group Flow (vph)	852	101	44	419	473	80
Turn Type	NA	pm+ov	Prot	NA	NA	Perm
Protected Phases	2	8	1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	34.3	83.6	5.6	45.5	49.3	49.3
Effective Green, g (s)	34.3	83.6	5.6	45.5	49.3	49.3
Actuated g/C Ratio	0.32	0.79	0.05	0.43	0.47	0.47
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	5.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1145	1332	93	1519	2320	736
v/s Ratio Prot	c0.24	0.04	c0.02	0.12	c0.09	
v/s Ratio Perm		0.03				0.05
v/c Ratio	0.74	0.08	0.47	0.28	0.20	0.11
Uniform Delay, d1	31.9	2.5	48.8	19.6	16.8	16.0
Progression Factor	0.82	0.39	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.0	3.8	0.1	0.2	0.3
Delay (s)	28.5	1.0	52.5	19.7	17.0	16.3
Level of Service	C	A	D	B	B	B
Approach Delay (s)	24.9			22.8	16.8	
Approach LOS	C			C	B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.97	0.91
Hourly flow rate (vph)	460	0	0	290	93	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1026					
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			460		750	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			228		583	228
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		76	91
cM capacity (veh/h)			1096		388	663

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	460	290	150
Volume Left	0	0	93
Volume Right	0	0	57
cSH	1700	1700	627
Volume to Capacity	0.27	0.17	0.24
Queue Length 95th (ft)	0	0	23
Control Delay (s)	0.0	0.0	14.8
Lane LOS			B
Approach Delay (s)	0.0	0.0	14.8
Approach LOS			B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection: 1: Airport Park Boulevard & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	L	R	L	TR
Maximum Queue (ft)	75	301	292	174	156	265	249	110	289	306	80	88
Average Queue (ft)	22	163	176	103	93	167	76	96	156	152	31	56
95th Queue (ft)	55	268	284	163	151	261	190	117	253	240	68	100
Link Distance (ft)		367	367	249	249	249			503	503	66	66
Upstream Blk Time (%)						1	0				2	14
Queuing Penalty (veh)						3	0				0	0
Storage Bay Dist (ft)	50						250	85				
Storage Blk Time (%)	4	45				1	0	27	12			
Queuing Penalty (veh)	9	9				3	0	30	13			

Intersection: 2: SB On-Ramp & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	L	R
Maximum Queue (ft)	270	304	145	92	128	204	162	142	298	196
Average Queue (ft)	187	211	59	31	39	102	84	49	98	72
95th Queue (ft)	306	327	171	71	84	172	146	111	211	154
Link Distance (ft)	249	249			168	168	215	215	215	
Upstream Blk Time (%)	6	14				1			0	0
Queuing Penalty (veh)	26	64				2			0	0
Storage Bay Dist (ft)			85	150						200
Storage Blk Time (%)		36							0	1
Queuing Penalty (veh)		41							0	1

Intersection: 3: NB Off-Ramp & Talmage Road

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	72	50
Average Queue (ft)	37	31
95th Queue (ft)	61	59
Link Distance (ft)	236	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		25
Storage Blk Time (%)	16	6
Queuing Penalty (veh)	9	6

Zone Summary

Zone wide Queuing Penalty: 217

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	346	219	439	318	19	265	0	574	22	41	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00		0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1770	3331		3433	3507		3433		1583	1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3331		3433	3500		3433		1583	1750	1750	
Peak-hour factor, PHF	0.90	0.96	0.94	0.95	0.93	0.84	0.93	0.71	0.98	0.81	0.87	0.85
Growth Factor (vph)	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	27	469	303	601	445	29	370	0	761	35	61	26
RTOR Reduction (vph)	0	89	0	0	3	0	0	0	266	0	15	0
Lane Group Flow (vph)	27	683	0	601	471	0	370	0	495	35	72	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	2.8	23.9		25.1	46.2		15.9		41.0	8.8	8.8	
Effective Green, g (s)	2.8	23.9		25.1	46.2		15.9		41.0	8.8	8.8	
Actuated g/C Ratio	0.03	0.25		0.26	0.48		0.17		0.43	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	52	835		904	1700		572		681	163	164	
v/s Ratio Prot	0.02	c0.21		0.18	0.13		0.11		c0.19	0.02	c0.04	
v/s Ratio Perm									0.12			
v/c Ratio	0.52	0.82		0.66	0.28		0.65		0.73	0.21	0.44	
Uniform Delay, d1	45.6	33.6		31.3	14.6		37.1		22.5	40.1	40.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	8.5	6.3		1.9	0.1		2.5		3.9	0.7	1.9	
Delay (s)	54.1	39.9		33.2	14.7		39.6		26.4	40.7	42.8	
Level of Service	D	D		C	B		D		C	D	D	
Approach Delay (s)		40.4			25.0			30.7			42.2	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.3	Sum of lost time (s)	21.6
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	834	109	35	781	0	144
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.93	0.90	0.93	0.96	0.92
Hourly flow rate (vph)	1141	152	51	1092	0	203
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	334			245		
pX, platoon unblocked			0.90		0.95	0.90
vC, conflicting volume			1141		1864	647
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			929		1339	378
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		100	63
cM capacity (veh/h)			657		126	556

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	761	533	51	546	546	203
Volume Left	0	0	51	0	0	0
Volume Right	0	152	0	0	0	203
cSH	1700	1700	657	1700	1700	556
Volume to Capacity	0.45	0.31	0.08	0.32	0.32	0.37
Queue Length 95th (ft)	0	0	6	0	0	42
Control Delay (s)	0.0	0.0	10.9	0.0	0.0	15.2
Lane LOS			B			C
Approach Delay (s)	0.0		0.5			15.2
Approach LOS						C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.97	0.91
Hourly flow rate (vph)	598	0	0	377	121	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	781					
pX, platoon unblocked						
vC, conflicting volume			598		975	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			598		975	598
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		57	85
cM capacity (veh/h)			979		279	502

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	598	377	195
Volume Left	0	0	121
Volume Right	0	0	74
cSH	1700	1700	393
Volume to Capacity	0.35	0.22	0.50
Queue Length 95th (ft)	0	0	67
Control Delay (s)	0.0	0.0	22.8
Lane LOS			C
Approach Delay (s)	0.0	0.0	22.8
Approach LOS			C

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	977	360	0	0	457
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	5.6			5.6
Lane Util. Factor		0.95	*0.88			0.88
Frt		1.00	1.00			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3278			2787
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3278			2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	0	1337	493	0	0	625
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1337	493	0	0	625
Turn Type		NA	NA			custom
Protected Phases		2 4	6			7
Permitted Phases						
Actuated Green, G (s)		44.1	12.4			20.5
Effective Green, g (s)		44.1	12.4			20.5
Actuated g/C Ratio		1.00	0.28			0.46
Clearance Time (s)			5.6			5.6
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)		3539	921			1295
v/s Ratio Prot		c0.38	0.15			c0.22
v/s Ratio Perm						
v/c Ratio		0.38	0.54			0.48
Uniform Delay, d1		0.0	13.4			8.1
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		0.1	0.6			1.3
Delay (s)		0.1	14.0			9.4
Level of Service		A	B			A
Approach Delay (s)		0.1	14.0		9.4	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	11.2
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Airport Park Boulevard & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	L	R	L	TR
Maximum Queue (ft)	75	346	333	265	282	273	266	110	542	566	54	81
Average Queue (ft)	28	209	226	197	210	142	60	107	476	473	28	53
95th Queue (ft)	63	325	328	265	276	229	155	113	573	581	58	90
Link Distance (ft)		367	367		267	267			502	502	66	66
Upstream Blk Time (%)				0	1	0	0		28	30	0	13
Queuing Penalty (veh)				0	4	1	0		0	0	0	0
Storage Bay Dist (ft)	50			250			275	85				
Storage Blk Time (%)	10	51		1	1	0	0	32	40			
Queuing Penalty (veh)	24	13		2	4	0	0	57	70			

Intersection: 2: SB On-Ramp & Talmage Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	T	TR	L	T	T	R
Maximum Queue (ft)	55	102	75	53	32	84
Average Queue (ft)	2	12	24	5	1	13
95th Queue (ft)	19	52	58	29	11	54
Link Distance (ft)	267	267		194	194	229
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: NB Off-Ramp & Talmage Road

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	159	50
Average Queue (ft)	57	41
95th Queue (ft)	116	58
Link Distance (ft)	236	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		25
Storage Blk Time (%)	32	12
Queuing Penalty (veh)	23	15

Intersection: 4: Talmage Road & SB Off-Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	T	R	R
Maximum Queue (ft)	213	239	198	125	186	209
Average Queue (ft)	75	81	84	69	118	78
95th Queue (ft)	178	197	133	123	184	149
Link Distance (ft)	194	194	393		701	
Upstream Blk Time (%)	0	2				
Queuing Penalty (veh)	3	11				
Storage Bay Dist (ft)				100		275
Storage Blk Time (%)			3	1		
Queuing Penalty (veh)			6	2		

Zone Summary

Zone wide Queuing Penalty: 234

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	346	219	439	318	19	265	0	574	22	41	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.97		1.00	1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00		0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1770	3331		3433	3507		3433		1583	1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)	1750	3331		3433	3500		3433		1583	1750	1750	
Peak-hour factor, PHF	0.90	0.96	0.94	0.95	0.93	0.84	0.93	0.71	0.98	0.81	0.87	0.85
Growth Factor (vph)	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	27	469	303	601	445	29	370	0	761	35	61	26
RTOR Reduction (vph)	0	99	0	0	3	0	0	0	263	0	16	0
Lane Group Flow (vph)	27	673	0	601	471	0	370	0	498	35	71	0
Turn Type	Prot	NA		Prot	NA		Prot		custom	Split	NA	
Protected Phases	5	2		1	6		8		1	7	7	
Permitted Phases									8			
Actuated Green, G (s)	4.8	26.2		30.6	52.0		17.7		48.3	9.9	9.9	
Effective Green, g (s)	4.8	26.2		30.6	52.0		17.7		48.3	9.9	9.9	
Actuated g/C Ratio	0.05	0.25		0.29	0.49		0.17		0.46	0.09	0.09	
Clearance Time (s)	5.6	5.6		5.6	5.6		5.2		5.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	80	823		991	1720		573		721	165	166	
v/s Ratio Prot	0.02	c0.20		0.18	0.13		0.11		c0.20	0.02	c0.04	
v/s Ratio Perm									0.12			
v/c Ratio	0.34	0.82		0.61	0.27		0.65		0.69	0.21	0.43	
Uniform Delay, d1	49.1	37.6		32.5	15.9		41.2		22.9	44.4	45.4	
Progression Factor	1.00	1.00		0.71	1.03		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.5	6.3		2.7	0.4		2.5		2.9	0.6	1.8	
Delay (s)	51.6	44.0		25.9	16.7		43.7		25.8	45.1	47.1	
Level of Service	D	D		C	B		D		C	D	D	
Approach Delay (s)		44.2			21.8			31.6			46.5	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	21.6
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	834	109	35	321	457	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	5.6	5.6	5.6
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	4990	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3500	1583	1750	3500	4990	1583
Peak-hour factor, PHF	0.95	0.93	0.90	0.93	0.96	0.92
Growth Factor (vph)	130%	130%	130%	130%	130%	130%
Adj. Flow (vph)	1141	152	51	449	619	203
RTOR Reduction (vph)	0	35	0	0	0	131
Lane Group Flow (vph)	1141	117	51	449	619	72
Turn Type	NA	pm+ov	Prot	NA	NA	Perm
Protected Phases	2	8	1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	44.3	81.7	7.5	57.4	37.4	37.4
Effective Green, g (s)	44.3	81.7	7.5	57.4	37.4	37.4
Actuated g/C Ratio	0.42	0.77	0.07	0.54	0.35	0.35
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	5.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1479	1303	125	1916	1760	558
v/s Ratio Prot	c0.32	0.03	c0.03	0.13	c0.12	
v/s Ratio Perm		0.04				0.05
v/c Ratio	0.77	0.09	0.41	0.23	0.35	0.13
Uniform Delay, d1	26.5	3.0	47.1	12.8	25.3	23.3
Progression Factor	0.78	0.15	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	2.2	0.1	0.6	0.5
Delay (s)	22.4	0.5	49.3	12.8	25.9	23.7
Level of Service	C	A	D	B	C	C
Approach Delay (s)	19.8			16.5	25.4	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	423	0	0	270	90	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.97	0.91
Hourly flow rate (vph)	598	0	0	377	121	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1026					
pX, platoon unblocked			0.74		0.74	0.74
vC, conflicting volume			598		975	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			288		795	288
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		55	87
cM capacity (veh/h)			948		265	559

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	598	377	195
Volume Left	0	0	121
Volume Right	0	0	74
cSH	1700	1700	380
Volume to Capacity	0.35	0.22	0.51
Queue Length 95th (ft)	0	0	70
Control Delay (s)	0.0	0.0	24.0
Lane LOS			C
Approach Delay (s)	0.0	0.0	24.0
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection: 1: Airport Park Boulevard & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	L	R	L	TR
Maximum Queue (ft)	75	376	397	279	273	280	249	110	555	555	72	92
Average Queue (ft)	31	216	237	258	253	198	109	109	525	529	15	56
95th Queue (ft)	73	343	346	271	270	311	257	111	543	549	50	93
Link Distance (ft)		367	367	249	249	249			503	503	66	66
Upstream Blk Time (%)		1	1	61	49	9	0		99	99	1	17
Queuing Penalty (veh)		0	0	211	169	31	0		0	0	0	0
Storage Bay Dist (ft)	50						250	85				
Storage Blk Time (%)	12	41				9	0	40	33			
Queuing Penalty (veh)	28	11				21	1	71	59			

Intersection: 2: SB On-Ramp & Talmage Road

Movement	EB	EB	EB	WB	WB	WB	B17	NB	NB	NB	NB	B8
Directions Served	T	T	R	L	T	T	T	L	L	L	R	T
Maximum Queue (ft)	248	275	145	167	239	253	402	316	292	221	207	172
Average Queue (ft)	163	181	64	72	203	143	315	204	184	131	100	15
95th Queue (ft)	264	276	176	186	285	317	512	293	282	210	181	80
Link Distance (ft)	249	249			168	168	388	215	215	215		324
Upstream Blk Time (%)	0	1		0	61	18	24	14	10	0	0	
Queuing Penalty (veh)	1	3		0	145	43	118	0	0	0	0	
Storage Bay Dist (ft)			85	150							200	
Storage Blk Time (%)		27		0	66					1	0	
Queuing Penalty (veh)		40		1	31					2	0	

Intersection: 2: SB On-Ramp & Talmage Road

Movement	B8
Directions Served	T
Maximum Queue (ft)	137
Average Queue (ft)	8
95th Queue (ft)	55
Link Distance (ft)	324
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: NB Off-Ramp & Talmage Road

Movement	WB	NB	NB	B9
Directions Served	T	L	R	T
Maximum Queue (ft)	168	308	66	230
Average Queue (ft)	23	89	37	14
95th Queue (ft)	108	217	68	91
Link Distance (ft)	147	236		401
Upstream Blk Time (%)	5	11		
Queuing Penalty (veh)	18	0		
Storage Bay Dist (ft)			25	
Storage Blk Time (%)		43	8	
Queuing Penalty (veh)		31	10	

Zone Summary

Zone wide Queuing Penalty: 1045

Appendix F - Caltrans Approval of the Preferred Alternative

DEPARTMENT OF TRANSPORTATION
DISTRICT 1, P. O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 441-4554
FAX (707) 441-5869
TTY 711

Flex your power!
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April 15, 2013

1-MEN-101-23.3
Ukiah Costco DEIR
SCH# 2011112025

Kim Jordan
Planning & Community Development Department
City of Ukiah
300 Seminary Avenue
Ukiah, CA 95482

Dear Ms. Jordan,

Thank you for giving us the opportunity to provide additional comments on the Draft Environmental Impact Report (DEIR) for the proposed Costco Wholesale project. The project is located within the Ukiah Airport Industrial Park, on Assessor's Parcel number 180-110-08 et al, near the junction of State Routes 101 and 222.

Traffic Mitigation

We have completed analysis of the proposed mitigation measures discussed in the DEIR. We consulted GHD and W-Trans to obtain current preferred design alternative concepts and model output information necessary to perform analysis. Our evaluation focused on the primary mitigation measures pertaining to State owned facilities including:

- Talmage Road Interchange Improvements
  - Reconfiguration of US 101 southbound (SB) off-ramp loop
  - Signal installation at intersection of US 101 SB off-ramp and Talmage Road
  - Installation of two westbound left-turn lanes (WBL) at intersection of Talmage Road and Airport Park Blvd.

We conclude that the mitigation measures proposed in the DEIR adequately mitigate projected traffic impacts on State facilities. Therefore, we request that the proposed mitigation be required as a condition of approval for the project.

Details regarding the technical analysis can be provided upon request.

Caltrans Permit/Approval

Any work within the State right of way will require an approved encroachment permit. Encroachment permit applications are reviewed for consistency with State standards and are subject to Department approval. Requests for Caltrans encroachment permit application forms can be sent to Caltrans District 1 Permits Office, P.O. Box 3700, Eureka CA 95502-3700, or requested by phone at (707) 445-6389. For additional information, the Caltrans Permit Manual is available online at: <http://www.dot.ca.gov/hq/traffops/developserv/permits/>.

If you have questions or need further assistance, please contact me at (707) 441-4554 or jaime_hostler@dot.ca.gov.

Sincerely,

Jaime Hostler
Associate Transportation Planner
Caltrans, District 1
Office of Regional & Community Planning

c: Phil Dow

GHD Inc

2235 Mercury Way
Suite 150
Santa Rosa CA 95407-5472

T: 1 707 523 1010   F: 1 707 527 8679   E: santarosa@ghd.com

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	Matthew Kennedy	Frank Penry		Matthew Kennedy		2/14/2014

www.ghd.com

Appendix F

Air Quality Report

TALMAGE INTERCHANGE IMPROVEMENT PROJECT ENVIRONMENTAL AIR QUALITY ASSESSMENT UKIAH, CALIFORNIA

June 5, 2014

♦ ♦ ♦

Prepared for:

Leonard Charles and Associates
7 Roble Court
San Anselmo, CA 94960

Prepared by:

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Job No.: 13-210

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PROJECT DESCRIPTION

This report presents the results of the environmental air quality assessment completed for the Talmage Interchange Improvement Project proposed in Ukiah, California. The proposed project includes improvements to the Talmage Road/U.S. 101 southbound on- and off-ramps and improvements to Talmage Road within the State right-of-way. Modifications within the State right-of-way to the Talmage Road/U.S. 101 southbound on- and off-ramps include removal of the existing southbound off-ramp to westbound Talmage Road from service, widening and realignment of the southbound off-ramp to eastbound Talmage Road to four lanes with terminus at a new signalized intersection with Talmage Road, signing and striping, minor grading, new sidewalks, curbs, and gutters. In addition to these improvements, Talmage Road would be widened to add a westbound through lane (two westbound through lanes) between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp (one through lane and one right-turn lane). Existing signals at the intersection of Talmage Road and Airport Park Boulevard would also be replaced.

SETTING

The inland urban section of Mendocino County, where the project is located, consists of the cities of Ukiah and Willits, as well as a large number of unincorporated communities along the main transportation corridors. U.S. 101 is the main (in some areas exclusive) north/south roadway and Highway 20 is the main east/west connector. The Northwestern Pacific Railroad runs roughly parallel to U.S. 101 and connects Willits and Ukiah. Currently U.S. 101 serves as the “main street” for Hopland and Willits; however, bypasses for both areas are in the planning stages. U.S. 101 varies between a divided highway, freeway, and 2-lane roadway in this area.

The project area is located in the North Coast Air Basin. The inland portion, like the rest of Mendocino County, is non-attainment for the state respirable particulate matter (PM_{10}) standard. The primary sources of PM_{10} are wood combustion emissions, fugitive dust from construction projects, automobile emissions, and industry. Some of the automobile emissions are the result of “pass-through” traffic on U.S. 101 because of its nature as a major transportation corridor in the state. The Mendocino County Air Quality Management District (MCAQMD) has full monitoring stations (nitrogen oxides [NOx], Ozone, carbon monoxide [CO], and PM_{10}) in both Ukiah and Willits. A fine particulate matter ($PM_{2.5}$) monitor has been established in Ukiah. Ukiah has had PM_{10} exceedences in the past. Winter cold-air inversions are common in the valleys from November to February.

Regulatory Background

National and California Ambient Air Quality Standards have been established to define clean air. The standards establish the concentration at which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Both the California and federal governments have adopted health-based standards for the criteria pollutants, which include ozone, particulate matter (PM_{10} and $PM_{2.5}$), and carbon monoxide. For some pollutants, the California (state) and national standards are similar. For other pollutants, the state standards are more stringent. In addition, the state standards incorporate a margin of safety to protect sensitive individuals. U.S. Environmental Protection Agency (EPA) promulgated national $PM_{2.5}$ standards in 1997.

The California Air Resources Board (CARB) coordinates and oversees both state and federal air quality control programs in California. CARB establishes state air quality standards, monitors existing air quality, limits allowable emissions from mobile and stationary sources, and is responsible for developing the State Implementation Plan (SIP). CARB has divided the state into many single and multi-county air basins. Ukiah is located in Mendocino County and this area is under the jurisdiction of MCAQMD in the North Coast Air Basin.

The MCAQMD is the regional agency tasked with managing air quality in the region. At the State level, CARB (a part of the California EPA) oversees regional air district activities and regulates air quality at the State level. The MCAQMD has adopted the Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Air Quality Guidelines with a few modifications which are used in this assessment to evaluate air quality impacts of projects.[1]

[1] http://www.co.mendocino.ca.us/aqmd/planning.htm.

Table 1 - Relevant California and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards
Ozone	8-hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147µg/m^3)
	1-hour	0.09 ppm (180 µg/m^3)	—
Carbon monoxide	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen dioxide	1-hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)
	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual	—	0.03 ppm (56 µg/m^3)
Particulate Matter (PM_{10})	Annual	20 µg/m^3	—
	24-hour	50 µg/m^3	150 µg/m^3
Particulate Matter ($PM_{2.5}$)	Annual	12 µg/m^3	15 µg/m^3
	24-hour	—	35 µg/m^3

Notes: ppm = parts per million   mg/m3 = milligrams per cubic meter   µg/m^3 = micrograms per cubic meter

Air Quality Monitoring Data

The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population. MCAQMD monitors air quality conditions at five locations in Mendocino County. The closest monitoring stations to the project site are in Ukiah at the 306 Gobbi Street and 105 North Main Street. Summarized air pollutant data for these stations are provided in Table 2. This table shows the highest air pollutant concentrations measured at the stations over the latest published four year period from 2010 through 2013.

Table 2 - Historical Air Pollution Data for the City of Ukiah

Historical Air Pollution Data Summary Table for the City of Ukiah (2010-2013)				
Pollutant	**2010**	**2011**	**2012**	**2013**
Ozone[1]				
Maximum 1-hour Concentration	0.097	0.066	0.66	0.59
Maximum 8-hour Concentration	0.050	0.047	0.61	0.49
Days Exceeding the State Standard	1	0	0	0
Days Exceeding the National Standard	0	0	0	0
Particulate Matter (PM_{10})[2]				
Maximum 24-hour Concentration	*	*	*	*
Annual Concentration	*	*	*	*
Days Exceeding the National Standard	*	*	*	*
Days Exceeding the State Standard	*	*	*	*
Particulate Matter ($PM_{2.5}$)[2]				
Days >24- hour National Standard	0	0	*	*
Maximum 24-Hour Concentration	22.0	20.6	20.5	17.6
Days Exceeding National Annual Average	6.5	7.6	*	*
Days Exceeding State Annual Average	*	*	*	*

[1] Monitoring station is located at 306 Gobbi Street in Ukiah.
[2] Monitoring station is located at 105 North Main Street in Ukiah.
[3] PM statistics may include data that are related to an exceptional event.
*Insufficient data (or no data) to determine value.

Criteria Air Pollutants and Effects

Air quality studies generally focus on five pollutants that are most commonly measured and regulated:

- Carbon Monoxide (CO)
- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Suspended particulate matter (PM), including PM_{10} and $PM_{2.5}$.

Table 3 provides details regarding the characteristics, health effects, and sources of these pollutants. In Mendocino County, particulate matter is the pollutant of greatest concern as measured air pollutant levels exceed these concentrations at times.

Table 3 - Major Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Carbon Monoxide (CO)	Non-reactive, colorless and odorless gas that dissipates relatively quickly; ambient CO concentrations generally located near vehicular traffic Highest CO concentrations measured are typically recorded during the winter	▪ Interferes with the transfer of oxygen to the brain ▪ Causes dizziness and fatigue ▪ Can impair central nervous system functions	Automobile exhaust, residential wood burning in fireplaces and woodstoves
Ozone (O_3)	Colorless toxic gas and the chief component of urban smog. Highest concentrations occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies	▪ Eye Irritation ▪ Respiratory function impairment ▪ Interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen	Although not directly emitted from a particular source, it forms in the atmosphere through a chemical reaction between reactive organic gas (ROG) and nitrogen oxides (NO_x) under sunlight; ROG and NOx are primarily emitted from automobiles, and industrial sources
Nitrogen Dioxide (NO_2)	Reddish-brown gas that irritates the lungs; NO and NO_2 are collectively referred to as NO_x and are major contributors to O_3 formation; NO_2 also contributes to the formation of PM_{10} Levels of NO_2 in the North Coast are relatively low	▪ Increase risk of acute and chronic respiratory disease	Like O_3, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen; NO is primarily emitted from automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants
Sulfur Oxides (SO_x)	Primarily SO_2, sulfur oxides are colorless gases with a pungent, irritating odor Due to the lack of sources, levels of SO_2 in the North Coast are relatively low.	▪ Increases risk of acute and chronic respiratory disease ▪ Can cause diminished ventilator function in children	Product of high-sulfur fuel combustion from coal and oil used in power stations, industries, and for domestic heating; industrial chemical manufacturing; diesel vehicle exhaust
Suspended Particulate Matter ($PM_{2.5}$ / PM_{10})	Very small liquid and solid particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals; can produce haze and reduce regional visibility *PM_{10}:* Particulate matter less than 10 microns in diameter, about one-seventh the thickness of a human hair *$PM_{2.5}$:* Particulate matter 2.5 microns or less in diameter	▪ Damages respiratory tract ▪ Increases the number and severity of asthma attacks ▪ Causes or aggravates bronchitis and other lung diseases ▪ Reduces the body's ability to fight infections	Directly and indirectly emitted. Motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; atmospheric chemical reactions

Source: Illingworth & Rodkin, Inc., 2012.

Toxic Air Contaminants

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and Federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of diesel particulate matter (DPM). Several of these regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.[2] The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

Odors

Offensive odors can be very unpleasant, leading to considerable distress among the public, and often generate citizen complaints to local governments and the MCAQMD. Offensive odors are typically associated with wastewater treatment plants, sanitary landfills, feedlots and dairies, and industrial facilities. The occurrence and severity of odor problems depends on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptor(s). No such facilities or any other sources of offensive odors have been identified in proximity to the project site.

[2] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: February 1, 2012.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors are residences approximately 100 feet northwest from the existing southbound off ramp.

Climate Change and Greenhouse Gases

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred because it implies that there are other consequences to the global climate in addition to rising temperatures.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988, has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), HFC-23 (fluoroform), HFC-134a (s, s, s, 2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light duty trucks, other trucks, buses, and motorcycles) make up the largest source (second to electricity generation) of GHG emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change. "Greenhouse Gas Mitigation" is a term for reducing GHG emissions in order to reduce or "mitigate" the impacts of climate change. "Adaptation," refers to the effort of planning for and adapting to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).[3]

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing the growth of vehicle miles traveled (VMT), 3) transitioning to lower GHG emitting fuels, and 4) improving vehicle technologies. To be most effective all four strategies should be pursued cooperatively.

Air Pollutant Attainment Status

The North Coast Air Basin is designated as either unclassified/attainment or unclassified for all federally listed pollutants. For the state listed pollutants the North Coast Air Basin is listed as attainment or unclassified for all with the exception of being listed as non-attainment for PM_{10}.

To address this, the MCAQMD has adopted a Particulate Matter (PM) Attainment Plan. The plan includes a description of local air quality, the sources of local PM emissions, and recommended control measures to reduce future PM levels.

AIR QUALITY IMPACTS AND MITIGATION MEASURES

Significance Criteria

CEQA contains guidelines to evaluate the significance of environmental air quality impacts attributable to a proposed project. Appendix G of the CEQA Guidelines states that a project would normally be considered to result in a significant impact if the project:

III. Air Quality:

a) Conflicts with or obstructs implementation of the applicable air quality plan.
b) Violates any air quality standard or contributed substantially to an existing or projected air quality violation.
c) Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
d) Exposes sensitive receptors to substantial pollutant concentrations.
e) Creates objectionable odors affecting a substantial number of people.

VII. Greenhouse Gas Emissions:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

[3] http://climatechange.transportation.org/ghg_mitigation/

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The MCAQMD has adopted the BAAQMD CEQA Guidelines for addressing air quality impacts. These thresholds include construction and operational related emissions. The following table shows the thresholds that would apply to this project:

Table 4 - Adopted Air Quality CEQA Thresholds of Significance – June 2, 2010

Project-Level	**Construction-Related**	**Operational-Related**
Criteria Air Pollutants and Precursors	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**
ROG	54 (Bay Area AQMD)	180
NOx	54 (Bay Area AQMD)	42
PM_{10}	82	82
$PM_{2.5}$	54	54
PM_{10}/ $PM_{2.5}$ (Fugitive Dust)	Best Management Practices	Same as above
Local CO	None	125 Tpy
GHG	None	1,100MT of CO2e/yr

For the purposes of this analysis, the following criteria were used to evaluate air quality impacts resulting from the project:

Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The MCAQMD has adopted a Particulate Matter Attainment Plan[4] which established control measures for particulate matter. The implementation of MCAQMD Rule 1-430 would meet the recommended requirements outlined in the plan to reduce the PM emissions from the construction of the project. (See Appendix A for Rule 1-430)

[4] Particulate Matter attainment Plan, Mendocino County Air Quality Management District of the California North Coast Air basin, January 2005

Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less-than-Significant Impact. The project is not anticipated to increase traffic or have any effect on traffic speed that would substantially affect local air pollutant emissions. The project would realign and remove portions of the off-ramp opposite of the closest residences, which would move some of the traffic (i.e., emission sources) further from the residences. This would result in similar or slightly lower localized air pollutant concentrations. Project construction would result in emissions of dust that could affect ambient respirable and fine particulate matter (i.e., PM_{10} and $PM_{2.5}$) concentrations. The project would incorporate measures to reduce visible emissions and dust control measures, as required by MCAQMD Rules 1-410 and 1-430 (see Appendix A). These include requiring emission controls on construction equipment and spraying water on exposed surfaces to minimize dust.

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less-than-Significant Impact. The project would not change traffic conditions such that there would be a measureable or modeled increase in air pollutants from project operation. As described above, project construction would result in temporary emissions of air pollutants. The project would incorporate dust control measures to minimize fugitive dust emissions that affect ambient PM_{10} and $PM_{2.5}$ concentrations. The Road Construction Emission Model, Version 6.3.2, indicates that construction emissions of ozone precursors (i.e., reactive organic gases and nitrogen oxides) and exhaust particulate matter would be well below emission thresholds proposed by the MCAQMD. Inputs to the model include model defaults for a 0.25-mile roadway segment and 1 acre of disturbed land. The PM_{10} and $PM_{2.5}$ emissions assume a 50% control of fugitive dust from watering and associated dust control measures. The results of the modeling are shown in Table 5.

Table 5 – Road Construction Emission Model Results

Emission Estimates for -> Talmage Rd Interchange **Project Phases**	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**Total PM_{10} (lbs/day)**	**Total $PM_{2.5}$ (lbs/day)**	**CO_2 (lbs/day)**
Grubbing/Land Clearing	2.9	12.3	24.2	2.0	1.1	3,163
Grading/Excavation	3.2	16.2	25.1	2.2	1.0	3,574
Drainage/Utilities/Sub-Grade	2.9	12.9	21.9	2.1	100	2,934
Paving	1.7	7.6	10.2	0.9	0.8	1,125
Maximum (pounds/day)	3.2	16.2	25.1	2.2	1.0	3,574
Total (tons/construction project)	0.2	0.9	1.4	0.1	0.1	198
MCAQMD Threshold Of Significance (pounds/day)	180	125	42	82	54	None

Expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant Impact. The project would not change traffic conditions such that there would be a measureable or modeled increase in air pollutant or TAC emissions from project operation. The BAAQMD published TAC screening tables for roadways in each county of the Bay Area. These tables are used to predict screening TAC impacts from local traffic. The predicted TAC impacts associated with these tables are based on roadway orientation, distance from roadway, and average daily traffic (ADT). Assuming an ADT of 30,000 at a 10-foot distance from a north-south roadway in Sonoma County, the screening level cancer risk would be 8.3 excess lifetime cancer cases per year, the annual $PM_{2.5}$ concentration would be 0.26 $\mu g/m^3$, and the acute or chronic non-cancer risks would be less than 0.03.[5] Since the closest receptors are over 50 feet from the closest portions of the TAC, impacts would be less. The project would not increase traffic or change traffic speeds, so emissions of TACs are not anticipated to change. There would be a slight change due to the reduction in idling time as the intersection operation would improve. The project may slightly change the distance from the roadway to receptors; however, they would always be over 50 feet from the roadways. The total excess cancer risk, $PM_{2.5}$ concentration and non-cancer risks from the facility would remain below the community risk thresholds described above. Project impacts are assessed by evaluating the change in community risk impacts caused by the project. The project would not change these insignificant levels, and therefore, would have a less-than-significant impact.

As described above, project construction would result in temporary emissions of air pollutants. There would also be temporary emissions of TACs in the form of construction equipment

[5] Note that there are no screening tables available for Mendocino County, but the Sonoma County screening tables are assumed to be reflective of roadway conditions at the project area.

exhaust emissions of diesel particulate matter. The primary concern with exposure to diesel particulate matter is cancer risk. BAAQMD assesses cancer risk in terms of contracting cancer over a 70-year exposure period (i.e., lifetime exposure). However, the magnitude and nature of this project is such that only a few pieces of equipment would be required for construction and the construction duration would be relatively short. Project construction activity involving the use of heavy-duty construction equipment would last less than 6 months, and therefore, would not have an adverse long-term impact on nearby sensitive receptors (i.e., nearby residences).

Create objectionable odors affecting a substantial number of people?

No Impact. Objectionable odors are typically associated with wastewater treatment plants, sanitary landfills, feedlots and dairies, and industrial facilities. No such facilities or any other sources of offensive odors have been identified in proximity to the project site. Project operation or construction would not create odors that would be objectionable to a substantial number of people.

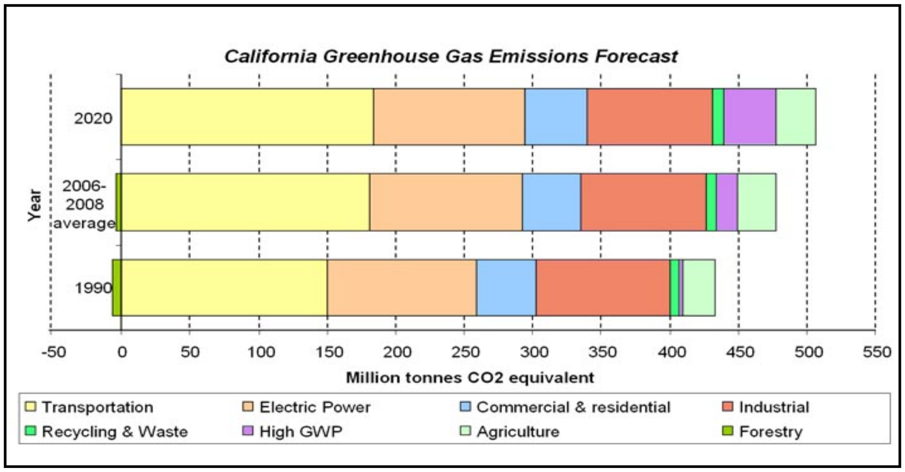
GHG Analysis

Less than Significant Impact. An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHG.[6] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines sections 15064(h)(1) and 15130). To make this determination the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects in order to make this determination is a difficult, if not impossible, task.

The Assembly Bill (AB) 32 Scoping Plan mandated by AB 32 contains the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, ARB released the GHG inventory for California (see Figure 1, forecast last updated: October 28, 2010). The forecast is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

[6] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

Figure 1 - California Greenhouse Gas Forecast



Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

The Department and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, the Department has created and is implementing the Climate Action Program at Caltrans that was published in December 2006.[7]

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 mph) and speeds over 55 mph; the most severe emissions occur from 0-25 mph. To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG

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[7] Caltrans Climate Action Program is located at the following web address:
http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

emissions produced during construction can be reduced to some degree by longer intervals between maintenance and rehabilitation events. Currently MCAQMD has adopted the BAAQMD significance thresholds, with some modifications, that apply to construction projects.

Based on the calculations from the Road Construction Emissions Model, the maximum daily CO_2 emissions would be 3,569 lbs/day and the total emissions from the construction of the project would be 197.3 tons. The completed project would reduce delay and improve traffic flow through the Talmage Road intersection, possibly reducing CO_2 emissions from operation.

The relocation of the south bound off ramp would help relieve congestion in the peak hour traffic periods during the day. With the construction of the project, the vehicle-miles-travelled (VMT) would remain the same as the No-Build scenario. The speed during the peak and off peak hours would remain the same. The combination of these would have an overall neutral effect on the GHG emissions generated in the project area when compared with the No-Build scenario. Table 6 shows the traffic used in calculating the CO_2 emissions for the various scenarios. Table 7 shows the GHG expressed in tons per day of CO_2. The net difference between the Build and No-Build scenarios is so small that they are not reflected in the calculations when shown in terms of tons per day. Operational emissions were calculated using CT-EMFAC Version 5, a computer model to estimate transportation emissions. CT-EMFAC was developed by UC Davis for Caltrans.

Table 6 – Peak-Hour Traffic

Roadway Link	Year	
	2012	2032
US 101 – Peak hour	2,300	2,990
US 101 – Off-Peak hour	1,143	1,486
Talmage Road – Peak hour	1,619	2,015
Talmage Road – Off-Peak hour	841	1002

Table 7 - CO_2 Emissions in Metric Tons per Year

Scenario	Year	
	2012	2032
Existing	5,838	--
No-Build	--	5,954
Build	--	5,490

The CO_2 emissions will increase over time with or without the project due to the increases in traffic on both U.S. 101 and Talmage Road. According to the Traffic Report, the traffic in 2032 will increase by a factor of 1.3 times. With the traffic remaining the same with or without the project, there will be slightly less delays at the interchanges with the project than without the project. As a result, there will be a reduction in the daily CO_2 emissions with the project over the no-build alternative. The CO_2 emissions numbers are only useful for a comparison between the build and no-build alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions would be because CO_2 emissions are dependent on other factors that are not part of the model such as the fuel mix[8], rate of acceleration, and the aerodynamics and efficiency of the vehicles.

[8] EMFAC model emission rates are only for direct engine-out CO_2 emissions not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components.

APPENDIX A

RULE 1-410 - VISIBLE EMISSIONS

(a) A person shall not discharge into the atmosphere from any source whatsoever any air contaminant for a period or periods aggregating more than three (3) minutes in any one hour that is as dark or darker in shade as that designated as No. 1 on the Ringlemann Chart, as published by the United States Bureau of Mines; or of such opacity as to obscure an observer's view to a degree equal to or greater than Ringlemann 1 or twenty (20) percent opacity.

(b) The provisions of Rule 1-410(a) do not apply to excessive visible emissions caused by:

(1) Failure of the emission to meet the requirements solely because of the presence of uncombined water.

(2) Smoke from fires set pursuant to Regulation 2 of the Mendocino County Air Quality Management District.

(3) Smoke from fires set or permitted by any public officer in the performance of his official duty for the improvement of watershed, range or pasture. (Health and Safety Code, Section 41704(c))

(4) Use of any aircraft to distribute seed, fertilizer, insecticides, or other agricultural aids over lands devoted to the growing of crops or the raising of fowl or animals. (Health and Safety Code, Section 41704(d))

(5) Open outdoor fires used only for cooking of food for human beings or for recreational purposes. (Health and Safety Code, Section 41704(e))

RULE 1-430 - FUGITIVE DUST EMISSIONS

This Rule prohibits the handling, transportation, or open storage of materials, or the conduct of other activities in such a manner that allows or may allow unnecessary amounts of particulate matter to become airborne except under the following circumstances:

a) Reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including, but not limited to, the following provisions:
   1) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.
   2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.
   3) The screening of all open-outdoor sandblasting and similar operations.
   4) The use of water or chemicals for the control of dust during the demolition of existing buildings or structures.

b) The following airborne dust control measures shall be required during all construction operations, the grading of roads, or the clearing of land

1) All visibly dry disturbed soil road surfaces shall be watered to minimize fugitive dust emissions.
2) All unpaved surfaces, unless otherwise treated with suitable chemicals or oils, shall have a posted speed limit of 10 miles per hour.
3) Earth or other material that has been transported by trucking or earth moving equipment, erosion by water, or other means onto paved streets shall be promptly removed.
4) Asphalt, oil, water or suitable chemicals shall be applied on materials stockpiles, and other surfaces that can give rise to airborne dusts.
5) All earthmoving activities shall cease when sustained winds exceed 15 miles per hour.
6) The operator shall take reasonable precautions to prevent the entry of unauthorized vehicles onto the site during non-work hours.
7) The operator shall keep a daily log of activities to control fugitive dust.

c) During recreational activities adequate dust control shall be maintained to prevent dust from migrating off the property where the activity is occurring.

[Amended 5/6/03]

Attachment 1 – Roadway Construction Modeling Results

Road Construction Emissions Model, Version 6.3.2

Emission Estimates for -> Talmage Rd Interchange **Project Phases (English Units)**	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**Total PM10 (lbs/day)**	**Exhaust PM10 (lbs/day)**	**Fugitive Dust PM10 (lbs/day)**	**Total PM2.5 (lbs/day)**	**Exhaust PM2.5 (lbs/day)**	**Fugitive Dust PM2.5 (lbs/day)**	**CO2 (lbs/day)**
Grubbing/Land Clearing	2.9	12.3	24.2	2.0	1.0	1.0	1.1	0.9	0.2	3,163.3
Grading/Excavation	3.2	16.2	25.1	2.2	1.2	1.0	1.3	1.1	0.2	3,574.5
Drainage/Utilities/Sub-Grade	2.9	12.9	21.9	2.1	1.1	1.0	1.2	1.0	0.2	2,934.0
Paving	1.7	7.6	10.2	0.9	0.9	-	0.8	0.8	-	1,152.6
Maximum (pounds/day)	3.2	16.2	25.1	2.2	1.2	1.0	1.3	1.1	0.2	3,574.5
Total (tons/construction project)	0.2	0.9	1.4	0.1	0.1	0.1	0.1	0.1	0.0	197.7

Notes:	Project Start Year ->	2015
	Project Length (months) ->	6
	Total Project Area (acres) ->	1
	Maximum Area Disturbed/Day (acres) ->	0
	Total Soil Imported/Exported (yd^3/day)->	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Attachment 2 - Example of CT-EMFAC Modeling

File Name:	US 101 No-Build Peak 2012 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:40
Area:	Mendocino (NC)
Analysis Year:	2012
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.096	0.598
Truck 2	0.084	0.955
Non-Truck	0.82	0.01

===

Road Length:	0.5	miles
Volume:	2300	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	0	minutes per vehicle
Tot. Idling Time:	0	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	100.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	1947.6	0	1962	-	3909.5	0.004
TOG	2307	0	1962	-	4269	0.005
CO	37875.4	0	-	-	37875.4	0.042
NOx	16280.7	0	-	-	16280.7	0.018
CO2	4867180.2	0	-	-	4867180.2	5.365
CO2 (Pavley I + LCFS)	4713077.3	0	-	-	4713077.3	5.195
PM10	452.3	0	-	490.1	942.4	0.001
PM2.5	415.6	0	-	193.5	609.1	<0.001
Benzene	59.6	0	19.6	-	79.2	<0.001
Acrolein	2.7	0	0	-	2.7	<0.001
Acetaldehyde	45.6	0	0	-	45.6	<0.001
Formaldehyde	109.3	0	0	-	109.3	<0.001
Butadiene	12.6	0	0	-	12.6	<0.001
Naphthalene	3	0	0.8	-	3.8	<0.001
POM	2.2	0	-	-	2.2	<0.001
Diesel PM	424.7	0	-	-	424.7	<0.001
DEOG	484	0	-	-	484	<0.001

File Name:	US 101 No-Build Off Peak 2012 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:41
Area:	Mendocino (NC)
Analysis Year:	2012
Season:	Annual

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.096	0.598
Truck 2	0.084	0.955
Non-Truck	0.82	0.01

==

Road Length:	0.5	miles
Volume:	1143	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	0	minutes per vehicle
Tot. Idling Time:	0	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	100.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	1935.7	0	1950	-	3885.7	0.004
TOG	2293	0	1950	-	4243	0.005
CO	37644.9	0	-	-	37644.9	0.041
NOx	16181.6	0	-	-	16181.6	0.018
CO2	4837553.8	0	-	-	4837553.8	5.332
CO2 (Pavley I + LCFS)	4684389	0	-	-	4684389	5.164
PM10	449.5	0	-	487.1	936.6	0.001
PM2.5	413.1	0	-	192.3	605.4	<0.001
Benzene	59.2	0	19.5	-	78.7	<0.001
Acrolein	2.7	0	0	-	2.7	<0.001
Acetaldehyde	45.3	0	0	-	45.3	<0.001
Formaldehyde	108.7	0	0	-	108.7	<0.001
Butadiene	12.5	0	0	-	12.5	<0.001
Naphthalene	3	0	0.8	-	3.7	<0.001
POM	2.1	0	-	-	2.1	<0.001
Diesel PM	422.1	0	-	-	422.1	<0.001
DEOG	481	0	-	-	481	<0.001

File Name:	Talmage Road No-Build Off Peak 2012 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:43
Area:	Mendocino (NC)
Analysis Year:	2012
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.096	0.598
Truck 2	0.084	0.955
Non-Truck	0.82	0.01

===

Road Length:	0.3	miles
Volume:	1619	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	1	minutes per vehicle
Tot. Idling Time:	215.87	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	817.2	1032.9	828.6	-	2678.7	0.003
TOG	977.8	1276.5	828.6	-	3082.9	0.003
CO	15091.3	10598.5	-	-	25689.8	0.028
NOx	6425.1	2971.3	-	-	9396.4	0.01
CO2	1973230.5	1444641.8	-	-	3417872.3	3.768
CO2 (Pavley I + LCFS)	1914223.4	1390650	-	-	3304873.4	3.643
PM10	137.1	50.7	-	207	394.7	<0.001
PM2.5	125.9	46.5	-	81.7	254.1	<0.001
Benzene	24.6	6.9	8.3	-	39.7	<0.001
Acrolein	1.1	0.1	0	-	1.2	<0.001
Acetaldehyde	21.9	15.5	0	-	37.5	<0.001
Formaldehyde	51.1	32.2	0	-	83.3	<0.001
Butadiene	5	1	0	-	6	<0.001
Naphthalene	1.3	1.9	0.3	-	3.5	<0.001
POM	0.7	0.4	-	-	1.1	<0.001
Diesel PM	124.6	29.8	-	-	154.4	<0.001
DEOG	247.3	209.8	-	-	457.1	<0.001

File Name:	Talmage Road Build Off Peak Period- 2015 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:52
Area:	Mendocino (NC)
Analysis Year:	2015
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.093	0.593
Truck 2	0.093	0.953
Non-Truck	0.814	0.01

===

Road Length:	0.3	miles
Volume:	841	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	0.5	minutes per vehicle
Tot. Idling Time:	112.13	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	560.5	374.7	691.8	-	1626.9	0.002
TOG	679.2	469.5	691.8	-	1840.5	0.002
CO	10990	3859.2	-	-	14849.2	0.016
NOx	4988.2	1270.7	-	-	6258.9	0.007
CO2	2087094.6	751988.7	-	-	2839083.4	3.13
CO2 (Pavley I + LCFS)	1908671.7	673101.2	-	-	2581772.9	2.846
PM10	64.4	17.3	-	216.5	298.2	<0.001
PM2.5	59.2	15.9	-	85.4	160.5	<0.001
Benzene	16.4	2.7	6.9	-	26.1	<0.001
Acrolein	0.7	<0.1	0	-	0.8	<0.001
Acetaldehyde	14.1	6.7	0	-	20.8	<0.001
Formaldehyde	33.2	13.8	0	-	47	<0.001
Butadiene	3.3	0.4	0	-	3.7	<0.001
Naphthalene	0.9	0.7	0.3	-	1.9	<0.001
POM	0.4	0.1	-	-	0.5	<0.001
Diesel PM	55	9.3	-	-	64.3	<0.001
DEOG	160.3	91	-	-	251.3	<0.001

File Name:	Talmage Road No-Build Off Peak Period- 2015 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:49
Area:	Mendocino (NC)
Analysis Year:	2015
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.093	0.593
Truck 2	0.093	0.953
Non-Truck	0.814	0.01

===

Road Length:	0.3	miles
Volume:	841	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	1	minutes per vehicle
Tot. Idling Time:	224.27	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	100.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	570.7	749.3	691.8	-	2011.8	0.002
TOG	683.4	939.1	691.8	-	2314.2	0.003
CO	11402.4	7718.3	-	-	19120.7	0.021
NOx	5305.5	2541.4	-	-	7846.9	0.009
CO2	2168399.8	1503977.5	-	-	3672377.3	4.048
CO2 (Pavley I + LCFS)	1973432	1346202.5	-	-	3319634.5	3.659
PM10	88.5	34.7	-	216.5	339.7	<0.001
PM2.5	81.3	31.9	-	85.4	198.6	<0.001
Benzene	17.1	5.5	6.9	-	29.5	<0.001
Acrolein	0.8	0.1	0	-	0.9	<0.001
Acetaldehyde	11.7	13.4	0	-	25.1	<0.001
Formaldehyde	28.8	27.6	0	-	56.4	<0.001
Butadiene	3.6	0.8	0	-	4.4	<0.001
Naphthalene	0.9	1.4	0.3	-	2.6	<0.001
POM	0.5	0.3	-	-	0.7	<0.001
Diesel PM	79.8	18.6	-	-	98.4	<0.001
DEOG	121.3	182	-	-	303.3	<0.001

===END===

File Name:	Talmage Road Build Peak Period- 2015 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:52
Area:	Mendocino (NC)
Analysis Year:	2015
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.093	0.593
Truck 2	0.093	0.953
Non-Truck	0.814	0.01

===

Road Length:	0.3	miles
Volume:	1692	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	0.5	minutes per vehicle
Tot. Idling Time:	112.8	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	563.8	376.9	695.9	-	1636.6	0.002
TOG	683.3	472.3	695.9	-	1851.5	0.002
CO	11055.4	3882.1	-	-	14937.5	0.016
NOx	5017.9	1278.3	-	-	6296.1	0.007
CO2	2099503	756459.5	-	-	2855962.6	3.148
CO2 (Pavley I + LCFS)	1920019.3	677103	-	-	2597122.4	2.863
PM10	64.7	17.4	-	217.8	300	<0.001
PM2.5	59.5	16	-	85.9	161.4	<0.001
Benzene	16.5	2.8	7	-	26.2	<0.001
Acrolein	0.7	<0.1	0	-	0.8	<0.001
Acetaldehyde	14.2	6.7	0	-	21	<0.001
Formaldehyde	33.4	13.9	0	-	47.3	<0.001
Butadiene	3.4	0.4	0	-	3.8	<0.001
Naphthalene	0.9	0.7	0.3	-	1.9	<0.001
POM	0.4	0.1	-	-	0.5	<0.001
Diesel PM	55.3	9.4	-	-	64.7	<0.001
DEOG	161.3	91.5	-	-	252.8	<0.001

File Name:	Talmage Road No-Build Peak Period- 2015 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:51
Area:	Mendocino (NC)
Analysis Year:	2015
Season:	Annual

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.093	0.593
Truck 2	0.093	0.953
Non-Truck	0.814	0.01

==

Road Length:	0.3	miles
Volume:	1692	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	1	minutes per vehicle
Tot. Idling Time:	225.6	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	563.8	753.8	695.9	-	2013.5	0.002
TOG	683.3	944.7	695.9	-	2323.8	0.003
CO	11055.4	7764.2	-	-	18819.6	0.021
NOx	5017.9	2556.5	-	-	7574.4	0.008
CO2	2099503	1512919.1	-	-	3612422.1	3.982
CO2 (Pavley I + LCFS)	1920019.3	1354206.1	-	-	3274225.4	3.609
PM10	64.7	34.9	-	217.8	317.4	<0.001
PM2.5	59.5	32	-	85.9	177.5	<0.001
Benzene	16.5	5.5	7	-	29	<0.001
Acrolein	0.7	0.1	0	-	0.8	<0.001
Acetaldehyde	14.2	13.5	0	-	27.7	<0.001
Formaldehyde	33.4	27.7	0	-	61.2	<0.001
Butadiene	3.4	0.8	0	-	4.1	<0.001
Naphthalene	0.9	1.4	0.3	-	2.6	<0.001
POM	0.4	0.3	-	-	0.6	<0.001
Diesel PM	55.3	18.7	-	-	74	<0.001
DEOG	161.3	183.1	-	-	344.4	<0.001

=====

File Name:	Talmage Road Build Peak Period 2032 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:58
Area:	Mendocino (NC)
Analysis Year:	2032
Season:	Annual

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

==

Road Length:	0.3	miles
Volume:	2015	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	0.5	minutes per vehicle
Tot. Idling Time:	134.33	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	261.4	187.5	403.3	-	852.3	<0.001
TOG	327.4	245	403.3	-	975.7	0.001
CO	4611.8	1651.7	-	-	6263.5	0.007
NOx	1816	770.9	-	-	2586.9	0.003
CO2	2591478.5	903705.9	-	-	3495184.4	3.853
CO2 (Pavley I + LCFS)	1963614.1	637776.4	-	-	2601390.4	2.868
PM10	39.1	11.1	-	265.3	315.5	<0.001
PM2.5	36	10.3	-	104.6	150.9	<0.001
Benzene	7.3	2.4	4	-	13.7	<0.001
Acrolein	0.2	<0.1	0	-	0.3	<0.001
Acetaldehyde	10.6	8.3	0	-	18.9	<0.001
Formaldehyde	23.1	16.6	0	-	39.6	<0.001
Butadiene	1.3	0.2	0	-	1.5	<0.001
Naphthalene	0.7	0.7	0.2	-	1.5	<0.001
POM	0.2	0.1	-	-	0.3	<0.001
Diesel PM	31.7	3.7	-	-	35.4	<0.001
DEOG	134.5	113	-	-	247.6	<0.001

File Name:	›-Build Peak Period 2032 - Annual.EC		
CT-EMFAC Version:	5.0.0.14319		
Run Date:	5/14/2014 13:59		
Area:	Mendocino (NC)		
Analysis Year:	2032		
Season:	Annual		

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

===

Road Length:	0.3	miles
Volume:	2015	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	1	ninutes per vehicle
Tot. Idling Time:	268.67	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	261.4	375	403.3	-	1039.8	0.001
TOG	327.4	490	403.3	-	1220.7	0.001
CO	4611.8	3303.5	-	-	7915.2	0.009
NOx	1816	1541.8	-	-	3357.8	0.004
CO2	2591478.5	1807411.8	-	-	4398890.4	4.849
CO2 (Pavley I + LCFS)	1963614.1	1275552.7	-	-	3239166.8	3.571
PM10	39.1	22.2	-	265.3	326.6	<0.001
PM2.5	36	20.6	-	104.6	161.1	<0.001
Benzene	7.3	4.7	4	-	16	<0.001
Acrolein	0.2	<0.1	0	-	0.3	<0.001
Acetaldehyde	10.6	16.5	0	-	27.2	<0.001
Formaldehyde	23.1	33.1	0	-	56.2	<0.001
Butadiene	1.3	0.5	0	-	1.8	<0.001
Naphthalene	0.7	1.3	0.2	-	2.2	<0.001
POM	0.2	0.2	-	-	0.4	<0.001
Diesel PM	31.7	7.5	-	-	39.1	<0.001
DEOG	134.5	226.1	-	-	360.6	<0.001

File Name:	d Peak Period 2032 - Annual.EC	
CT-EMFAC Version:	5.0.0.14319	
Run Date:	5/14/2014 13:56	
Area:	Mendocino (NC)	
Analysis Year:	2032	
Season:	Annual	

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

==

Road Length:	0.5	miles
Volume:	2990	vehicles per hour
Number of Hours:	8	hours
Avg. Idling Time:	0	ninutes per vehicle
Tot. Idling Time:	0	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	100.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	720.1	0	997.5	-	1717.7	0.002
TOG	879.4	0	997.5	-	1876.9	0.002
CO	11477.1	0	-	-	11477.1	0.013
NOx	4412.7	0	-	-	4412.7	0.005
CO2	6618401.5	0	-	-	6618401.5	7.296
CO2 (Pavley I + LCFS)	4940389.2	0	-	-	4940389.2	5.446
PM10	157.7	0	-	656.1	813.8	<0.001
PM2.5	145.2	0	-	258.6	403.8	<0.001
Benzene	20.9	0	10	-	30.9	<0.001
Acrolein	0.9	0	0	-	0.9	<0.001
Acetaldehyde	18.2	0	0	-	18.2	<0.001
Formaldehyde	42.6	0	0	-	42.6	<0.001
Butadiene	4.3	0	0	-	4.3	<0.001
Naphthalene	1.7	0	0.4	-	2.1	<0.001
POM	0.8	0	-	-	0.8	<0.001
Diesel PM	140.4	0	-	-	140.4	<0.001
DEOG	204	0	-	-	204	<0.001

File Name:	Talmage Road Build Off Peak Period 2032 - Annual.EC
CT-EMFAC Version:	5.0.0.14319
Run Date:	5/14/2014 13:57
Area:	Mendocino (NC)
Analysis Year:	2032
Season:	Annual

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

===

Road Length:	0.3	miles
Volume:	1002	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	0.5	minutes per vehicle
Tot. Idling Time:	133.6	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	260	186.5	401.1	-	847.6	<0.001
TOG	325.6	243.7	401.1	-	970.4	0.001
CO	4586.6	1642.7	-	-	6229.3	0.007
NOx	1806.1	766.7	-	-	2572.8	0.003
CO2	2577331.5	898772.5	-	-	3476104.1	3.832
CO2 (Pavley I + LCFS)	1952894.6	634294.7	-	-	2587189.3	2.852
PM10	38.9	11	-	263.9	313.8	<0.001
PM2.5	35.8	10.2	-	104	150	<0.001
Benzene	7.2	2.3	4	-	13.6	<0.001
Acrolein	0.2	<0.1	0	-	0.3	<0.001
Acetaldehyde	10.6	8.2	0	-	18.8	<0.001
Formaldehyde	22.9	16.5	0	-	39.4	<0.001
Butadiene	1.3	0.2	0	-	1.5	<0.001
Naphthalene	0.7	0.7	0.2	-	1.5	<0.001
POM	0.2	0.1	-	-	0.3	<0.001
Diesel PM	31.5	3.7	-	-	35.2	<0.001
DEOG	133.8	112.4	-	-	246.2	<0.001

File Name:	l Off Peak Period 2032 - Annual.EC	
CT-EMFAC Version:	5.0.0.14319	
Run Date:	5/14/2014 13:56	
Area:	Mendocino (NC)	
Analysis Year:	2032	
Season:	Annual	

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

==

Road Length:	0.5	miles
Volume:	1486	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	0	minutes per vehicle
Tot. Idling Time:	0	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	100.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	715.8	0	991.5	-	1707.3	0.002
TOG	874.1	0	991.5	-	1865.6	0.002
CO	11408	0	-	-	11408	0.013
NOx	4386.2	0	-	-	4386.2	0.005
CO2	6578558.3	0	-	-	6578558.3	7.252
CO2 (Pavley I + LCFS)	4910647.7	0	-	-	4910647.7	5.413
PM10	156.7	0	-	652.2	808.9	<0.001
PM2.5	144.3	0	-	257	401.4	<0.001
Benzene	20.8	0	9.9	-	30.7	<0.001
Acrolein	0.9	0	0	-	0.9	<0.001
Acetaldehyde	18	0	0	-	18	<0.001
Formaldehyde	42.3	0	0	-	42.3	<0.001
Butadiene	4.3	0	0	-	4.3	<0.001
Naphthalene	1.7	0	0.4	-	2.1	<0.001
POM	0.8	0	-	-	0.8	<0.001
Diesel PM	139.5	0	-	-	139.5	<0.001
DEOG	202.7	0	-	-	202.7	<0.001

File Name:	-Build Off Peak Period 2032 - Annual.EC	
CT-EMFAC Version:	5.0.0.14319	
Run Date:	5/14/2014 14:01	
Area:	Mendocino (NC)	
Analysis Year:	2032	
Season:	Annual	

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category
Truck 1	0.09	0.591
Truck 2	0.112	0.965
Non-Truck	0.798	0.01

==

Road Length:	0.3	miles
Volume:	1002	vehicles per hour
Number of Hours:	16	hours
Avg. Idling Time:	1	minutes per vehicle
Tot. Idling Time:	267.2	hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	100.00%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire/Brake Wear (grams)	Total (grams)	Total (US tons)
ROG	260	373	401.1	-	1034.1	0.001
TOG	325.6	487.3	401.1	-	1214.1	0.001
CO	4586.6	3285.4	-	-	7872	0.009
NOx	1806.1	1533.4	-	-	3339.5	0.004
CO2	2577331.5	1797545.1	-	-	4374876.6	4.822
CO2 (Pavley I + LCFS)	1952894.6	1268589.4	-	-	3221484	3.551
PM10	38.9	22.1	-	263.9	324.8	<0.001
PM2.5	35.8	20.4	-	104	160.3	<0.001
Benzene	7.2	4.7	4	-	15.9	<0.001
Acrolein	0.2	<0.1	0	-	0.3	<0.001
Acetaldehyde	10.6	16.4	0	-	27	<0.001
Formaldehyde	22.9	33	0	-	55.9	<0.001
Butadiene	1.3	0.5	0	-	1.8	<0.001
Naphthalene	0.7	1.3	0.2	-	2.2	<0.001
POM	0.2	0.2	-	-	0.4	<0.001
Diesel PM	31.5	7.4	-	-	38.9	<0.001
DEOG	133.8	224.8	-	-	358.6	<0.001

Appendix G

Noise Analysis Report

TALMAGE ROAD/SOUTHBOUND U.S. 101 RAMP REALIGNMENT PROJECT DRAFT ENVIRONMENTAL NOISE ASSESSMENT UKIAH, CALIFORNIA

February 26, 2014

♦ ♦ ♦

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INTRODUCTION

This report presents the results of the environmental noise assessment completed for the Talmage Road/Southbound U.S. 101 Ramp Realignment Project proposed in Ukiah, California. The proposed project includes improvements to the Talmage Road/U.S. 101 southbound on- and off-ramps and improvements to Talmage Road within the State right-of-way. Modifications within the State right-of-way to the Talmage Road/U.S. 101 southbound on- and off-ramps include removal of the existing southbound off-ramp to westbound Talmage Road from service, widening and realignment of the southbound off-ramp to eastbound Talmage Road to four lanes with terminus at a new signalized intersection with Talmage Road, signing and striping, minor grading, new sidewalks, curbs and gutters. In addition to these improvements, Talmage Road would be widened to add a westbound through lane (two westbound through lanes) between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp (one through lane and one right-turn lane). Existing signals at the intersection of Talmage Road and Airport Park Boulevard would also be replaced.

23CFR772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23CFR772.7, projects are categorized as Type I, Type II or Type III projects. The Federal Highway Administration (FHWA) defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, the physical alteration of an existing highway where there is either a substantial horizontal or substantial vertical alteration, or other activities discussed in the definition of a Type I project. A Type II project involves construction of noise abatement on an existing highway with no changes to highway capacity or alignment. Type III projects do not require a noise analysis.

The improvements proposed by the project do not result in either a new highway facility in a new location, substantial horizontal or substantial vertical alteration in the existing roadway alignments, or otherwise meet the definition of the Type I project. Therefore, the project does not require a Noise Study Report.

This report is divided into two sections. The Setting section provides a brief description of the fundamentals of environmental noise and vibration, summarizes applicable regulatory criteria established by the City of Ukiah, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions. The Impacts and Mitigation Measures section of the report describes the significance criteria used in the analysis, evaluates noise and vibration levels resulting from temporary project construction activities, and evaluates permanent noise level increases resulting from the operation of the proposed improvement.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.
Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, November 2009.

TABLE 3 Reaction of People and Damage to Buildings From Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Criteria

The State of California and the City of Ukiah establish regulatory criteria that are applicable in this noise and vibration impact assessment. The State's CEQA guidelines are used to assess the potential significance of environmental noise impacts pursuant to goals and policies set forth in the local General Plan and Municipal Code.

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of environmental noise impacts attributable to a proposed project. Applicable CEQA checklist questions ask whether the project would result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

CEQA does not define the noise level increase that is considered substantial. Typically, a permanent increase in the day-night average noise level of 3 dBA L_{dn} or greater at noise-sensitive receptors would be considered significant when projected noise levels would exceed those considered satisfactory for the affected land use. An increase of 5 dBA L_{dn} or greater would be considered significant when projected noise levels would continue to meet those considered satisfactory for the affected land use. A substantial temporary noise increase from construction is typically defined as noise levels exceeding 60 dBA L_{eq} and the ambient noise environment by at least 5 dBA L_{eq} for a period of more than one year.

City of Ukiah. The City of Ukiah General Plan's primary noise goal (Goal NZ-1) is to stabilize or reduce transportation noise impacts on adjacent residential land uses. Implementation Measure NZ-1.2(c) supports this goal by requiring that the expansion of existing roads be designed using accepted acoustical engineering features such as low landscaped berms, landscaping, below-grade construction, and speed control, to minimize the expansion of the Discomfort Threshold Corridor (DTC). Goal NZ-3 is to respect individuals' rights to avoid exposure to excessive or unwanted noise. Policy NZ-3.1 supports Goal NZ-3 by enforcing existing noise regulations.

The City of Ukiah limits construction activities to between the hours of 7:00 AM and 7:00 PM seven days a week. Section §6054, Construction of Buildings and Projects, states:

> *It shall be unlawful for any person within a residential zone, or within a radius of five hundred feet (500') therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist or any other construction type device (between the hours of 7:00 P.M. of one day and 7:00 A.M. of the next day) in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless beforehand a permit therefor has been duly obtained from the Director of Public works. No permit shall be required to perform emergency work as defined in §6046 of this Article.*

Existing Noise Environment

Noise-sensitive land uses (single-family and multiple-family residences) are located west of U.S. 101 and north Talmage Road. Ambient noise measurements were made during two noise surveys; the first noise survey occurred in January 2013, and the second occurred in November 2013. The two noise monitoring surveys were conducted to quantify ambient noise levels at representative noise-sensitive land uses located in the project vicinity.

January 2013 Noise Monitoring Survey

During the first noise monitoring survey, ambient noise levels were measured at four locations from Thursday, January 3, 2013 to Friday, January 4, 2013. Noise levels measured at site LT-1 quantified the daily trend in noise levels at receptors north of Talmage Road. The three remaining noise measurements were short-term, observed noise measurements that were 10 to 20 minutes in duration. The January 2013 monitoring locations are shown on Figure 1. Appendix A contains field notes and calibration records for noise monitoring equipment.

Long-term noise measurement LT-1 was located in front of 560 Munson Frontage Road just west of Airport Park Boulevard. This location was selected to quantify the daily trend in noise levels at residential land uses north of Talmage Road. Hourly average noise levels typically ranged from 62 to 68 dBA L_{eq} during weekday daytime hours and from 53 to 62 dBA L_{eq} during weekday nighttime hours. The calculated day-night average noise level at this location was 67 dBA L_{dn}. The daily distribution of noise levels at LT-1 is summarized in Figure 2.

Short-term measurement ST-1 was made at the approximate setback of single-family residences nearest the Lorraine Street/Munson Frontage Road intersection. Site ST-2 was located at the approximate setback of single-family residences nearest the Henderson Lane/Munson Frontage Road intersection, and ST-3 was made at the easternmost terminus of Munson Frontage Road. The results of the short-term noise measurements are presented in Table 4.

TABLE 4 Summary of Short-Term Noise Measurements (dBA)

Location and Time of Day	Lmax	L(1)	L(10)	L(50)	L(90)	Leq	Ldn[1]
ST-1: Setback of single-family residences nearest the Lorraine Street/Munson Frontage Road intersection. (11:20 a.m. - 11:30 a.m.)	71	69	63	55	52	59	63
(11:30 a.m. - 11:40 a.m.)	74	71	64	56	52	60	
ST-2: Setback of single-family residences nearest the Henderson Lane/Munson Frontage Road intersection. (10:50 a.m.-11:00 a.m.)	72	66	61	56	54	58	60
(11:00 a.m.-11:10 a.m.)	68	65	60	56	53	57	
ST-3: Easternmost terminus of Munson Frontage Road. (12:40 p.m. - 12:50 p.m.)	72	69	64	61	58	62	63

Source: Illingworth & Rodkin, Inc., 2013

[1]L_{dn} approximated by correlating the data measured at the short-term site with the data measured at the corresponding long-term measurement site during concurrent time intervals. The difference in measured noise levels between the two sites is then applied to the L_{dn} calculated for the data measured at the long-term site in order to estimate the L_{dn} at the short-term site. For example, if the measured 10-minute L_{eq} at the long-term site is 65 dBA, with an L_{dn} of 70 dBA, and the measured 10-minute L_{eq} at the short-term site is 55 dBA during the same 10-minute time period, then the estimated L_{dn} at the short-term site would be 60 dBA.

November2013 Noise Monitoring Survey

During the second noise monitoring survey, conducted between Wednesday, November 13, 2013 and Sunday, November 17, 2013, ambient noise levels were measured at six locations. The daily trends in noise levels were measured at three locations (LT-2, LT-3, and LT-4). The three remaining noise measurements were short-term, observed noise measurements conducted in 10 minute intervals over a period of 40 minutes at each site. The November 2013 monitoring locations are also shown on Figure 1. Appendix A contains field notes and calibration records for noise monitoring equipment.

Long-term noise measurement LT-2 was made to document ambient noise levels at receptors west of U.S. 101 and north of the primary project area along Marlene Street. LT-2 was 115 feet from the center of U.S. 101 and 55 feet from the center of the U.S. 101 southbound off-ramp to Talmage Road. Hourly average noise levels typically ranged from 67 to 73 dBA L_{eq} during weekday daytime hours and from 62 to 71 dBA L_{eq} during weekday nighttime hours. The calculated day-night average noise level at this location was 74 dBA L_{dn} on Thursday and Friday. Ambient noise levels were lower on Saturday (72 dBA L_{dn}). The daily distribution of noise levels at LT-2 is summarized in Figures 3-5.

Noise measurement LT-3 documented ambient noise levels resulting from traffic along Talmage Road at receptors along Munson Frontage Road near Betty Street. Site LT-3 was 95 feet from the center of Talmage Road. Hourly average noise levels typically ranged from 61 to 69 dBA L_{eq} during weekday daytime hours and from 52 to 65 dBA L_{eq} during weekday nighttime hours. The calculated day-night average noise level at this location was 68 dBA L_{dn} on Thursday and 67 dBA L_{dn} on Friday. Ambient noise levels were 66 dBA L_{dn} on Saturday. The daily distribution of noise levels at LT-3 is summarized in Figures 6-8.

Long-term noise measurement LT-4 was made to document ambient noise levels near receptors along Munson Frontage Road adjacent to the U.S. 101 southbound off-ramp to Talmage Road. LT-4 was at the westernmost terminus of Munson Frontage Road, 70 feet from the center of the U.S. 101 southbound off-ramp to Talmage Road, and 100 feet from the center of Talmage Road. Hourly average noise levels typically ranged from 59 to 66 dBA L_{eq} during weekday daytime hours and from 53 to 62 dBA L_{eq} during weekday nighttime hours. The calculated day-night average noise level at this location was 67 dBA L_{dn} on Thursday and 66 dBA L_{dn} on Friday. Ambient noise levels were 65 dBA L_{dn} on Saturday. The daily distribution of noise levels at LT-4 is summarized in Figures 9-11.

Short-term measurement ST-4 was made at the easternmost terminus of Munson Frontage Road and repeated ST-3 from the January 2013 survey. ST-5 was made near residential receptors along Munson Frontage Road near LT-1 from the January 2013 noise survey. Site ST-6 was made in front of 744 Munson Frontage Road. The results of the November 2013 short-term noise measurements are presented in Table 5.

TABLE 5 Summary of Short-Term Noise Measurements (dBA)

Location and Time of Day	Lmax	L(1)	L(10)	L(50)	L(90)	Leq	Ldn[1]
ST-4: Easternmost terminus of Munson Frontage Road. (10:10 a.m.-10:20 a.m.)	72	67	62	59	55	60	63-65
(10:20 a.m.-10:30 a.m.)	69	67	63	60	56	61	
(10:30 a.m.-10:40 a.m.)	71	68	63	59	56	61	
(10:40 a.m.-10:50 a.m.)	67	66	63	59	56	60	
ST-5: Between 560 and 570 Munson Frontage Road. (11:00 a.m.-11:10 a.m.)	78	74	66	61	56	63	64-66
(11:10 a.m.-11:20 a.m.)	79	76	67	61	57	65	
(11:20 a.m.-11:30 a.m.)	72	69	65	61	56	62	
(11:30 a.m.-11:40 a.m.)	75	72	66	60	57	63	
ST-6: Front of 744 Munson Frontage Road. (12:10 p.m.-12:20 p.m.)	66	64	59	56	53	57	62-64
(12:20 p.m.-12:30 p.m.)	66	64	60	57	55	58	
(12:30 p.m.-12:40 p.m.)	73	70	64	57	54	60	
(12:40 p.m.-12:50 p.m.)	74	71	61	57	53	60	

Source: Illingworth & Rodkin, Inc., 2013
[1]L_{dn} approximated by correlating the data measured at the short-term site with the data measured at the corresponding long-term measurement site during concurrent time intervals. The difference in measured noise levels between the two sites is then applied to the L_{dn} calculated for the data measured at the long-term site in order to estimate the L_{dn} at the short-term site. For example, if the measured 10-minute L_{eq} at the long-term site is 65 dBA, with an L_{dn} of 70 dBA, and the measured 10-minute L_{eq} at the short-term site is 55 dBA during the same 10-minute time period, then the estimated L_{dn} at the short-term site would be 60 dBA.

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in a significant impact if noise levels conflict with adopted environmental standards or plans, if the project would expose persons to or generate excessive groundborne vibration levels, or if noise levels generated by the project would substantially increase existing noise levels on a permanent or temporary basis. For the purposes of this analysis, the following criteria were used to evaluate noise and vibration impacts resulting from the project:

- A noise impact would be identified if the project violates regulations established in the City of Ukiah's Municipal Code;
- A vibration impact would be identified if groundborne vibration levels would exceed 0.3 in/sec PPV (peak particle velocity) at adjacent buildings;
- A noise impact would be identified if the permanent noise level increase resulting from the project is 3 dBA L_{dn} or greater;

- A noise impact would be identified if construction activities would result in a substantial temporary noise increase at noise-sensitive uses in the project vicinity. A substantial temporary noise increase is defined as construction noise levels exceeding 60 dBA L_{eq} and the ambient noise environment by at least 5 dBA L_{eq} for a period of more than one year;

- A noise impact would be identified if the project would expose people residing or working in the project area to excessive airport-related noise.

Impact 1: **Conflict with Municipal Code Standards.** The project would not conflict with Municipal Code standards established to regulate noise from construction. **This is a less-than-significant impact.**

The City of Ukiah does not establish quantitative noise level limits for construction activities, but does limit construction activities within a residential zone, or within 500 feet of residences, to between the hours of 7:00 AM and 7:00 PM seven days a week assuming that, "…a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless beforehand a permit therefor has been duly obtained from the Director of Public Works". Proposed construction activities would occur during hours allowed by the City and would not conflict with the City of Ukiah Municipal Code Standards applicable to construction noise. Therefore, the impact would be considered less-than-significant impact.

Mitigation Measures: **None Required**

Impact 2: **Exposure to Groundborne Vibration.** The construction of the project would not result in excessive groundborne vibration levels at adjacent land uses. **This is a less-than-significant impact.**

The California Department of Transportation recommends a vibration limit of 0.5 inches/second, peak particle velocity (in/sec, PPV) as a limit to avoid damage to buildings that are structurally sound and designed to modern engineering standards, 0.3 in/sec, PPV for buildings that are found to be structurally sound but where structural damage is a major concern, and a conservative limit of 0.08 in/sec, PPV for ancient buildings or buildings that are documented to be structurally weakened.

All buildings in the project vicinity are assumed to be structurally sound, but these buildings may or may not have been designed to modern engineering standards. Vibration impacts would be considered significant if levels from proposed construction activities would exceed 0.3 in/sec PPV at nearby buildings. Vibration levels exceeding 0.3 in/sec PPV could result in cosmetic damage (e.g., minor cracking may result in plastered walls or ceilings). No ancient buildings or buildings that are documented to be structurally weakened are known to exist in the area.

Demolition and construction activities associated with the project would generate vibration when heavy equipment or impact tools (e.g., jackhammers, hoe rams) are used near sensitive receptors. Heavy equipment required to construct the project would likely include AC grinders, excavators, backhoes, hoe rams, full size loaders, skip loaders, AC rollers, graders, vacuum trucks, concrete mixers, jackhammers, and haul trucks. Construction activities that generate higher vibration levels, such as impact or vibratory pile driving, would not be required to construct the project.

Table 5 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. A review of the vibration source level data indicates that vibration levels expected from project construction would typically range from 0.003 in/sec PPV to 0.210 in/sec PPV at a distance of 25 feet for the vast majority of proposed construction activities.

TABLE 5 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)
Pile Driver (Impact)	upper range	1.158
	typical	0.644
Pile Driver (Sonic)	upper range	0.734
	typical	0.170
Clam shovel drop		0.202
Hydromill (slurry wall)	in soil	0.008
	in rock	0.017
Vibratory Roller		0.210
Hoe Ram		0.089
Large bulldozer		0.089
Caisson drilling		0.089
Loaded trucks		0.076
Jackhammer		0.035
Small bulldozer		0.003

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Federal Transit Agency, Office of Planning and Environment, May 2006.

Project demolition/construction activities would occur as close as about 20 feet from the nearest existing commercial building (Triple “S” Tires) when work occurs along westbound Talmage Road and about 70 feet from the nearest existing residential structure located adjacent to the southbound off-ramp to westbound Talmage Road when this ramp is removed from service. At a distance of 20 feet, vibration levels could range from 0.004 to 0.268 in/sec PPV. At a distance of 70 feet, vibration levels could range from 0.001 to 0.068 in/sec PPV. Vibration levels would not exceed the 0.3 in/sec PPV significance criteria, the impact would be considered less-than-significant.

In areas where vibration would not be expected to cause architectural damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and it would not be considered significant given the intermittent and short duration of the phases that have the highest potential of producing vibration (demolition and use of jackhammers and other high power tools).

Mitigation Measures: None Required

Impact 3: **Substantial Permanent Noise Level Increase.** The interchange improvements would realign travel lanes; however, traffic noise levels would not be substantially increased over a permanent basis. **This is a less-than-significant impact.**

For the purposes of this analysis, a substantial permanent noise level increase is identified as 3 dBA L_{dn} or greater above existing conditions.

Traffic noise levels were predicted using the Federal Highway Administration's Traffic Noise Model (TNM). TNM calculates traffic noise levels based on the geometry of the site, which includes the positioning of travel lanes, receptors, barriers, terrain, ground type, buildings, etc. Geometrical features were digitized and input into the traffic noise model based on the project's geometric plans. The noise source is the traffic flow, as defined by the user, in terms of hourly volumes of automobiles (autos), medium-duty trucks (medium), heavy-duty trucks (heavy), buses, and motorcycles. *GHD* provided peak hour traffic volume data for existing conditions (2012) and future conditions in 2032. Travel speeds were input into the model based on observations made during the noise monitoring surveys. Appendix B contains the TNM input and output files.

TNM cannot accurately account for pavement types and conditions, atypical vehicle noise populations, transparent shielding (such as wood fences with shrinkage gaps), reflections from nearby buildings and structures, or meteorological conditions. For these reasons, noise measurements are conducted and traffic noise model adjustments and calibration factors are developed. The calculated and measured noise levels are compared to assess differences and validate the traffic noise model.

The calibration factors or model adjustments (K-factors) developed from this process were used to modify the model to more closely represent measured conditions. Modeled results that vary from measurements by more than 2 dB are adjusted after a careful review of all measurement and modeled data. The adjustments were calculated as follows:

- Where modeled levels are more than 2 dB lower than measured levels, the modeled results are adjusted to measured conditions: Adjustment = Measured – Modeled;
- Where the modeled result is 0 to +2 dB lower than the measured level, no adjustment is made: Adjustment = 0;
- Where the modeled result is 0 to +2 dB higher than the measured level, no adjustment is made: Adjustment = 0;
- Where the modeled result is more than +2 dB higher than the measured level, an adjustment is made to bring the modeled result to within 2 dB of measured conditions: Adjustment = (Measured + 2) – Modeled.

Table 6 summarizes the K-factors used to modify the model's predicted noise levels to more closely represent measured noise conditions.

TABLE 6 TNM Adjustment Factors (dBA)

Receptor	Measured	Validation	Difference	K-Factor
LT-1	66.8	64.3	-2.5	+0.5
ST-1	62.7	59.8	-2.9	+0.9
ST-2	59.7	59.0	-0.7	0
ST-3/ST-4*	64.1	66.5	+2.4	-0.4
LT-2	73.5	73.1	-0.4	0
LT-3	67.1	64.7	-2.4	+0.4
LT-4	65.8	69.0	+3.2	-1.2
ST-5	65.0	63.8	-1.2	0
ST-6	63.2	61.3	-1.9	0

*ST-4 modeling results used to represent ST-3 and ST-4 measurement positions as ST-4 measurement yielded worst-case existing noise levels.
Source: Illingworth & Rodkin, Inc., 2014

Once the traffic noise model was calibrated, the traffic noise model was used to calculate existing noise level conditions, and future noise level conditions under the Preferred Alternative and the Caltrans Alternative. The results of the traffic noise modeling for the Preferred Alternative are summarized in Table 7, and the results of the traffic noise modeling for the Caltrans Alternative are summarized in Table 8.

TABLE 7 Traffic Noise Modeling Results (dBA, L_{dn})

Receptor	Existing	Future Preferred Alternative	Noise Level Increase	Significant Increase?
LT-1	64.8	66.1	+1.3	No
ST-1	60.7	62.6	+1.9	No
ST-2	59.0	61.1	+2.1	No
ST-3/ST-4*	66.1	66.5	+0.4	No
LT-2	73.1	74.3	+1.2	No
LT-3	65.1	66.3	+1.2	No
LT-4	67.8	68.4	+0.6	No

Receptor	Existing	Future Preferred Alternative	Noise Level Increase	Significant Increase?
ST-5	63.8	65.3	+1.5	No
ST-6	61.3	63.5	+2.2	No

*ST-4 modeling results used to represent ST-3 and ST-4 measurement positions as ST-4 measurement yielded worst-case existing noise levels.
Source: Illingworth & Rodkin, Inc., 2014

TABLE 8 Traffic Noise Modeling Results (dBA, L_{dn})

Receptor	Existing	Future Caltrans Alternative	Noise Level Increase	Significant Increase?
LT-1	64.8	66.0	+1.2	No
ST-1	60.7	62.6	+1.9	No
ST-2	59.0	60.9	+1.9	No
ST-3/ST-4*	66.1	66.8	+0.7	No
LT-2	73.1	74.3	+1.2	No
LT-3	65.1	66.3	+1.2	No
LT-4	67.8	69.0	+1.2	No
ST-5	63.8	65.3	+1.5	No
ST-6	61.3	63.0	+1.7	No

*ST-4 modeling results used to represent ST-3 and ST-4 measurement positions as ST-4 measurement yielded worst-case existing noise levels.
Source: Illingworth & Rodkin, Inc., 2014

As noted in Table 7 and 8, the traffic noise modeling results show noise increases ranging from 0 to 2 dBA at receptors in the project vicinity under the Preferred Alternative and the Caltrans Alternative. The noise increases are attributable to the proposed improvements and additional traffic volumes expected along the roadways. The increase in noise levels would not exceed the 3 dBA threshold of significance resulting in a less-than-significant impact.

Mitigation Measures: **None Required**

Impact 4: **Temporary Construction Noise.** Noise generated by construction activities would not be expected to result in a substantial temporary noise increase at adjacent land uses. **This is a less-than-significant impact.**

The construction of the project would generate noise, and would temporarily increase noise levels at adjacent receptors. Noise impacts resulting from roadway construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors. Where noise from construction activities exceeds 60 dBA L_{eq} and exceeds the ambient noise environment by at least 5 dBA L_{eq} at noise-sensitive uses in the project vicinity for a period of one year or more, the impact would be considered significant.

Construction activities generate considerable amounts of noise, especially when heavy equipment is used. At times, these activities would occur immediately adjacent to residential receptors. For example, work planned along the southbound U.S. 101 off-ramp to westbound Talmage Road would intermittently expose adjacent receptors to the highest noise levels. The highest maximum noise levels generated by project construction would typically range from about 80 to 90 dBA L_{max} at a distance of 50 feet from the noise source (Table 9). Typical hourly average construction generated noise levels are about 79 dBA to 88 dBA L_{eq} measured at a distance of 50 feet from the center of the site during busy construction periods when multiple pieces of construction equipment are operating in a given area (Table 10).

TABLE 9 Construction Equipment 50-Foot Noise Emission Levels

Equipment Category	Lmax Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous

Equipment Category	Lmax Level (dBA)[1,2]	Impact/Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:
1 Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.
2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.
3 Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.
Source: National Cooperative Highway Research Program, 1999.

TABLE 10 Typical Ranges of Noise Levels at 50 Feet from Construction Sites (dBA L_{eq})

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.
Source: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding provided by buildings or terrain result in lower construction noise levels at distant receptors. A more typical condition would assume an average distance of approximately 200 feet between the proposed construction activities and the residential receptors along Munson Frontage Road. With additional distance from the construction noise sources, maximum instantaneous noise levels are calculated to range from about 68 dBA to 78 dBA L_{max} and typical hourly average construction generated noise levels will range from about 67 dBA to 76 dBA L_{eq}. Such noise levels would typically represent expected construction noise levels over the duration of the construction period.

The City of Ukiah Municipal Code establishes limits on the hours during the day that construction activity is permitted to occur, and proposed construction activities would occur during daytime hours only. This ensures that construction noise impacts would not occur during the sensitive nighttime period when it would result in potential sleep disturbance. Construction of the proposed improvements would result in temporary noise level increases at sensitive receptors along the project alignment. Construction noise levels would exceed the 60 dBA L_{eq} noise threshold and exceed the ambient noise environment by at least 5 dBA L_{eq}. However, construction activities would generally move along the right-of-way as construction proceeds, and the overall construction duration would be limited to less than one year. This is a less-than-significant impact.

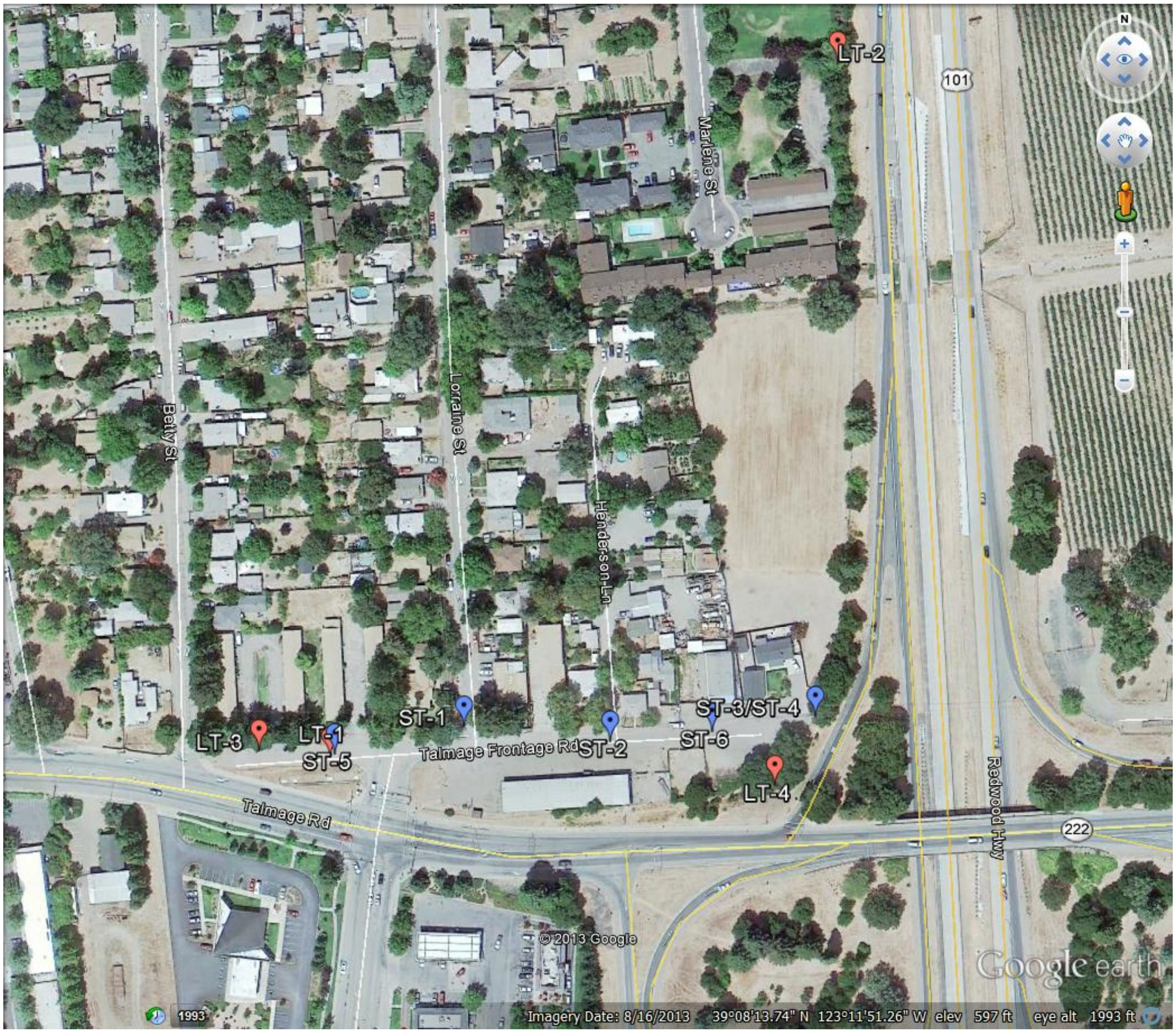
Mitigation Measures: None Required

Impact 5: Compatibility with Aircraft Noise Exposure. The project would not expose persons to excessive aircraft noise.

The project area is located approximately one-quarter mile northeast of the Ukiah Municipal Airport. Due to vehicle traffic along U.S. 101 and Talmage Road, aircraft does not make a significant contribution to overall noise levels at receptors in the project vicinity. Intermittent aircraft noise associated with the operations of Ukiah Municipal Airport would have no effect on construction workers given the noise exposure that these workers are subjected to on a daily basis. The project is not located within the vicinity of a private airstrip; therefore the criterion is not applicable.

Mitigation Measures: None Required

Figure 1 **Aerial Photo Showing Measurement/Modeling Receptors**



Noise Levels at Noise Measurement Site LT-1
Front of 560 Munson Frontage Road just west of Airport Park Boulevard
January 3-4, 2013

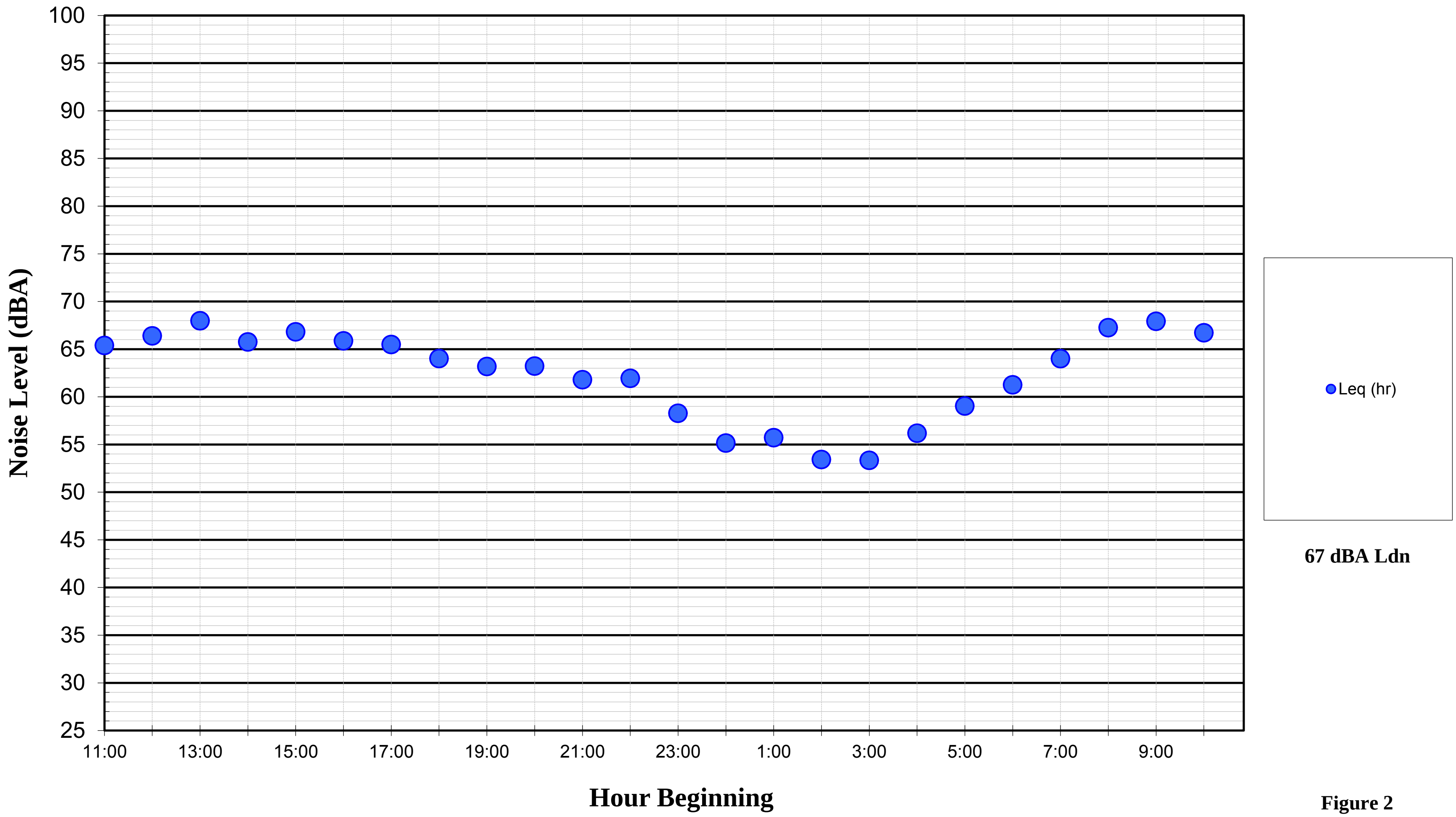


Figure 2

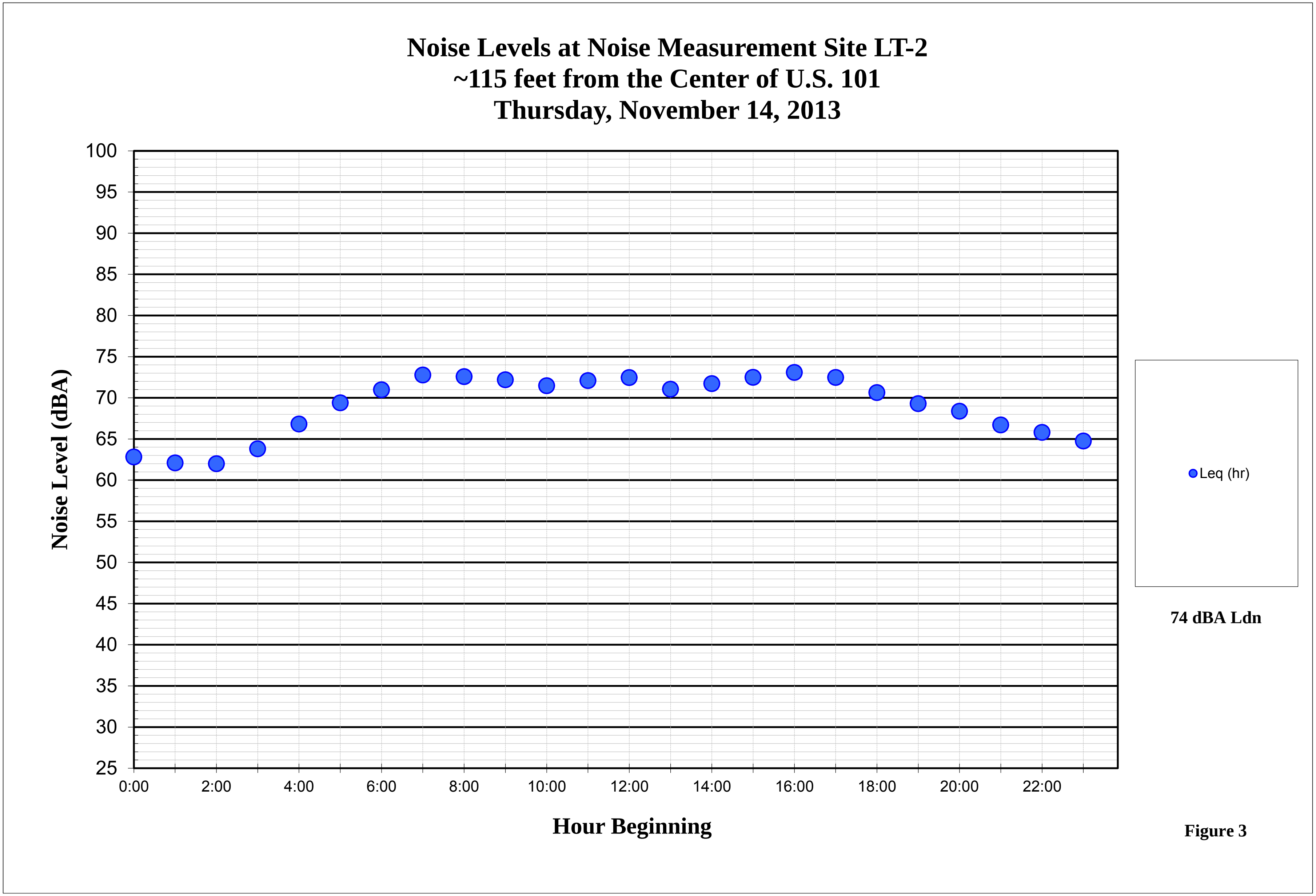
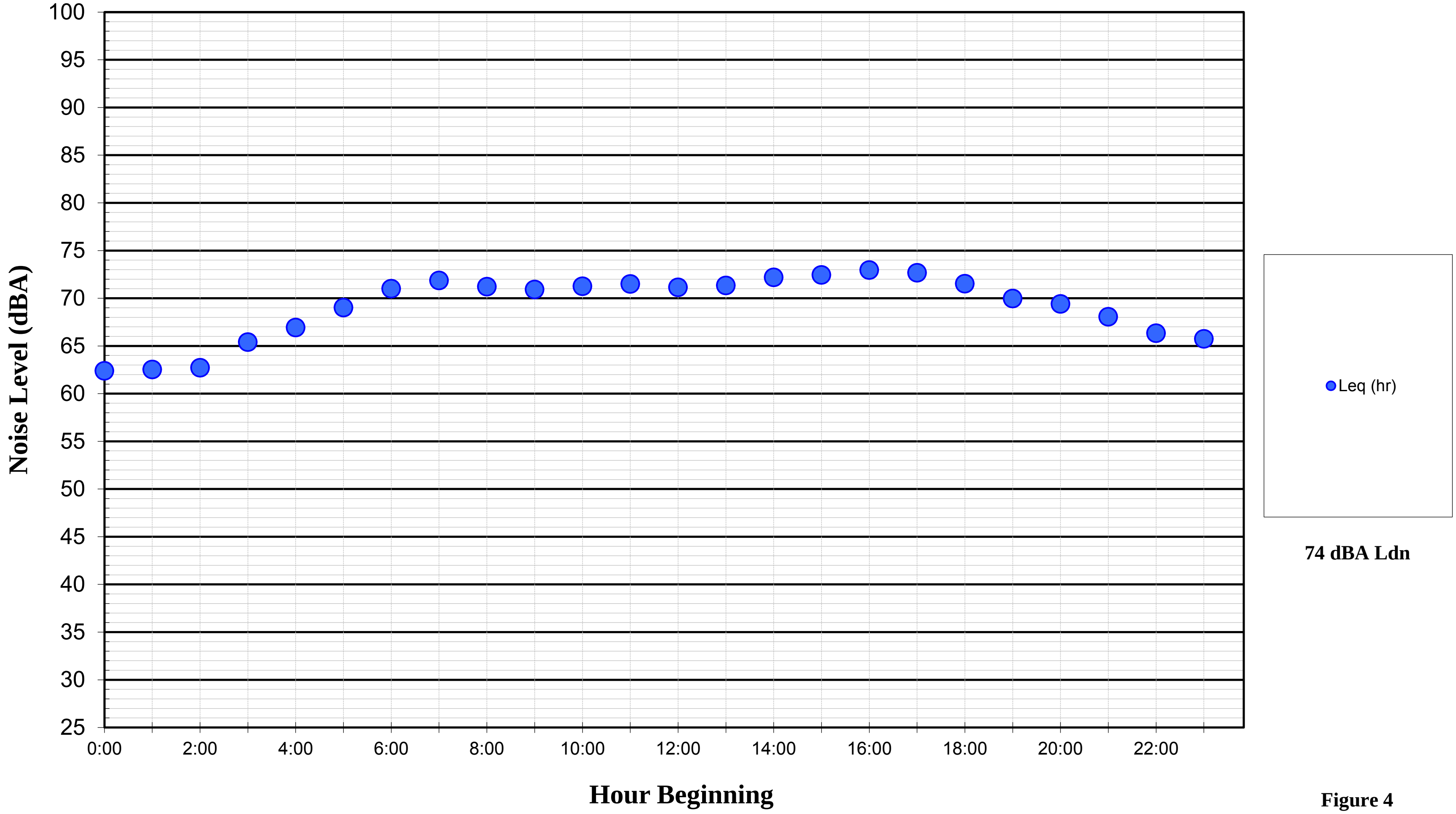

Noise Levels at Noise Measurement Site LT-2
~115 feet from the Center of U.S. 101
Thursday, November 14, 2013
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Leq (hr)
74 dBA Ldn

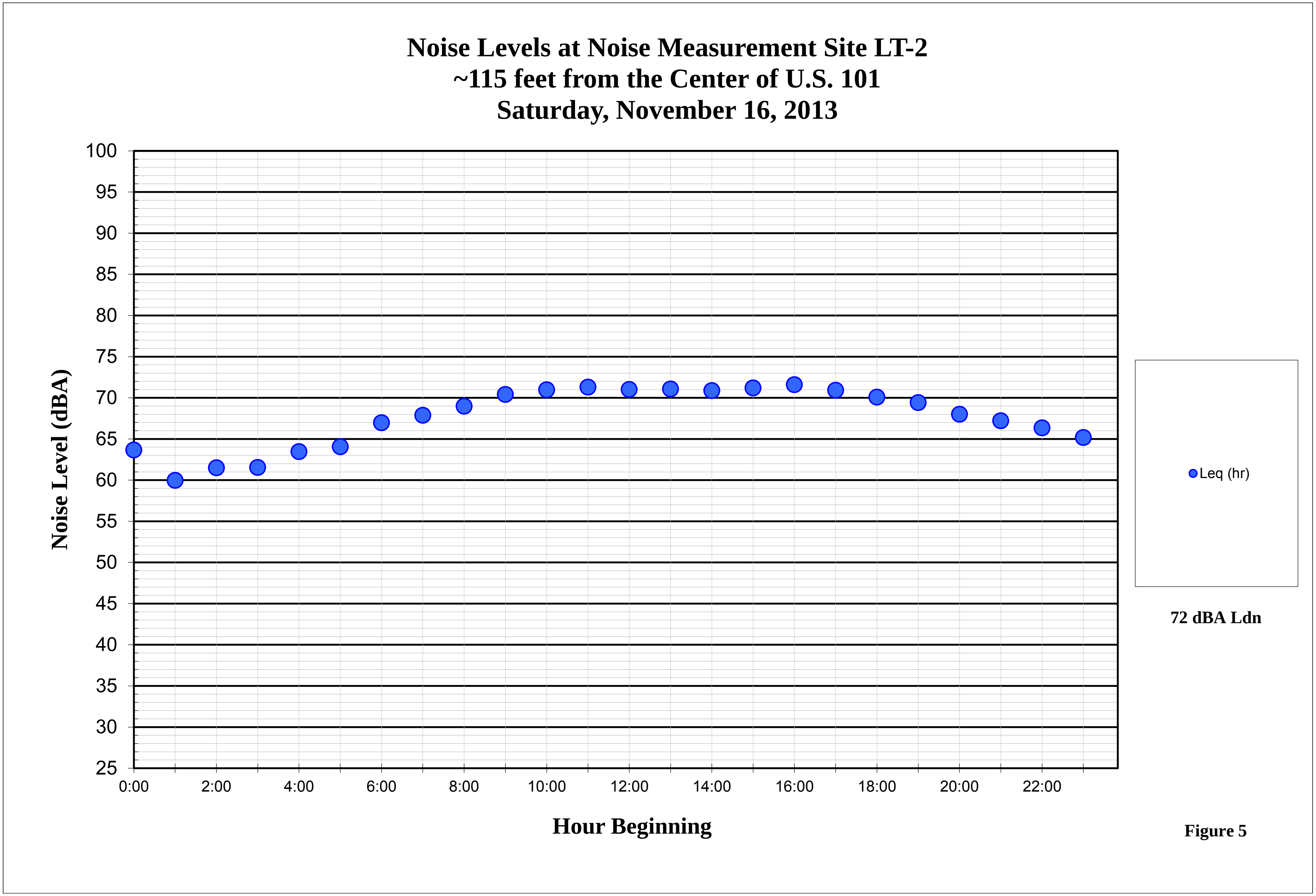
Figure 3

Noise Levels at Noise Measurement Site LT-2
~115 feet from the Center of U.S. 101
Friday, November 15, 2013



74 dBA Ldn

Figure 4



Noise Levels at Noise Measurement Site LT-2
~115 feet from the Center of U.S. 101
Saturday, November 16, 2013
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Leq (hr)
72 dBA Ldn

Figure 5

Noise Levels at Noise Measurement Site LT-2
~95 feet from the Center of Talmage Road at West End of Talmage Frontage Road
Thursday, November 14, 2013

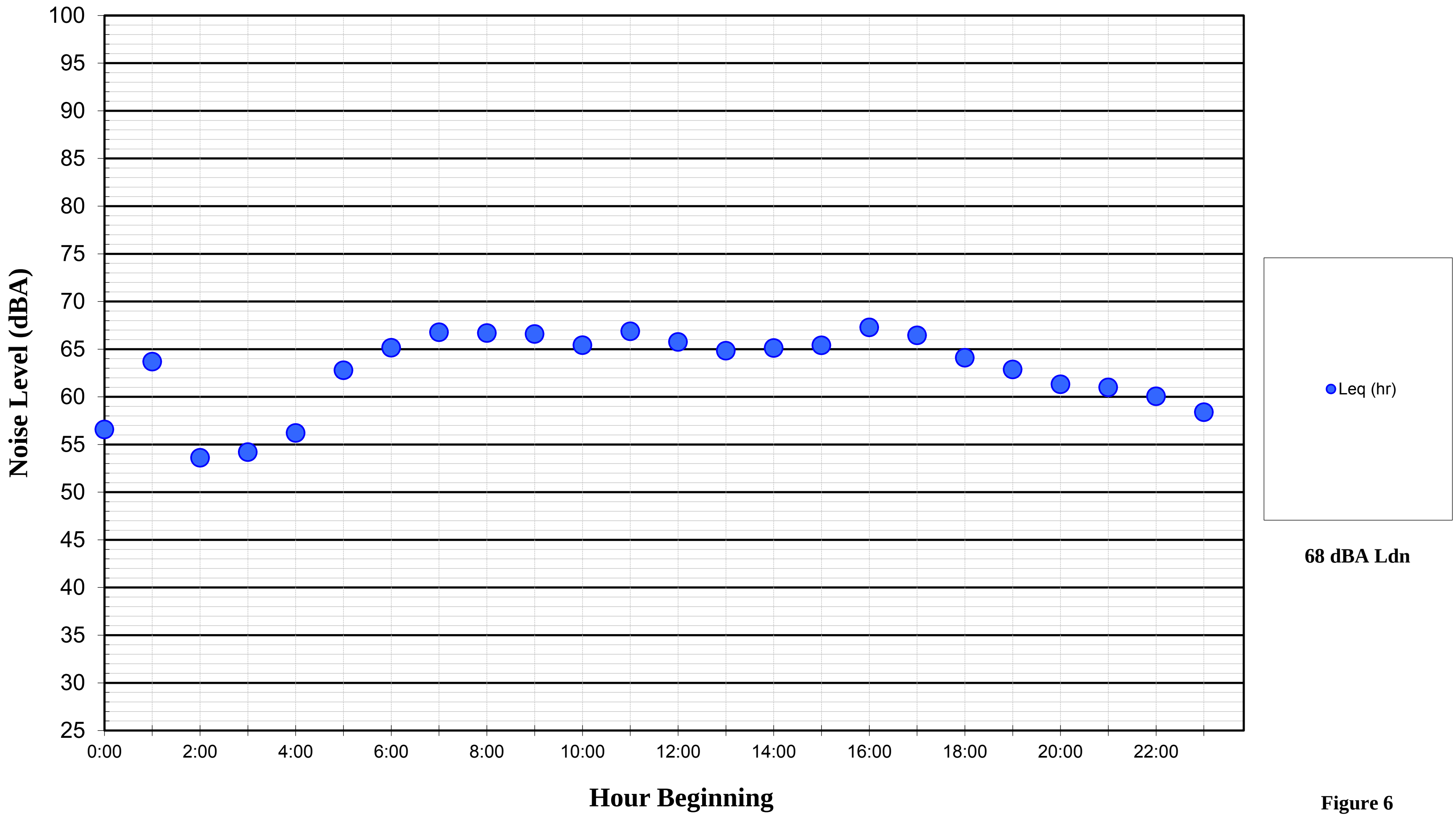


Figure 6

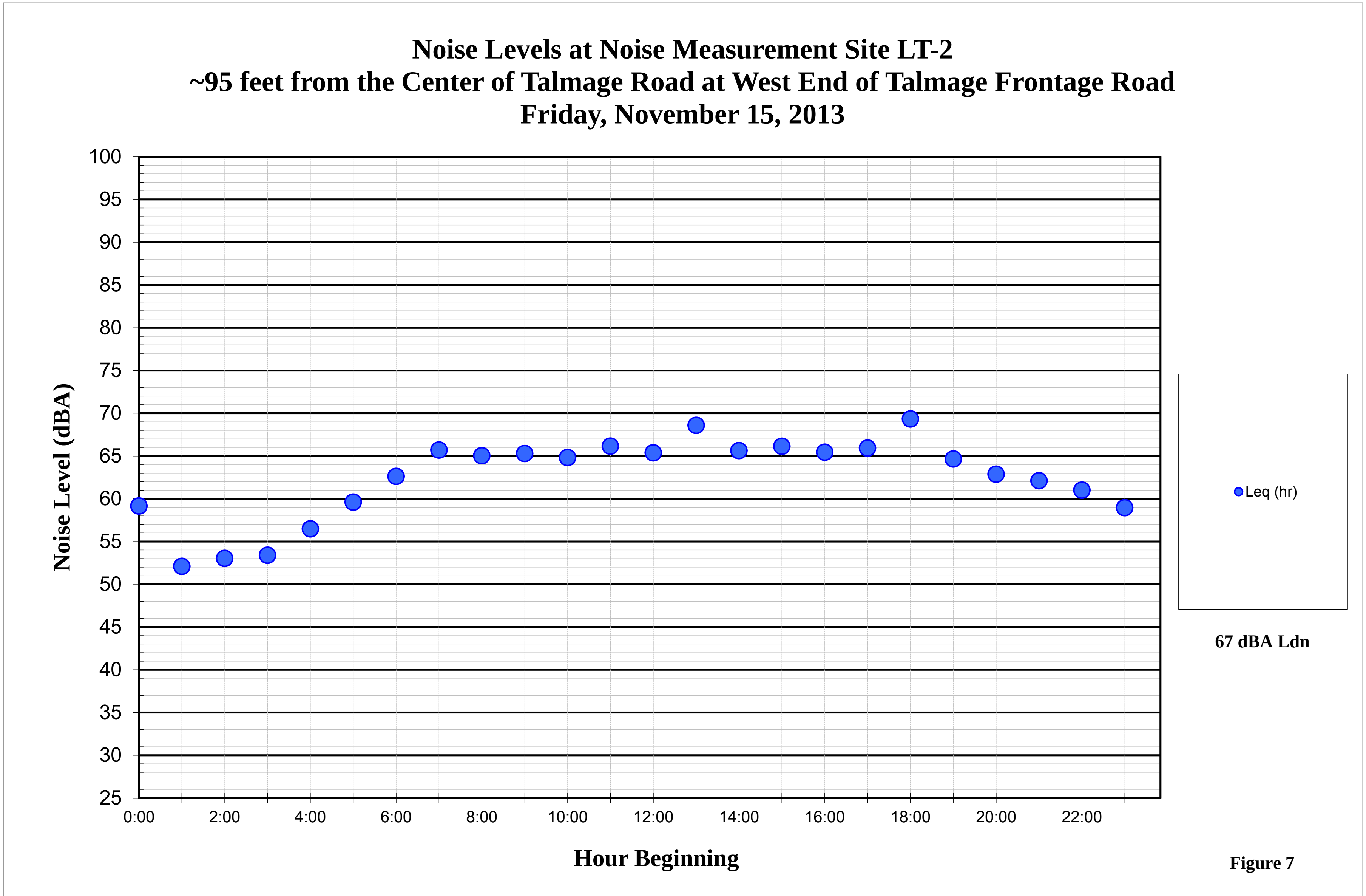

Noise Levels at Noise Measurement Site LT-2
~95 feet from the Center of Talmage Road at West End of Talmage Frontage Road
Friday, November 15, 2013
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Leq (hr)
67 dBA Ldn

Figure 7

Noise Levels at Noise Measurement Site LT-2
~95 feet from the Center of Talmage Road at West End of Talmage Frontage Road
Saturday, November 16, 2013

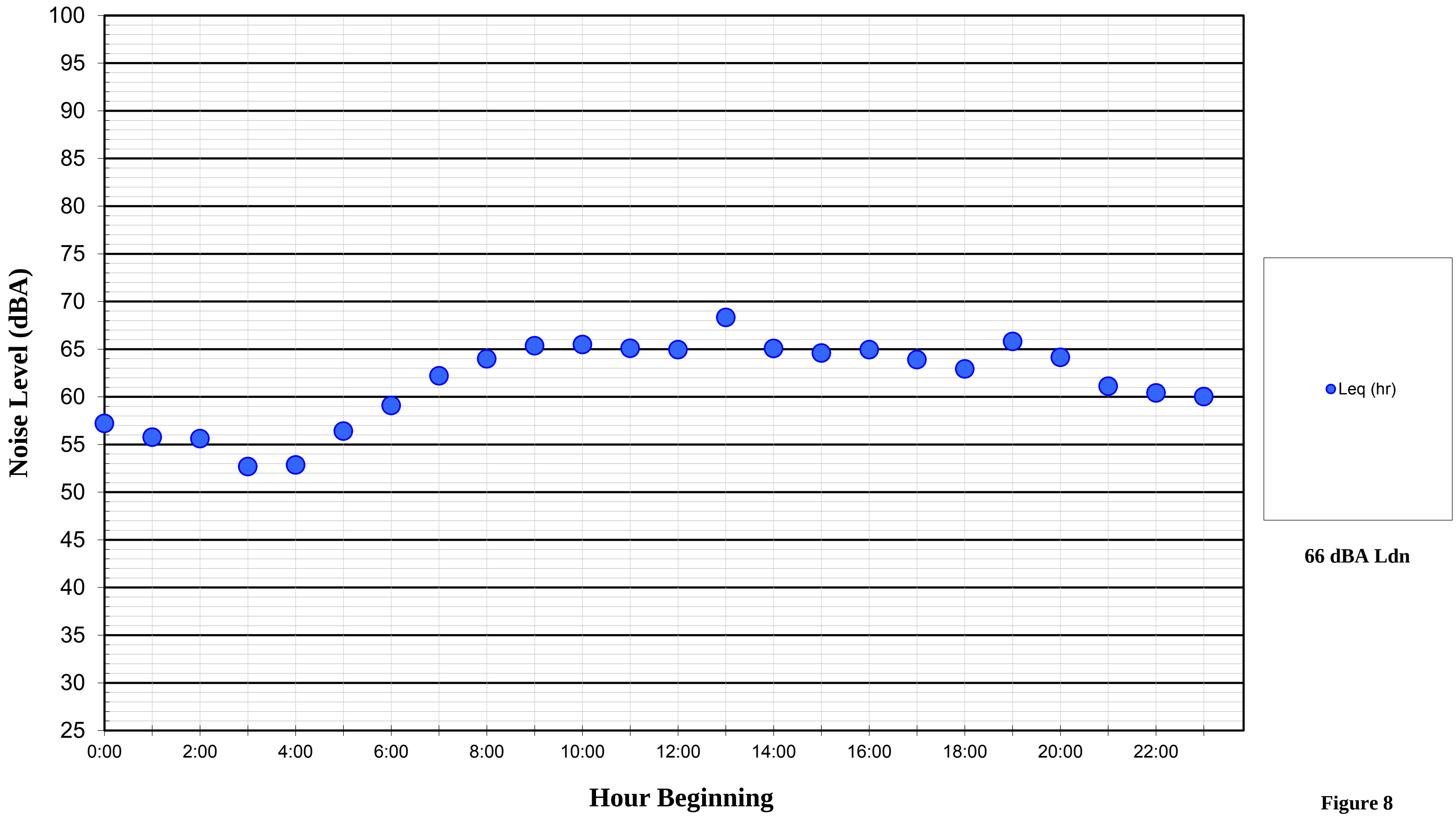


Figure 8

Noise Levels at Noise Measurement Site LT-3
~100 feet from the Center of Talmage Road at East End of Munson Frontage Road
Thursday, November 14, 2013

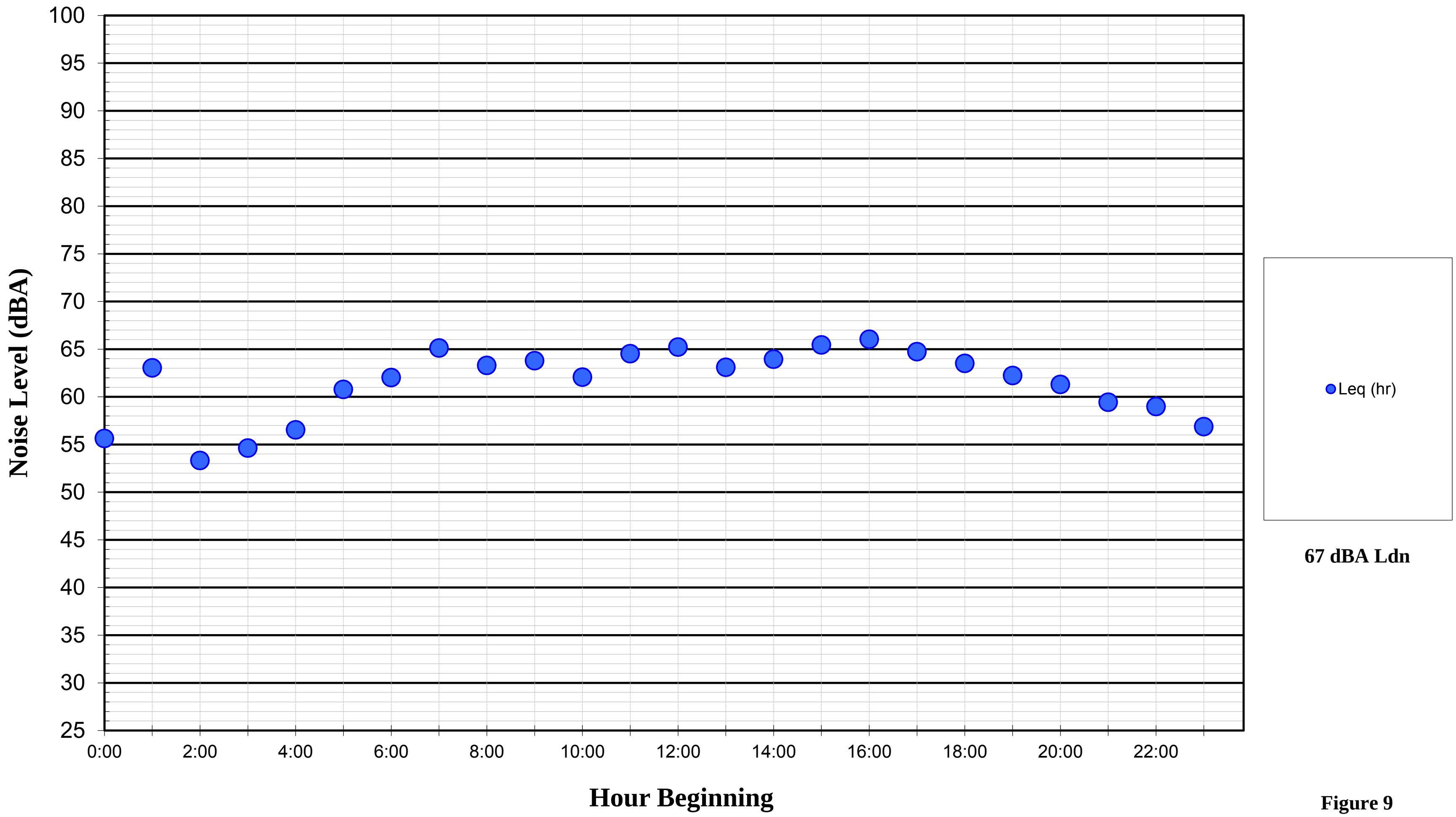
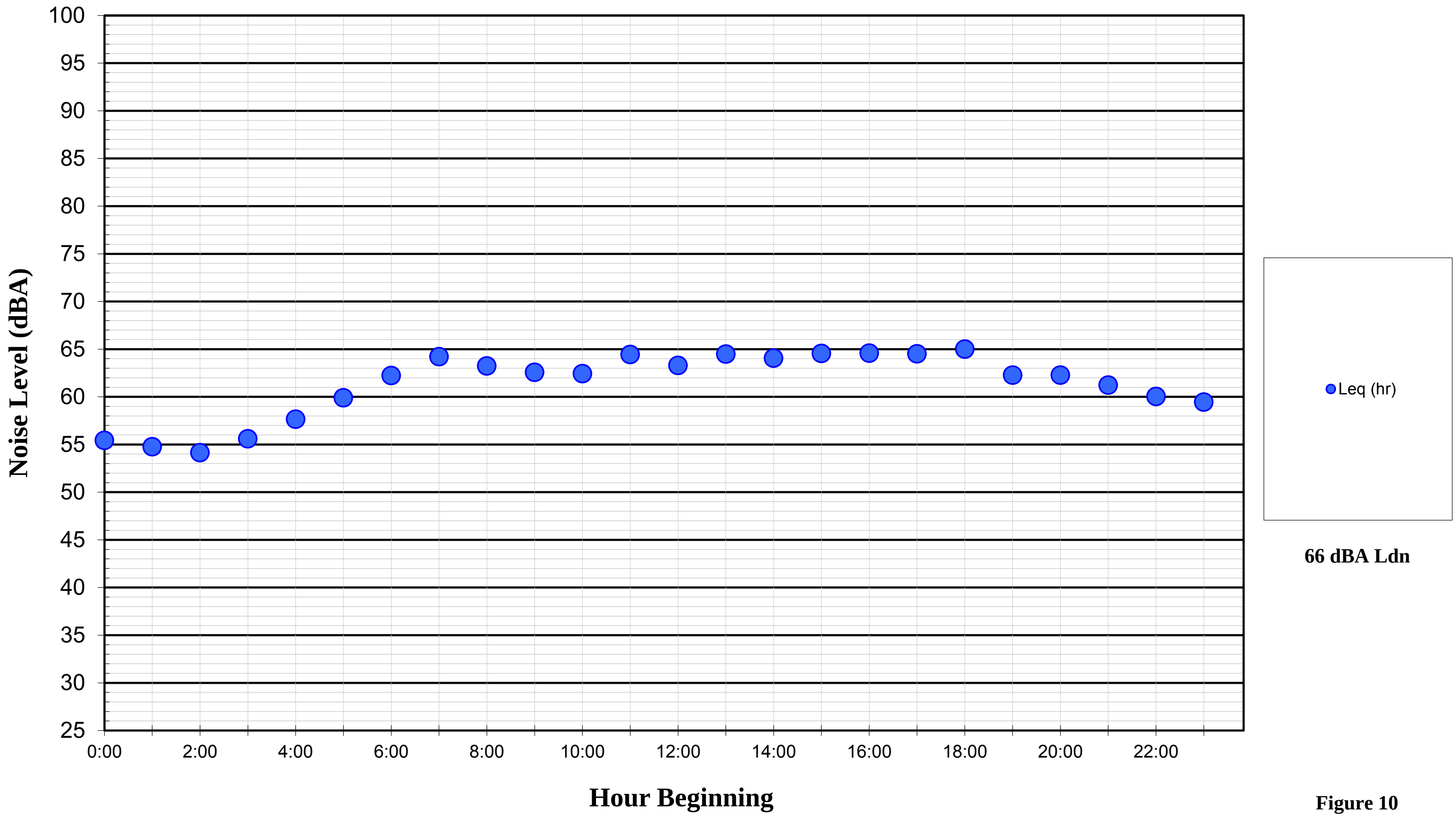


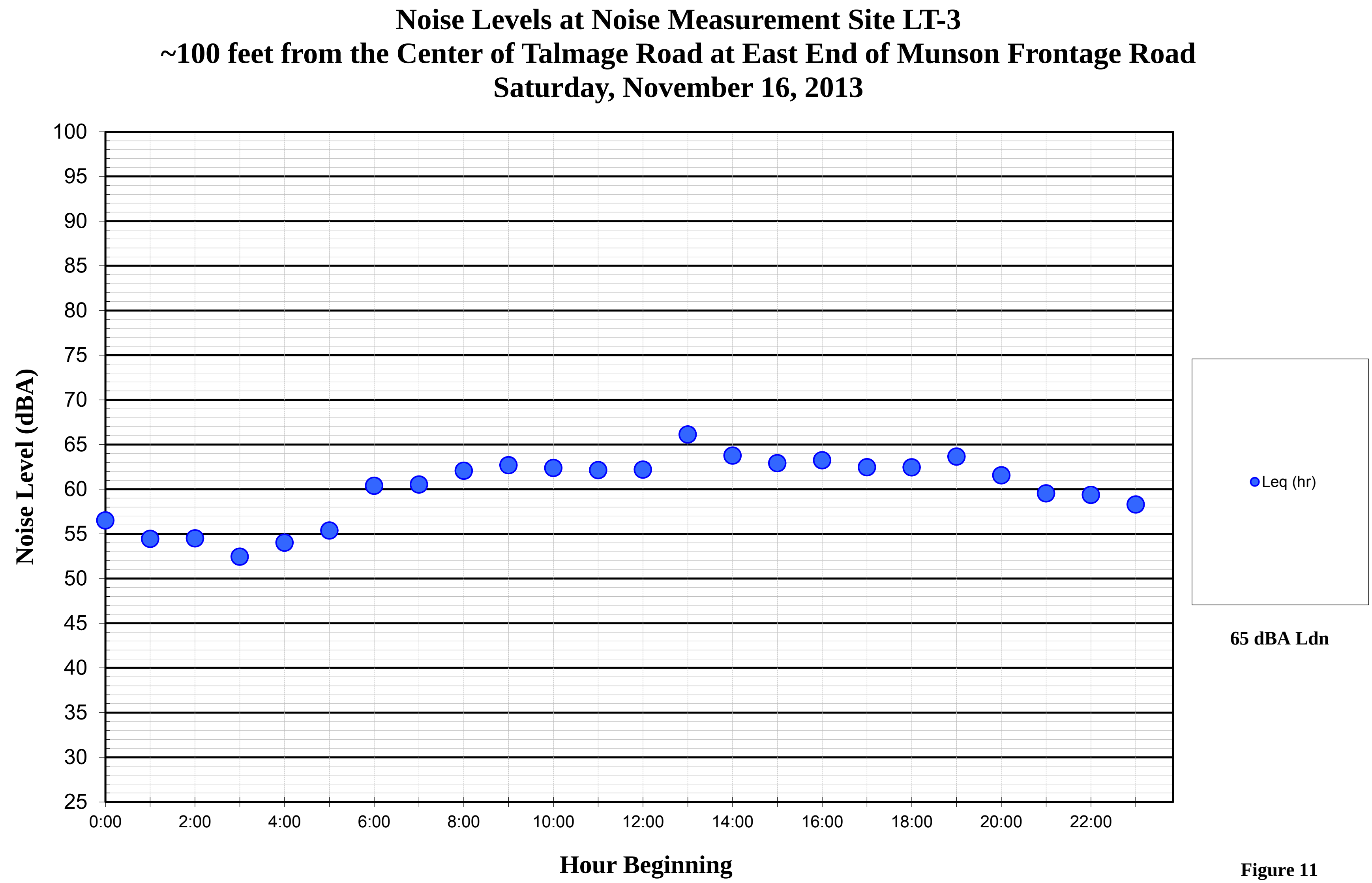
Figure 9

Noise Levels at Noise Measurement Site LT-3
~100 feet from the Center of Talmage Road at East End of Munson Frontage Road
Friday, November 15, 2013



66 dBA Ldn

Figure 10



Noise Levels at Noise Measurement Site LT-3
~100 feet from the Center of Talmage Road at East End of Munson Frontage Road
Saturday, November 16, 2013
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Leq (hr)
65 dBA Ldn

Figure 11

Appendix A Field Notes and Calibration Records

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: UTILITY POLE IN FRONT OF 560 TALMAGE FRONTAGE RD
N39 08 10.5 W123 11 55.8

JOB NO. 12-171
SITE NO. LT-1
TECHNICIAN CP
SLM IRS CAL 114

DATE 1/3/13   DAY OF WEEK THURS   TIME BEGIN 1020   DURATION ______

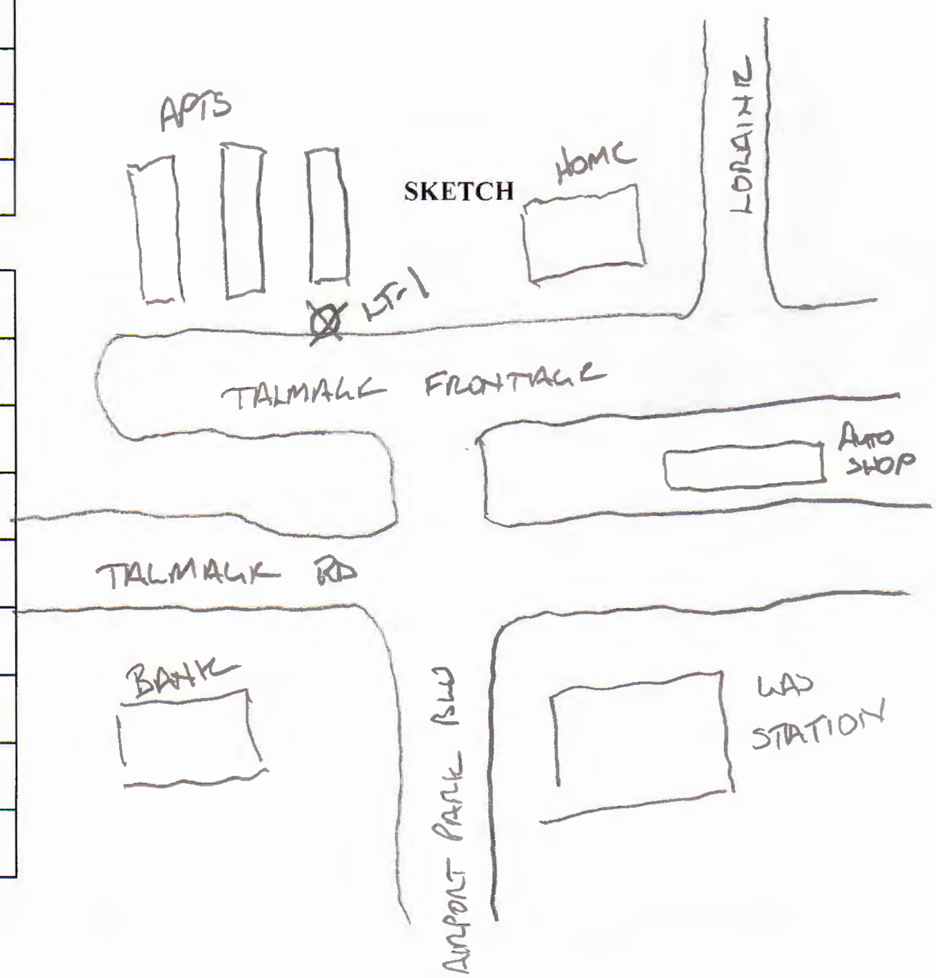
WEATHER CONDITIONS   SKY: OVERCAST   WIND: NONE   TEMP: 42°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min.	15 min.
☐	☐	Trucks				
☐	☐	Cars				
☐	☐	Buses				
☐	☐	Motorcycles				
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

MEASUREMENT	1	2
L_{max}		
L_{min}		
$L_{(1)}$		
$L_{(10)}$		
$L_{(50)}$		
$L_{(90)}$		
L_{eq} (5)		
L_{eq} (10)		
L_{eq} (15)		

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: LORRAINE ST APPROX 25YDS NORTH OF TALMAGE FRONTAGE RD
N 39 08 11.4 W 123 11 53.7

JOB NO. 12-171
SITE NO. ST-1
TECHNICIAN CP
SLM LR.3 CAL 114

DATE 1/3/13   DAY OF WEEK THURS   TIME BEGIN 1120   DURATION 2x10

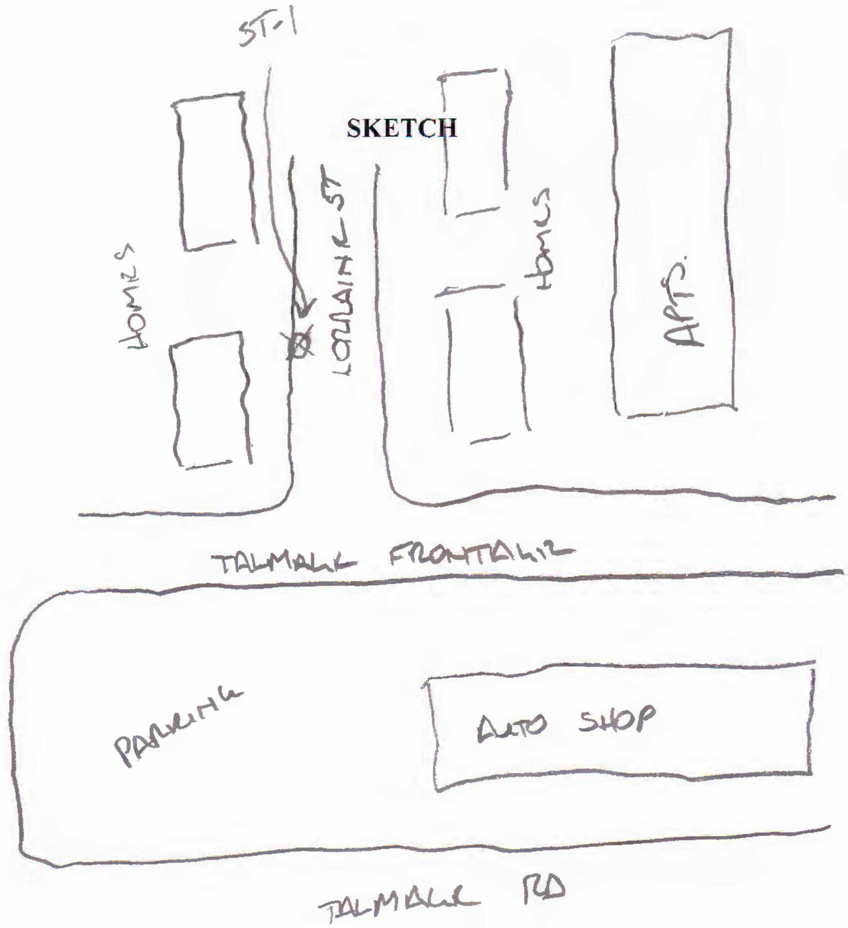
WEATHER CONDITIONS   SKY: OVERCAST   WIND: NONE   TEMP: 42°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min. (LORRAINE)	10 min. (TALMAGE)	15 min.
☐	☒	Trucks				6	
☒	☐	Cars			10	211	
☐	☐	Buses					
☐	☐	Motorcycles					
☐	☐	Emerg. Veh.					
☐	☐	Jets					
☐	☐	Gen. Av.					
☐	☐	Trains					
☐	☐	Constr.					
☐	☐	Industrial					
☐	☐	Other					

COMMENTS

MEASUREMENT	1 1120	2 1130
L_{max}	71.4	73.8
L_{min}	47.6	49.3
$L_{(1)}$	68.6	71.1
$L_{(10)}$	63.2	63.7
$L_{(50)}$	55.2	55.8
$L_{(90)}$	52.0	52.0
L_{eq} (5)		
L_{eq} (10)	59.2	60.2
L_{eq} (15)		

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: CORNER OF HENDERSON LN + TALMALK FRONTALK RD
N39 08 10.8 W123 11 57.0

JOB NO. 12-171
SITE NO. ST-2
TECHNICIAN CP
SLM IR-3 CAL 114

DATE 1/3/13   DAY OF WEEK THURS   TIME BEGIN 1050   DURATION 2x10

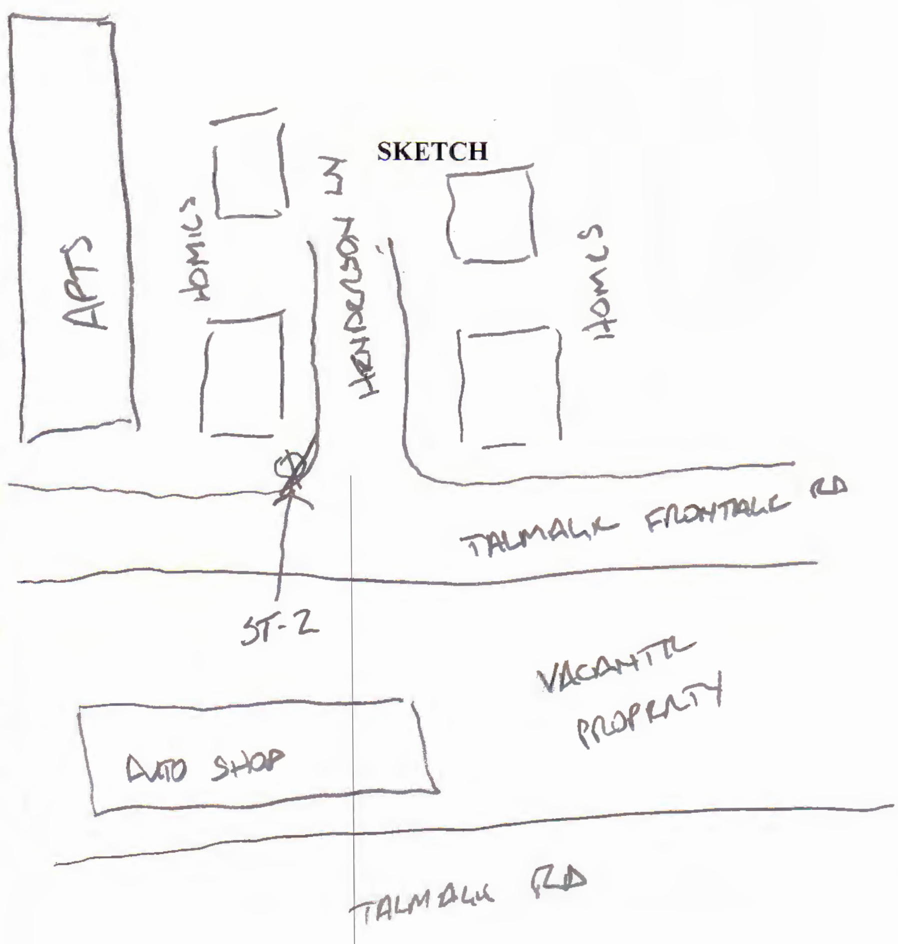
WEATHER CONDITIONS   SKY: OVERCAST   WIND: NONE   TEMP: 42°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min. FRONTALK	10 min. TALMALK	15 min.
☐	☐	Trucks				6	
☑	☐	Cars	63.0		5	127	
☐	☐	Buses					
☐	☐	Motorcycles					
☐	☐	Emerg. Veh.					
☐	☐	Jets					
☐	☐	Gen. Av.					
☐	☐	Trains					
☐	☐	Constr.					
☐	☐	Industrial					
☐	☐	Other					

COMMENTS

MEASUREMENT	1 1050	2 1100
L_{max}	71.6	68.2
L_{min}	50.7	48.4
$L_{(1)}$	65.5	64.5
$L_{(10)}$	61.0	59.5
$L_{(50)}$	56.3	56.1
$L_{(90)}$	53.8	53.1
L_{eq} (5)		
L_{eq} (10)	58.2	57.3
L_{eq} (15)		

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court Petaluma, CA 94954 (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: EAST END OF TALMAGE FRONTAGE RD NEXT TO CAL TRANS ACCESS GATE
N 39 08 11.4 W 123 11 47.3

JOB NO. 12-171
SITE NO. ST-3
TECHNICIAN CP
SLM IR-3 CAL 114

DATE 1/4/13 DAY OF WEEK FRI TIME BEGIN 1240 DURATION 10

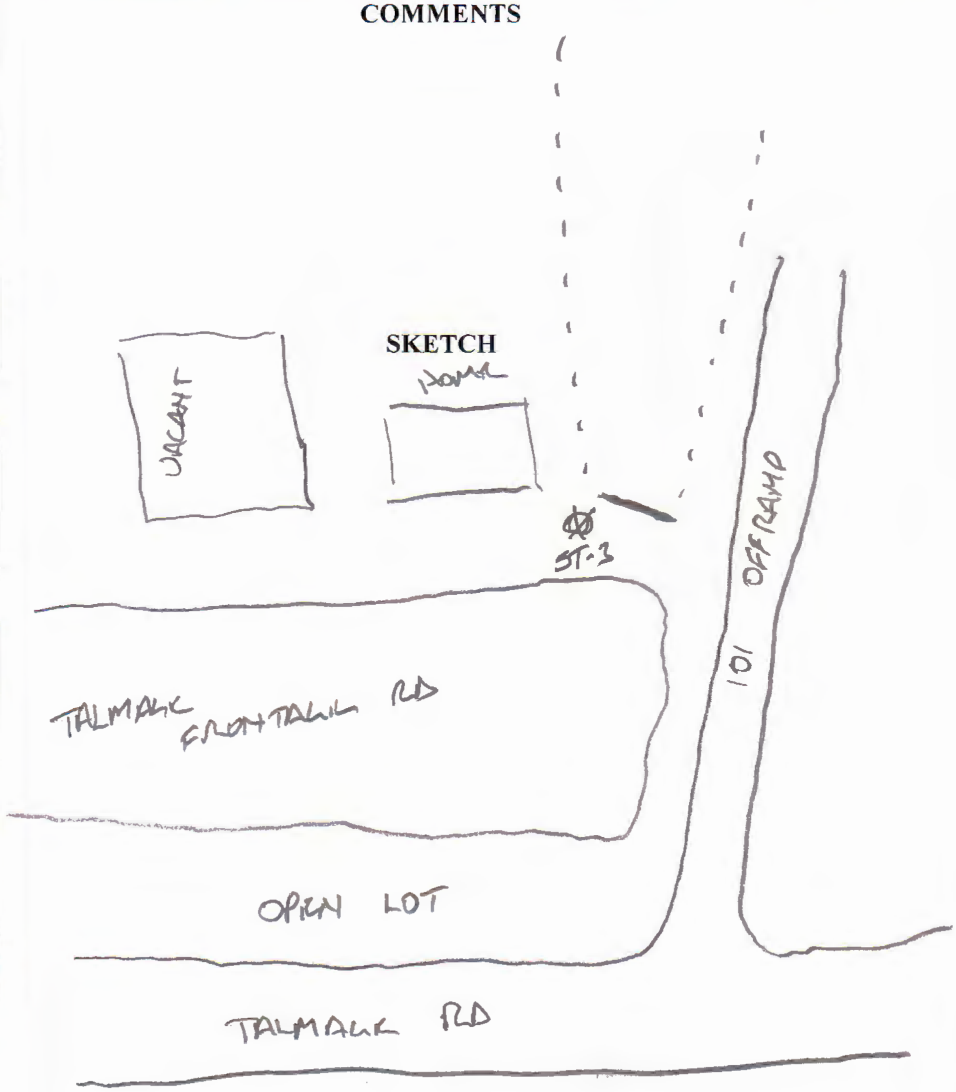
WEATHER CONDITIONS SKY: CLEAR WIND: NONE TEMP: 55°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min. N	10 min. S	15 min.
☐	☒	Trucks			5	5	OFFRAMP 48
☒	☐	Cars			156	102	
☐	☐	Buses					
☐	☐	Motorcycles					
☐	☐	Emerg. Veh.					
☐	☐	Jets					
☐	☐	Gen. Av.					
☐	☐	Trains					
☐	☐	Constr.					
☐	☐	Industrial					
☐	☐	Other					

COMMENTS

MEASUREMENT	1	2
L_{max}	71.5	
L_{min}	56.8	
$L_{(1)}$	68.7	
$L_{(10)}$	64.1	
$L_{(50)}$	60.7	
$L_{(90)}$	58.1	
L_{eq} (5)		
L_{eq} (10)	61.9	
L_{eq} (15)		

SKETCH



RPT LT-2

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court Petaluma, CA 94954 (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: LT-2 - OPEN SPACE AREA N/O APARTMENTS LOCATED AT SOUTH END OF MARLENE ST., 55' FROM CENTER OF SB 101 OFF-RAMP TO TALMAGE; 115' FROM ℄ HWY 101 N 39 08 19.4, W 123 11 47.2

JOB NO. 13-210
SITE NO. LT-2
TECHNICIAN MST
SLM IR-P1 CAL 94.0 PRE ✓94.0 POST

DATE 11/13/13 DAY OF WEEK W TIME BEGIN 10:40 A DURATION 24 H

WEATHER CONDITIONS SKY: CLEAR WIND: CALM TEMP: 66°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min.	15 min.
☒	☐	Trucks	HWY 101			
☒	☐	Cars				
☐	☐	Buses				
☐	☐	Motorcycles				
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

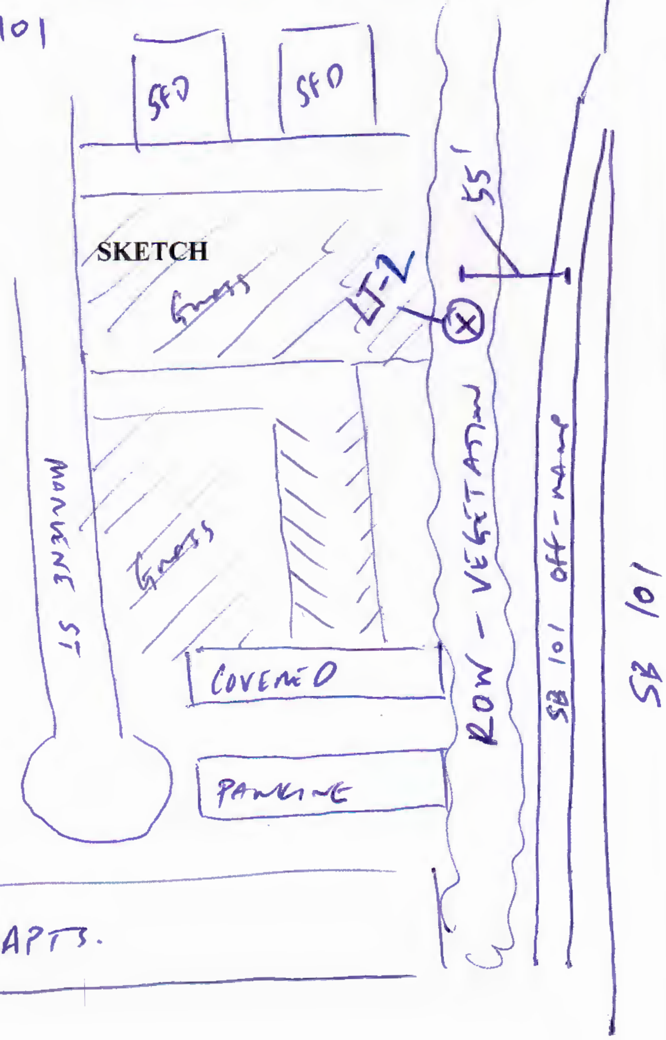
MEASUREMENT	1	2
L_{max}		
L_{min}		
$L_{(1)}$		
$L_{(10)}$		
$L_{(50)}$		
$L_{(90)}$		
L_{eq} (5)		
L_{eq} (10)		
L_{eq} (15)		

COMMENTS

- ONLY SIGNIFICANT NOISE SOURCE IS HWY 101
- 12' HIGH IN TREE

DATE	Ldn
11/13	—
11/14	74.1
11/15	74.2
11/16	72.2
11/17	—

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

RPT LT-3

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: LT-3 - WEST END OF TALMAGE FRONTAGE RD. BETWEEN #530 / #540 UNITS A-H. 12' IN TREE, ~95' FROM ℄ TALMAGE RD.
N 39 08 10.7 W 123 11 ~~48.0~~ 57.1

JOB NO. 13-210
SITE NO. LT-3
TECHNICIAN MST
SLM LR-P3 CAL 94.0 PRE ✓94.0 POST

DATE 11/13/13   DAY OF WEEK W   TIME BEGIN ~10:25 A   DURATION 24+

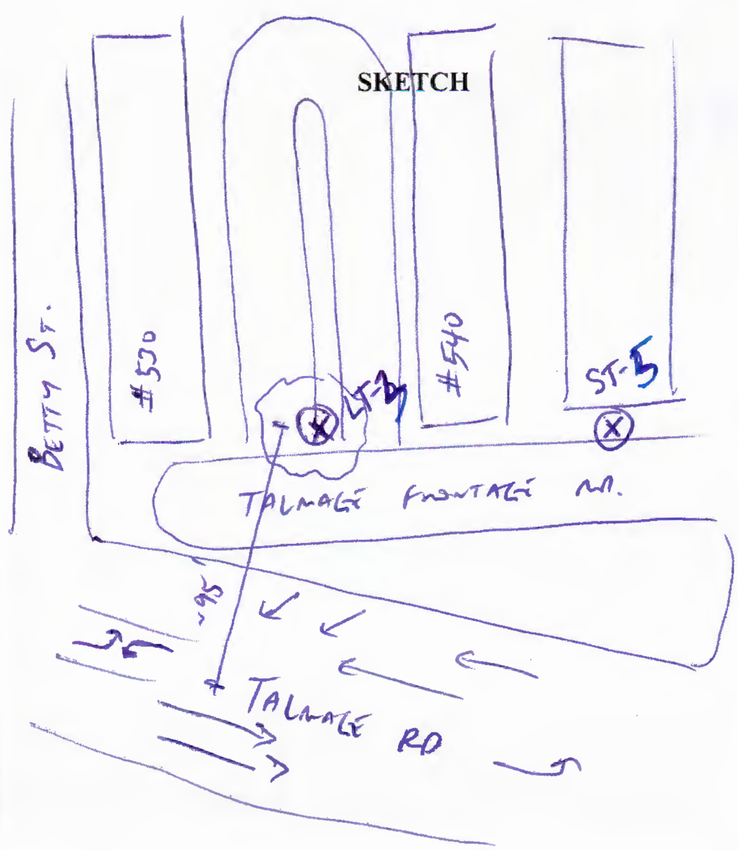
WEATHER CONDITIONS   SKY: CLEAR   WIND: CALM   TEMP: 66°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min.	15 min.
☑	☐	Trucks	TALMAGE RD.			
☑	☐	Cars				
☐	☐	Buses				
☐	☐	Motorcycles				
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

MEASUREMENT	1	2
L_{max}	DATE	Ldn
L_{min}	11/13	—
$L_{(1)}$	11/14	~~66.6~~ 68.2
$L_{(10)}$	11/15	~~66.1~~ 67.2
$L_{(50)}$	11/16	~~64.8~~ 66.0
$L_{(90)}$	11/17	—
L_{eq} (5)		
L_{eq} (10)		
L_{eq} (15)		

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

1 Willowbrook Court Petaluma, CA 94954 (707) 794-0400

RPT LT-4

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: LT-4 - NEAR TALMADGE AT SB 101 OFF-RAMP OPPOSITE #750 TALMADGE FRONTAGE ROAD ~100' FROM ℄ TALMAGE RD AND ~70' FROM ℄ SB 101 OFF-RAMP 12' IN TREE N 39 08 10.6 W 123 11 48.0

JOB NO. 13-210
SITE NO. LT-4
TECHNICIAN MST
SLM IRP2 CAL 94.0 PRE ✓94.0 POST

DATE 11/13/13 DAY OF WEEK W TIME BEGIN ~10:10A DURATION 24+

WEATHER CONDITIONS SKY: CLEAR WIND: CALM TEMP: 66°

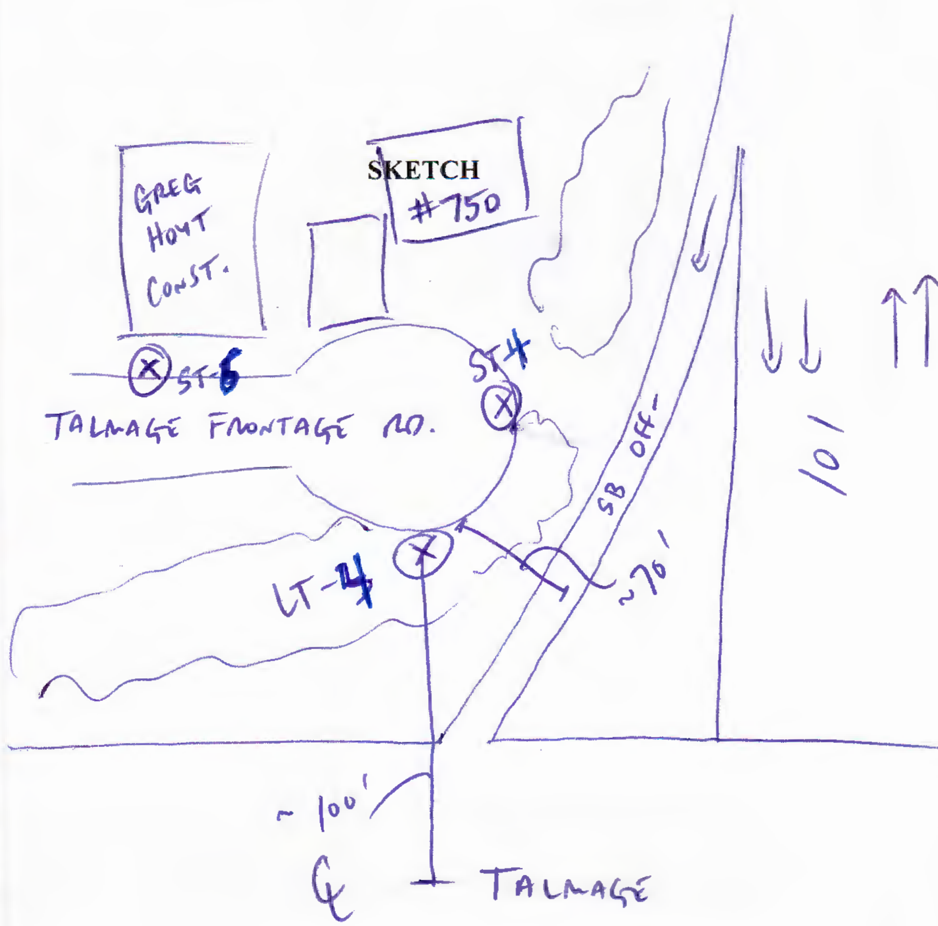
Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10 min.	15 min.
☒	☐	Trucks				
☒	☐	Cars				
☐	☐	Buses				
☐	☐	Motorcycles				
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

- HWY 101, OFF-RAMP, TALMAGE ARE DOMINANT NOISE SOURCES.

MEASUREMENT	1	2
L_{max}	DATE	Ldn
L_{min}	11/13	—
$L_{(1)}$	11/14	~~68.2~~ 66.6
$L_{(10)}$	11/15	~~67.2~~ 66.1
$L_{(50)}$	11/16	~~66.0~~ 64.8
$L_{(90)}$	11/17	—
L_{eq} (5)		
L_{eq} (10)		
L_{eq} (15)		

SKETCH



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

RPT ST-4

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: ST-4 - EAST END OF TALMAGE FRONTAGE ROAD NEAR LT-4, ST-3 FROM PREVIOUS SURVEY FRONT OF #1750, 5' ABOVE GROUND N 39 08 11.0 W 123 11 47.6

JOB NO. 13-210
SITE NO. ST-4
TECHNICIAN MST
SLM IR 1# CAL 114.0 PRE 114.0 POST

DATE 11/13/13   DAY OF WEEK W   TIME BEGIN 10:10 A   DURATION 20min X 2

WEATHER CONDITIONS   SKY: CLEAR   WIND: CALM   TEMP: 66°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	10:30 10 min.	15 min.
☑	☐	Trucks				
☑	☐	Cars			71	
☐	☐	Buses				
☐	☐	Motorcycles				
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

SPEEDS
- TALMAGE ~ 35 mph
- OFF-RAMP ~ 25 mph → 0 mph

SKETCH

- SEE LT-3 DATASHEET

MEASUREMENT	1		2	
L_{max}	72.4	68.6	71.0	66.6
L_{min}	47.4	53.3	52.2	52.0
$L_{(1)}$	67.4	66.5	67.8	65.6
$L_{(10)}$	62.3	63.3	63.1	62.7
$L_{(50)}$	59.1	59.8	59.4	59.1
$L_{(90)}$	55.2	56.2	56.1	56.0
L_{eq} (5)				
L_{eq} (10)	60.0	60.7	60.6	60.0
L_{eq} (15)	-1.7	-1.5	-1.9	-1.6
LEQ @ LT-4	61.7	62.2	62.5	61.6
	1010	1020	1030	1040

OFF-SET = -1.7 dB vs. LT-4
∴ Ldn @ ST-1 63 - 65

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

RPT ST-5

1 Willowbrook Court Petaluma, CA 94954 (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: ST-5 - WEST END OF TALMAGE FRONTAGE RD. NEAR #560 / #570 UNITS I-P ; 5' ABOVE GROUND N 39 08 10.8 , W 123 11 55.9

JOB NO. 13-210
SITE NO. ST-5
TECHNICIAN MST
SLM IRI CAL 114.0 PRE / 114.0 POST

DATE 11/13/13 DAY OF WEEK W TIME BEGIN 11:00 DURATION 20 MIN X 2

WEATHER CONDITIONS SKY: CLEAR WIND: CALM TEMP: 66°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	11:10 10 min.	15 min.
☑	☐	Trucks			MT ~~||||~~ ||| HT |||	
☑	☐	Cars			180	
☐	☐	Buses			1	
☐	☐	Motorcycles			0	
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

* LOCAL GARBAGE TRUCK DURING 11:10 A INTERVAL

SKETCH

- SEE LT-3 DATASHEET

MEASUREMENT	1		2	
L_{max}	71.5	78.6	72.0	74.6
L_{min}	51.0	53.9	52.8	53.3
$L_{(1)}$	73.8	75.7	69.1	72.1
$L_{(10)}$	66.4	67.1	65.2	65.5
$L_{(50)}$	60.5	61.3	60.6	60.2
$L_{(90)}$	56.2	57.3	56.2	57.3
L_{eq} (5)				
L_{eq} (10)	63.3	64.6	62.1	62.6
L_{eq} (15)	-2.4	*	-1.9	-2.0
LEQ @ LT-3	65.7	65.7	64.0	64.6
	11:00	11:10	11:20	11:30

OFFSET = -2.1 dB vs. LT-3

∴ Ldn @ ST-2 = 64-66

RPT ST-6

ILLINGWORTH & RODKIN, INC.

Acoustics • Air Quality

1 Willowbrook Court   Petaluma, CA 94954   (707) 794-0400

ENVIRONMENTAL NOISE DATA SHEET

LOCATION: ST-6 - FRONT OF # 744 TALMAGE FRONTAGE RD. (GREG HOYT CONSTRUCTION)

N 39 08 10.9 W 123 11 49.3

JOB NO. 13-210
SITE NO. ST-6
TECHNICIAN MST
SLM IR1 CAL 114.0 PRE 114.0 POST

DATE 11/17/13 DAY OF WEEK SUN TIME BEGIN 12:10 P DURATION 20 MIN X 2

WEATHER CONDITIONS SKY: CLEAR WIND: CALM TEMP: ~68°

Maj.	Min.	Noise Source	Typical Noise Levels	5 min.	12:10 P 10 min.	15 min.
☒	☐	Trucks			M 11 H Ø	
☒	☐	Cars			168	
☐	☐	Buses			Ø	
☐	☐	Motorcycles			1	
☐	☐	Emerg. Veh.				
☐	☐	Jets				
☐	☐	Gen. Av.				
☐	☐	Trains				
☐	☐	Constr.				
☐	☐	Industrial				
☐	☐	Other				

COMMENTS

- LOCAL DOOR SLAMS DURING 12:30 INTERVAL / 12:40 INT.

SKETCH

- SEE LT-4 DATASHEET

MEASUREMENT	1		2	
L_{max}	65.9	66.1	73.0	73.5
L_{min}	51.0	51.4	51.8	50.3
$L_{(1)}$	64.0	64.1	69.7	71.3
$L_{(10)}$	59.3	59.8	63.5	60.8
$L_{(50)}$	55.8	57.1	57.2	56.6
$L_{(90)}$	53.3	54.8	54.1	53.3
L_{eq} (5)				
L_{eq} (10)	56.9	57.8	60.0	59.6
L_{eq} (15)	-3.2	-3.1	-1.8	-2.1
LEQ @ LT-4	60.1 (12:10)	60.9 (12:20)	61.8 (12:30)	61.7 (12:40)

OFF-SET = -2.6 dB vs. LT-4

∴ Ldn @ ST-3 = 62-64

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2012-167385

Instrument Model 820, Serial Number 0899, was calibrated on 11DEC2012. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 11DEC2012
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	20MAR2013	2012-156690

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 28 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.

Tested with PRM828 S/N 1832

Signed: David Jensen
Technician: David Jensen

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-170745

Instrument Model 820, Serial Number 1237, was calibrated on 04MAR2013. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 04MAR2013
Calibration due: 04MAR2014

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	20MAR2013	2012-156690

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 24 ° Centigrade

Relative Humidity: 26 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.
Tested with PRM828 S/N 1787

Signed: Ron Harris
Technician: Ron Harris

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

IR1

Certificate Number 2013-171846

Instrument Model 820, Serial Number 1474, was calibrated on 28MAR2013. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 28MAR2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	08MAR2014	2013-171090

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 24 ° Centigrade

Relative Humidity: 36 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.
Tested with PRM828 S/N 2783

Signed: Ron Harris
Technician: Ron Harris

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1326

Instrument:	**Sound Level Meter**
Model:	**Piccolo**
Manufacturer:	**Soft dB inc.**
Serial Number:	**130625011**
Tested with:	
Type (class):	**2**
Customer:	**Soft dB inc.**
Tel/Fax:	**418-686-0993 / 418-686-2043**

Tested in accordance with the following standard:

- **IEC 60651-** Specification for Sound Level Meters
- **ANSI S1.4-** Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES[1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

[1] The results of this calibration apply only to the instrument type with serial number identified in this report.
[2] Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	55,5	54,6	+/- 3	0,9	pass
63	68,5	67,8	+/- 2	0,7	pass
125	78	77,9	+/- 1,5	0,1	pass
250	85,5	85,4	+/- 1,5	0,1	pass
500	90,9	90,8	+/- 1,5	0,1	pass
1000	94	94	+/- 1,5	0	pass
2000	95,4	95,2	+/- 2	0,2	pass
4000	97,6	95	+/- 3	2,6	pass
8000	89	92,9	+/- 5	-3,9	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,8	91	+/- 3	-0,2	pass
63	93,5	93,5	+/- 2	0	pass
125	94	93,8	+/- 1,5	0,2	pass
250	94,4	94	+/- 1,5	0,4	pass
500	94,3	94	+/- 1,5	0,3	pass
1000	94	94	+/- 1,5	0	pass
2000	94,1	93,8	+/- 2	0,3	pass
4000	95,8	93,2	+/- 3	2,6	pass
8000	87,2	91	+/- 5	-3,8	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,4° C	101,9 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2013-08-22

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1327

Instrument:	**Sound Level Meter**
Model:	**Piccolo**
Manufacturer:	**Soft dB inc.**
Serial Number:	130625012
Tested with:	
Type (class):	**2**
Customer:	**Soft dB inc.**
Tel/Fax:	**418-686-0993 / 418-686-2043**

Tested in accordance with the following standard:

- **IEC 60651-** Specification for Sound Level Meters
- **ANSI S1.4-** Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES[1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

[1] The results of this calibration apply only to the instrument type with serial number identified in this report.
[2] Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	55,3	54,6	+/- 3	0,7	pass
63	67,9	67,8	+/- 2	0,1	pass
125	78,4	77,9	+/- 1,5	0,5	pass
250	85,7	85,4	+/- 1,5	0,3	pass
500	90,8	90,8	+/- 1,5	0	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	96,9	95	+/- 3	1,9	pass
8000	90,4	92,9	+/- 5	-2,5	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,5	91	+/- 3	-0,5	pass
63	93,3	93,5	+/- 2	-0,2	pass
125	93,9	93,8	+/- 1,5	0,1	pass
250	94,3	94	+/- 1,5	0,3	pass
500	94,1	94	+/- 1,5	0,1	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	93,9	93,8	+/- 2	0,1	pass
4000	95	93,2	+/- 3	1,8	pass
8000	88,5	91	+/- 5	-2,5	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,4° C	101,9 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2013-08-22

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1328

Instrument:	**Sound Level Meter**
Model:	**Piccolo**
Manufacturer:	**Soft dB inc.**
Serial Number:	**130625013**
Tested with:	
Type (class):	**2**
Customer:	**Soft dB inc.**
Tel/Fax:	**418-686-0993 / 418-686-2043**

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES[1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

[1] The results of this calibration apply only to the instrument type with serial number identified in this report.
[2] Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,3	54,6	+/- 3	-0,3	pass
63	67,8	67,8	+/- 2	0	pass
125	78,1	77,9	+/- 1,5	0,2	pass
250	85,6	85,4	+/- 1,5	0,2	pass
500	91	90,8	+/- 1,5	0,2	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	97	95	+/- 3	2	pass
8000	89,9	92,9	+/- 5	-3	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,6	91	+/- 3	-0,4	pass
63	93,4	93,5	+/- 2	-0,1	pass
125	94	93,8	+/- 1,5	0,2	pass
250	94,4	94	+/- 1,5	0,4	pass
500	94,4	94	+/- 1,5	0,4	pass
1000	94	94	+/- 1,5	0	pass
2000	94,9	93,8	+/- 2	1,1	pass
4000	95,3	93,2	+/- 3	2,1	pass
8000	88	91	+/- 5	-3	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,4° C	101,9 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2013-08-22

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards. All tests were performed around the reference condition.

Appendix B TNM Input/Output Files

I&R
MST

24 February 2014
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 13-210
RUN: EXISTING

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EXISTING EB TALMAGE TO SB 101	12.0	point15	15	167.8	1,227.3	600.00				Average	
		point16	16	332.6	1,196.5	598.00				Average	
		point17	17	495.3	1,167.6	598.00				Average	
		point18	18	500.0	943.9	594.00				Average	
		point19	19	545.9	846.5	594.00				Average	
		point20	20	854.8	630.3	594.00					
EXISTING WB TALMAGE	12.0	point43	43	887.3	1,215.6	610.00				Average	
		point44	44	334.7	1,239.4	598.00				Average	
		point45	45	178.7	1,270.1	600.00					
EXISTING EB TALMAGE	12.0	point46	46	170.7	1,241.2	600.00				Average	
		point47	47	333.5	1,209.8	598.00				Average	
		point48	48	891.0	1,203.4	610.00					
SB 101	24.0	point35	35	947.0	2,638.0	594.00				Average	
		point1	1	943.4	1,436.1	594.00				Average	
		point2	2	943.9	6.4	594.00					
NB 101	24.0	point3	3	1,014.5	1.9	594.00				Average	
		point37	37	1,017.5	1,444.1	594.00				Average	
		point38	38	1,018.2	2,636.9	594.00					
SB 101 TO EB TALMAGE	12.0	point41	41	910.1	1,903.5	594.00				Average	
		point21	21	904.1	959.6	594.00				Average	
		point22	22	866.1	867.3	594.00				Average	
		point23	23	792.0	808.6	594.00				Average	
		point24	24	674.9	793.1	594.00				Average	
		point25	25	587.4	833.9	594.00				Average	
		point26	26	525.1	932.9	594.00				Average	

		point27	27	528.9	1,050.7	594.00				Average	
		point28	28	594.3	1,140.4	596.00				Average	
		point29	29	663.6	1,174.7	602.00				Average	
		point30	30	892.8	1,196.6	610.00					
SB 101 TO WB TALMAGE	12.0	point39	39	902.4	1,903.3	594.00	Stop	0.00	100	Average	
		point31	31	844.9	1,432.9	595.00				Average	
		point32	32	742.1	1,242.7	606.00					
SB 101 Off-Ramp	12.0	point59	53	942.2	2,640.3	594.00				Average	
		point60	54	906.7	1,908.8	594.00					
NB Airport Park	24.0	point57	55	123.4	936.3	600.00				Average	
		point58	56	164.8	1,206.9	600.00					
SB Airport Park	24.0	point55	59	131.5	1,211.7	600.00				Average	
		point56	60	83.4	942.9	600.00					
EB TALMAGE WEST	24.0	point63	63	-389.5	1,380.6	602.00				Average	
		point10	10	-109.9	1,332.2	602.00				Average	
		point11	11	158.6	1,236.7	600.00					
WB TALMAGE WEST	24.0	point8	8	172.1	1,271.8	600.00				Average	
		point9	9	-104.4	1,356.3	602.00				Average	
		point62	62	-387.3	1,407.5	602.00					

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INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 13-210
RUN: EXISTING

Roadway	Points													
Name	Name	No.	Segment											
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
EXISTING EB TALMAGE TO SB 101	point15	15	109	96	40	2	40	2	40	0	0	0	0
	point16	16	109	96	40	2	40	2	40	0	0	0	0
	point17	17	109	96	40	2	40	2	40	0	0	0	0
	point18	18	109	96	40	2	40	2	40	0	0	0	0
	point19	19	109	96	40	2	40	2	40	0	0	0	0
	point20	20											
EXISTING WB TALMAGE	point43	43	786	96	40	2	40	2	40	0	0	0	0
	point44	44	786	96	40	2	40	2	40	0	0	0	0
	point45	45											
EXISTING EB TALMAGE	point46	46	767	96	40	2	40	2	40	0	0	0	0
	point47	47	767	96	40	2	40	2	40	0	0	0	0
	point48	48											
SB 101	point35	35	1085	89	65	7	60	4	60	0	0	0	0
	point1	1	1085	89	65	7	60	4	60	0	0	0	0
	point2	2											
NB 101	point3	3	1085	89	65	7	60	4	60	0	0	0	0
	point37	37	1085	89	65	7	60	4	60	0	0	0	0
	point38	38											
SB 101 TO EB TALMAGE	point41	41	144	97	45	1	40	2	40	0	0	0	0
	point21	21	144	97	45	1	40	2	40	0	0	0	0
	point22	22	144	97	45	1	40	2	40	0	0	0	0

	point23	23	144	97	45	1	40	2	40	0	0	0	0
	point24	24	144	97	45	1	40	2	40	0	0	0	0
	point25	25	144	97	45	1	40	2	40	0	0	0	0
	point26	26	144	97	45	1	40	2	40	0	0	0	0
	point27	27	144	97	45	1	40	2	40	0	0	0	0
	point28	28	144	97	45	1	40	2	40	0	0	0	0
	point29	29	144	97	45	1	40	2	40	0	0	0	0
	point30	30											
SB 101 TO WB TALMAGE	point39	39	430	97	45	1	40	2	40	0	0	0	0
	point31	31	430	97	45	1	40	2	40	0	0	0	0
	point32	32											
SB 101 Off-Ramp	point59	53	574	97	55	1	55	2	55	0	0	0	0
	point60	54											
NB Airport Park	point57	55	661	96	40	2	40	2	40	0	0	0	0
	point58	56											
SB Airport Park	point55	59	534	96	40	2	40	2	40	0	0	0	0
	point56	60											
EB TALMAGE WEST	point63	63	584	96	40	2	40	2	40	0	0	0	0
	point10	10	584	96	40	2	40	2	40	0	0	0	0
	point11	11											
WB TALMAGE WEST	point8	8	624	96	40	2	40	2	40	0	0	0	0
	point9	9	624	96	40	2	40	2	40	0	0	0	0
	point62	62											

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INPUT: RECEIVERS
PROJECT/CONTRACT: 13-210
RUN: EXISTING

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST-5	1	1	106.5	1,389.5	599.00	4.92	0.00	66	10.0	8.0	Y
ST-1	2	1	279.4	1,428.8	597.00	4.92	0.00	66	10.0	8.0	Y
ST-2	3	1	488.2	1,405.6	596.00	4.92	0.00	66	10.0	8.0	Y
ST-3/ST-4	4	1	764.5	1,381.6	593.00	4.92	0.00	66	10.0	8.0	Y
LT-2	6	1	855.5	2,310.9	594.00	12.00	0.00	66	10.0	8.0	Y
LT-4	7	1	717.5	1,331.7	599.00	12.00	0.00	66	10.0	8.0	Y
LT-3	8	1	-7.7	1,408.2	593.00	12.00	0.00	66	10.0	8.0	Y
ST-6	9	1	624.3	1,386.3	593.00	4.92	0.00	66	10.0	8.0	Y
LT-1	11	1	106.5	1,389.5	599.00	12.00	0.00	66	10.0	8.0	Y

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Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 13-210
RUN: EXISTING
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver													
Name	No.	#DUs	Existing	No Barrier						With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type		Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact		LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
ST-5	1	1	0.0	63.8	66	63.8	10	----		63.8	0.0	8	-8.0
ST-1	2	1	0.0	59.8	66	59.8	10	----		59.8	0.0	8	-8.0
ST-2	3	1	0.0	59.0	66	59.0	10	----		59.0	0.0	8	-8.0
ST-3/ST-4	4	1	0.0	66.5	66	66.5	10	Snd Lvl		66.5	0.0	8	-8.0
LT-2	6	1	0.0	73.1	66	73.1	10	Snd Lvl		73.1	0.0	8	-8.0
LT-4	7	1	0.0	69.0	66	69.0	10	Snd Lvl		69.0	0.0	8	-8.0
LT-3	8	1	0.0	64.7	66	64.7	10	----		64.7	0.0	8	-8.0
ST-6	9	1	0.0	61.3	66	61.3	10	----		61.3	0.0	8	-8.0
LT-1	11	1	0.0	64.3	66	64.3	10	----		64.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	9	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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INPUT: ROADWAYS
PROJECT/CONTRACT: 13-210
RUN: FUTURE PREFERRED ALTERNATIVE

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement)			Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
				X	Y	Z					
	ft			ft	ft	ft		mph	%		
FUTURE EB TALMAGE TO SB 101	12.0	point15	15	170.2	1,231.1	600.00				Average	
		point16	16	328.8	1,191.5	598.00				Average	
		point17	17	495.3	1,167.6	598.00				Average	
		point18	18	500.0	943.9	594.00				Average	
		point19	19	545.9	846.5	594.00				Average	
		point20	20	854.8	630.3	594.00					
FUTURE WB TALMAGE	24.0	point43	43	890.7	1,217.6	610.00				Average	
		point44	44	340.5	1,245.8	598.00				Average	
		point45	45	181.2	1,281.8	600.00					
FUTURE EB TALMAGE	12.0	point46	46	173.1	1,242.3	600.00				Average	
		point47	47	332.7	1,200.6	598.00				Average	
		point48	48	893.0	1,200.8	610.00					
SB 101	24.0	point35	35	947.0	2,638.0	594.00				Average	
		point1	1	943.4	1,436.1	594.00				Average	
		point2	2	943.9	6.4	594.00					
NB 101	24.0	point3	3	1,014.5	1.9	594.00				Average	
		point37	37	1,017.5	1,444.1	594.00				Average	
		point38	38	1,018.2	2,636.9	594.00					
SB 101 Off-Ramp	12.0	point59	53	942.2	2,640.3	594.00				Average	
		point60	54	906.7	1,908.8	594.00					
NB Airport Park	24.0	point57	55	123.4	936.3	600.00				Average	
		point58	56	164.8	1,206.9	600.00					
SB Airport Park	24.0	point55	59	131.5	1,211.7	600.00				Average	
		point56	60	83.4	942.9	600.00					
EB TALMAGE WEST	24.0	point63	63	-389.5	1,380.6	602.00				Average	

		point10	10	-109.9	1,332.2	602.00		Average
		point11	11	158.6	1,236.7	600.00		
WB TALMAGE WEST	24.0	point8	8	172.1	1,271.8	600.00		Average
		point9	9	-104.4	1,356.3	602.00		Average
		point62	62	-387.3	1,407.5	602.00		
SB 101 TO WB/EB TALMAGE	24.0	point41	65	910.1	1,903.5	594.00		Average
		point21	66	904.1	959.6	594.00		Average
		point22	67	866.1	867.3	594.00		Average
		point23	68	792.0	808.6	594.00		Average
		point24	69	674.9	793.1	594.00		Average
		point25	70	587.4	833.9	594.00		Average
		point51	71	530.2	971.4	594.00		Average
		point52	72	532.6	1,167.7	594.00		

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INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 13-210
RUN: FUTURE PREFERRED ALTERNATIVE

Roadway	Points													
Name	Name	No.	Segment											
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles		
			Volume	P	S	P	S	P	S	P	S	P	S	
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph	
FUTURE EB TALMAGE TO SB 101	point15	15	142	96	40	2	40	2	40	0	0	0	0	
	point16	16	142	96	40	2	40	2	40	0	0	0	0	
	point17	17	142	96	40	2	40	2	40	0	0	0	0	
	point18	18	142	96	40	2	40	2	40	0	0	0	0	
	point19	19	142	96	40	2	40	2	40	0	0	0	0	
	point20	20												
FUTURE WB TALMAGE	point43	43	1016	96	40	2	40	2	40	0	0	0	0	
	point44	44	1016	96	40	2	40	2	40	0	0	0	0	
	point45	45												
FUTURE EB TALMAGE	point46	46	998	96	40	2	40	2	40	0	0	0	0	
	point47	47	998	96	40	2	40	2	40	0	0	0	0	
	point48	48												
SB 101	point35	35	1411	89	65	7	60	4	60	0	0	0	0	
	point1	1	1411	89	65	7	60	4	60	0	0	0	0	
	point2	2												
NB 101	point3	3	1411	89	65	7	60	4	60	0	0	0	0	
	point37	37	1411	89	65	7	60	4	60	0	0	0	0	
	point38	38												
SB 101 Off-Ramp	point59	53	786	97	55	1	55	2	55	0	0	0	0	
	point60	54												
NB Airport Park	point57	55	860	96	40	2	40	2	40	0	0	0	0	

	point58	56											
SB Airport Park	point55	59	696	96	40	2	40	2	40	0	0	0	0
	point56	60											
EB TALMAGE WEST	point63	63	761	96	40	2	40	2	40	0	0	0	0
	point10	10	761	96	40	2	40	2	40	0	0	0	0
	point11	11											
WB TALMAGE WEST	point8	8	813	96	40	2	40	2	40	0	0	0	0
	point9	9	813	96	40	2	40	2	40	0	0	0	0
	point62	62											
SB 101 TO WB/EB TALMAGE	point41	65	786	97	45	1	45	2	45	0	0	0	0
	point21	66	786	97	25	1	25	2	25	0	0	0	0
	point22	67	786	97	25	1	25	2	25	0	0	0	0
	point23	68	786	97	25	1	25	2	25	0	0	0	0
	point24	69	786	97	25	1	25	2	25	0	0	0	0
	point25	70	786	97	25	1	25	2	25	0	0	0	0
	point51	71	786	97	25	1	25	2	25	0	0	0	0
	point52	72											

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INPUT: RECEIVERS
PROJECT/CONTRACT: 13-210
RUN: FUTURE PREFERRED ALTERNATIVE

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST-5	1	1	106.5	1,389.5	599.00	4.92	0.00	66	10.0	8.0	Y
ST-1	2	1	279.4	1,428.8	597.00	4.92	0.00	66	10.0	8.0	Y
ST-2	3	1	488.2	1,405.6	596.00	4.92	0.00	66	10.0	8.0	Y
ST-3/ST-4	4	1	764.5	1,381.6	593.00	4.92	0.00	66	10.0	8.0	Y
LT-2	6	1	855.5	2,310.9	594.00	12.00	0.00	66	10.0	8.0	Y
LT-4	7	1	717.5	1,331.7	599.00	12.00	0.00	66	10.0	8.0	Y
LT-3	8	1	-7.7	1,408.2	593.00	12.00	0.00	66	10.0	8.0	Y
ST-6	9	1	624.3	1,386.3	593.00	4.92	0.00	66	10.0	8.0	Y
LT-1	11	1	106.5	1,389.5	599.00	12.00	0.00	66	10.0	8.0	Y

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Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 13-210
RUN: FUTURE PREFERRED ALTERNATIVE
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST-5	1	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
ST-1	2	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
ST-2	3	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
ST-3/ST-4	4	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
LT-2	6	1	0.0	74.3	66	74.3	10	Snd Lvl	74.3	0.0	8	-8.0
LT-4	7	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
LT-3	8	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
ST-6	9	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
LT-1	11	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	9	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 13-210
RUN: FUTURE CALTRANS ALTERNATIVE

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
FUTURE EB TALMAGE TO SB 101	12.0	point15	15	170.2	1,231.1	600.00				Average	
		point16	16	328.8	1,191.5	598.00				Average	
		point17	17	495.3	1,167.6	598.00				Average	
		point18	18	500.0	943.9	594.00				Average	
		point19	19	545.9	846.5	594.00				Average	
		point20	20	854.8	630.3	594.00					
FUTURE WB TALMAGE	24.0	point43	43	890.7	1,217.6	610.00				Average	
		point44	44	340.5	1,245.8	598.00				Average	
		point45	45	181.2	1,281.8	600.00					
FUTURE EB TALMAGE	12.0	point46	46	173.1	1,242.3	600.00				Average	
		point47	47	332.7	1,200.6	598.00				Average	
		point48	48	893.0	1,200.8	610.00					
SB 101	24.0	point35	35	947.0	2,638.0	594.00				Average	
		point1	1	943.4	1,436.1	594.00				Average	
		point2	2	943.9	6.4	594.00					
NB 101	24.0	point3	3	1,014.5	1.9	594.00				Average	
		point37	37	1,017.5	1,444.1	594.00				Average	
		point38	38	1,018.2	2,636.9	594.00					
SB 101 Off-Ramp	12.0	point59	53	942.2	2,640.3	594.00				Average	
		point60	54	906.7	1,908.8	594.00					
NB Airport Park	24.0	point57	55	123.4	936.3	600.00				Average	
		point58	56	164.8	1,206.9	600.00					
SB Airport Park	24.0	point55	59	131.5	1,211.7	600.00				Average	
		point56	60	83.4	942.9	600.00					
EB TALMAGE WEST	24.0	point63	63	-389.5	1,380.6	602.00				Average	

		point10	10	-109.9	1,332.2	602.00				Average	
		point11	11	158.6	1,236.7	600.00					
WB TALMAGE WEST	24.0	point8	8	172.1	1,271.8	600.00				Average	
		point9	9	-104.4	1,356.3	602.00				Average	
		point62	62	-387.3	1,407.5	602.00					
SB 101 TO WB/EB TALMAGE	24.0	point41	65	910.1	1,903.5	594.00				Average	
		point21	66	904.1	959.6	594.00				Average	
		point22	67	866.1	867.3	594.00				Average	
		point23	68	792.0	808.6	594.00				Average	
		point24	69	674.9	793.1	594.00				Average	
		point25	70	587.4	833.9	594.00				Average	
		point51	71	530.2	971.4	594.00				Average	
		point52	72	532.6	1,167.7	594.00					
SB 101 OFF TO WB TALMAGE	24.0	point84	84	904.4	1,902.7	594.00				Average	
		point79	79	879.1	1,496.1	594.00				Average	
		point80	80	856.2	1,411.1	595.00				Average	
		point81	81	810.8	1,336.7	600.00				Average	
		point82	82	723.7	1,265.4	606.00				Average	
		point83	83	672.4	1,236.4	610.00					

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TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 13-210
RUN: FUTURE CALTRANS ALTERNATIVE

Roadway Name	Points Name	No.	Segment Total Volume	Autos P	Autos S	MTrucks P	MTrucks S	HTrucks P	HTrucks S	Buses P	Buses S	Motorcycles P	Motorcycles S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
FUTURE EB TALMAGE TO SB 101	point15	15	142	96	40	2	40	2	40	0	0	0	0
	point16	16	142	96	40	2	40	2	40	0	0	0	0
	point17	17	142	96	40	2	40	2	40	0	0	0	0
	point18	18	142	96	40	2	40	2	40	0	0	0	0
	point19	19	142	96	40	2	40	2	40	0	0	0	0
	point20	20											
FUTURE WB TALMAGE	point43	43	1016	96	40	2	40	2	40	0	0	0	0
	point44	44	1016	96	40	2	40	2	40	0	0	0	0
	point45	45											
FUTURE EB TALMAGE	point46	46	998	96	40	2	40	2	40	0	0	0	0
	point47	47	998	96	40	2	40	2	40	0	0	0	0
	point48	48											
SB 101	point35	35	1411	89	65	7	60	4	60	0	0	0	0
	point1	1	1411	89	65	7	60	4	60	0	0	0	0
	point2	2											
NB 101	point3	3	1411	89	65	7	60	4	60	0	0	0	0
	point37	37	1411	89	65	7	60	4	60	0	0	0	0
	point38	38											
SB 101 Off-Ramp	point59	53	747	97	55	1	55	2	55	0	0	0	0
	point60	54											
NB Airport Park	point57	55	860	96	40	2	40	2	40	0	0	0	0

	point58	56												
SB Airport Park	point55	59	696	96	40	2	40	2	40	0	0	0	0
	point56	60												
EB TALMAGE WEST	point63	63	761	96	40	2	40	2	40	0	0	0	0
	point10	10	761	96	40	2	40	2	40	0	0	0	0
	point11	11												
WB TALMAGE WEST	point8	8	813	96	40	2	40	2	40	0	0	0	0
	point9	9	813	96	40	2	40	2	40	0	0	0	0
	point62	62												
SB 101 TO WB/EB TALMAGE	point41	65	188	97	45	1	45	2	45	0	0	0	0
	point21	66	188	97	25	1	25	2	25	0	0	0	0
	point22	67	188	97	25	1	25	2	25	0	0	0	0
	point23	68	188	97	25	1	25	2	25	0	0	0	0
	point24	69	188	97	25	1	25	2	25	0	0	0	0
	point25	70	188	97	25	1	25	2	25	0	0	0	0
	point51	71	188	97	25	1	25	2	25	0	0	0	0
	point52	72												
SB 101 OFF TO WB TALMAGE	point84	84	559	97	45	1	40	2	40	0	0	0	0
	point79	79	559	97	45	1	40	2	40	0	0	0	0
	point80	80	559	97	45	1	40	2	40	0	0	0	0
	point81	81	559	97	45	1	40	2	40	0	0	0	0
	point82	82	559	97	45	1	40	2	40	0	0	0	0
	point83	83												

I&R
MST

24 February 2014
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 13-210
RUN: FUTURE CALTRANS ALTERNATIVE

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST-5	1	1	106.5	1,389.5	599.00	4.92	0.00	66	10.0	8.0	Y
ST-1	2	1	279.4	1,428.8	597.00	4.92	0.00	66	10.0	8.0	Y
ST-2	3	1	488.2	1,405.6	596.00	4.92	0.00	66	10.0	8.0	Y
ST-3/ST-4	4	1	764.5	1,381.6	593.00	4.92	0.00	66	10.0	8.0	Y
LT-2	6	1	855.5	2,310.9	594.00	12.00	0.00	66	10.0	8.0	Y
LT-4	7	1	717.5	1,331.7	599.00	12.00	0.00	66	10.0	8.0	Y
LT-3	8	1	-7.7	1,408.2	593.00	12.00	0.00	66	10.0	8.0	Y
ST-6	9	1	624.3	1,386.3	593.00	4.92	0.00	66	10.0	8.0	Y
LT-1	11	1	106.5	1,389.5	599.00	12.00	0.00	66	10.0	8.0	Y

I&R
MST

24 February 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 13-210
RUN: FUTURE CALTRANS ALTERNATIVE
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST-5	1	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
ST-1	2	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
ST-2	3	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
ST-3/ST-4	4	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
LT-2	6	1	0.0	74.3	66	74.3	10	Snd Lvl	74.3	0.0	8	-8.0
LT-4	7	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
LT-3	8	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
ST-6	9	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
LT-1	11	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	9	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

1 Willowbrook Court, Suite 120
Petaluma, CA 94954

Memo

Date: August 20, 2014

To: Leonard Charles
LCA

From: Michael Thill
Illingworth & Rodkin, Inc.

Subject: **Talmage Road/Southbound U.S. 101 Ramp Realignment Project, Ukiah, CA – Talmage Road 60 dBA L_{dn} Noise Contour Distances/DTCs**

This memo summarizes the results of calculations made to determine the relative distances to the 60 dBA L_{dn} noise contours under the existing, existing plus project, future no-build, and future plus project due to vehicle traffic along Talmage Road. Calculations were made for the Preferred Project as well as the Caltrans Alternative. All noise contour distances presented in Table 1, below, are measured from the centerline of Talmage Road and assume no intervening shielding from structures or barriers. The calculations of noise contour distances were made is in response to the City of Ukiah General Plan Implementation Measure NZ-1.2(c), which reads as follows:

Implementation Measure NZ-1.2(c): Expansion of existing roads must be designed using accepted acoustical engineering features – examples include low landscaped berms, landscaping, below-grade construction, and speed control – to minimize expansion of the existing DTC (Discomfort Threshold Contour).

The distances to the 60 dBA L_{dn} Noise Contour, otherwise known as the DTCs, were calculated for residential receptors located north of Talmage Road represented by measurement and modeling receptors LT-1 and LT-3. These measurement and modeling receptors were selected for this analysis because these locations represent the locations of long-term noise measurements that were made during the preparation of the Environmental Noise Assessment of the Talmage Road/Southbound U.S. 101 Ramp Realignment Project dated February 26, 2014, and have an unimpeded line-of-sight to Talmage Road traffic.

The 60 dBA L_{dn} Noise Contours were calculated for the following conditions:

- Existing
- Existing Plus Project (Preferred Project and Caltrans Alternative) – assumes geometrical modifications to the roadway
- Future No Build – assumes future traffic volumes along the existing/no build roadway alignment
- Future Plus Project (Preferred Project and Caltrans Alternative) – assumes future traffic volumes and geometrical modifications to the roadway

Table 1 summarizes the results of the calculations for receptor LT-1 and Table 2 summarizes the results of the calculations for receptor LT-3.

TABLE 1 Summary of DTCs for Receptor LT-1

Modeling Scenario	Modeled Noise Level L_{dn}, dBA	Distance (feet) from Talmage Road Centerline	Distance (feet) to DTC from Talmage Road Centerline	Change in DTC Distance (feet) due to Project
Existing	64.8	110	220	
Existing Plus Project (Preferred Project)	64.9	110	230	+10
Existing Plus Project (Caltrans Alternative)	64.9	110	230	+10
Future No Build	65.9	110	270	
Future Plus Project (Preferred Project)	66.1	110	270	0
Future Plus Project (Caltrans Alternative)	66.0	110	270	0

TABLE 2 Summary of DTCs for Receptor LT-3

Modeling Scenario	Modeled Noise Level L_{dn}, dBA	Distance (feet) from Talmage Road Centerline	Distance (feet) to DTC from Talmage Road Centerline	Change in DTC Distance (feet) due to Project
Existing	65.1	95	200	
Existing Plus Project (Preferred Project)	65.2	95	200	0
Existing Plus Project (Caltrans Alternative)	65.1	95	200	0
Future No Build	66.2	95	240	
Future Plus Project (Preferred Project)	66.3	95	240	0
Future Plus Project (Caltrans Alternative)	66.3	95	240	0

A review of the DTCs in Table 1 shows that, for Receptor LT-1, the proposed project would increase the distance to the DTC by up to 10 feet under the Existing Plus Project (Preferred Project and Caltrans Alternative) Scenarios as compared to existing conditions. Such a change in the distance to the DTC would not be measureable or perceptible. No change in the DTC would be expected at Receptor LT-1 under the Future Plus Project (Preferred Project and Caltrans Alternative) Scenarios as compared to Future No Build conditions.

Since the project "accommodates" the additional traffic occurring in 2032, the change in the distance to the future DTC is also compared to the distance to the existing DTC at Receptor LT-1. The overall change in distance is approximately 50 feet when comparing existing (220 feet from the centerline) and future conditions (270 feet from the centerline). To place this change in distance into context with respect to receive noise levels, noise levels have been assigned to the distances for existing and future conditions. The existing DTC represents a noise level of 60 dBA L_{dn} under existing conditions, and the existing noise level at 270 feet is calculated to be 59 dBA L_{dn}. In the future, the noise level at 270 feet is calculated to reach 60 dBA L_{dn}. The 1 dBA L_{dn} noise increase would not be measurable outside of a laboratory environment, and would not represent a perceptible change in noise levels at nearby residential land uses.

Similarly, a review of the DTCs in Table 2 shows that the proposed project would not increase the distance to the DTC at Receptor LT-3 under the Existing Plus Project (Preferred Project and Caltrans Alternative) Scenarios as compared to existing conditions, or under the Future Plus Project (Preferred Project and Caltrans Alternative) Scenarios as compared to Future No Build conditions.

The overall change in distance to the DTC is approximately 40 feet when comparing existing (200 feet from the centerline) and future conditions (240 feet from the centerline). Again, the existing DTC represents a noise level of 60 dBA L_{dn} under existing conditions, and the existing noise level at 240 feet is calculated to be 59 dBA L_{dn}. In the future, the noise level at 240 feet is calculated to reach 60 dBA L_{dn}. The increase in noise level by 1 dBA L_{dn} would result from traffic "accommodated" by the project. This change in noise level would not be measurable outside of a laboratory environment, and would not represent a perceptible change in noise levels at nearby residential land uses.

Appendix H

Energy Report

TALMAGE INTERCHANGE IMPROVEMENT PROJECT ENERGY ANALYSIS UKIAH, CALIFORNIA

July 28, 2014
Revised August 19, 2014

♦ ♦ ♦

Prepared for:

Leonard Charles and Associates
7 Roble Court
San Anselmo, CA 94960

Prepared by:

ILLINGWORTH & RODKIN, INC.
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Petaluma, CA 94954
(707) 794-0400

Job No.: 13-210

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Regulatory Background

This energy analysis has been prepared pursuant to the California Environmental Quality Act (CEQA). CEQA Appendix F requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. The purpose of this analysis is to compare the energy consumption impacts associated with the new proposed intersection. Relative energy consumption impacts are evaluated in terms of direct energy consumption, indirect energy consumption, and total energy consumption.

Affected Environment

In 2012, total energy use per person in the State of California was 201 million British thermal units (MBTU)[1], according to the 2012 census there are approximately 15,900 residents in the City of Ukiah. This would equate to approximately 3,196 billion BTU's of energy consumption per year in the City of Ukiah. According to the California Energy Commission, nearly half of the energy consumed in the state is used in transportation[2]. This project should decrease the amount of energy consumed by improving traffic flow. It is expected that the amount of energy consumed by the construction of this project will be a small percentage of the total energy consumed by the City of Ukiah.

Project Description

This report presents the results of the energy analysis for the Talmage Interchange Improvement Project proposed in Ukiah, California. The proposed project includes improvements to the Talmage Road/U.S. 101 southbound on- and off-ramps and improvements to Talmage Road within the State right-of-way. Modifications within the State right-of-way to the Talmage Road/U.S. 101 southbound on- and off-ramps include removal of the existing southbound off-ramp to westbound Talmage Road from service, widening and realignment of the southbound off-ramp to eastbound Talmage Road to four lanes with terminus at a new signalized intersection with Talmage Road, signing and striping, minor grading, new sidewalks, curbs, and gutters. In addition to these improvements, Talmage Road would be widened to add a westbound through lane (two westbound through lanes) between the U.S. 101 overpass and Airport Park Boulevard, and to add an additional eastbound lane between Airport Park Boulevard and the Talmage Road/U.S. 101 southbound on-ramp (one through lane and one right-turn lane). Existing signals at the intersection of Talmage Road and Airport Park Boulevard would also be replaced.

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[1] http://www.eia.gov/state/rankings/?sid=CA#series/12
[2] http://www.consumerenergycenter.org/transportation/index.html

Caltrans Alternative

The Caltrans Alternative consists of the modification and realignment of the existing southbound on and off-ramps, signalization of the southbound off-ramp to westbound Talmage Road intersection, and construction of a raised center median on Talmage Road to channelize traffic in the eastbound and westbound directions. The new traffic signal would not be interconnected and coordinated with the traffic signal at the intersection of Airport Park Boulevard and Talmage Road. Provisions to interconnect these two signals would be provided if this alternative is selected as the environmentally superior alternative. This alternative maintains most of the interchange geometry and adds lanes to provide capacity for the anticipated increases in traffic volumes.

Preferred Alternative

The Preferred Alternative would remove the existing U.S. 101 southbound off-ramp to westbound Talmage Road, and widen the existing U.S. 101 southbound loop off-ramp to eastbound Talmage Road south of the Talmage Road overpass. The loop ramp would be modified to terminate at Talmage Road. With this configuration all southbound traffic exiting U.S. 101 at Talmage Road would use the loop off-ramp terminating at a new signalized intersection. Three left turn lanes would direct traffic to westbound Talmage Road and a single right turn lane would direct traffic to eastbound Talmage Road. Phasing of the new traffic signal would include right-turn overlaps for the eastbound Talmage Road right-turn on to southbound U.S. 101 on-ramp and the U.S. 101 southbound off-ramp right turn lane on to eastbound Talmage Road would also be widened to accommodate dual westbound left turn lanes at Airport Park Boulevard and two westbound through lanes. The new traffic signal would be interconnected and coordinated with the traffic signal at the intersection of Airport Park Boulevard and Talmage Road.

No Build Alternative

The no build alternative would result in continued use for the existing intersection, no capacity or signal improvements are anticipated. Only routine maintenance and repair would occur in the project area.

Methodology

Traffic information used in the energy analysis was provided by a traffic report prepared for by GHD, Inc. Peak and off peak traffic data was reported for existing (2012) and future (2032) traffic volumes. Off peak traffic data was not provided for ramp volumes, a reduction factor of 52.7% was applied to peak traffic volumes in order to determine off peak volumes. Reduction factor was calculated from the difference in peak and off peak traffic volumes reported for U.S. 101 and Talmage Road. Energy consumption for the different roadway alternatives was calculated using fuel consumption factors provided by the computer program EMFAC2011 and guidelines set by Caltrans[3]. Consumption factors used for this analysis are listed in Appendix A. This report compares the existing energy consumption with the future energy consumption for the two build alternatives and no build alternative. The vehicle miles traveled (VMT) and traffic volumes remain constant for all of the alternatives.

Direct Energy

Direct energy is the amount of fuel consumed by vehicles over a given period of time. Factors that influence fuel consumption include: speed, grade, intersection delay time, traffic density (free flowing or congested) and changing fuel economy due to newer more fuel efficient vehicles on the road. The traffic report did not differentiate between truck and auto traffic, for the purpose of this report the same energy consumption factors were applied to all vehicles for all of the alternatives.

Indirect Energy

Indirect energy is the remaining energy consumed to construct, operate and maintain the proposed project alternative. Indirect energy also includes the manufacture and maintenance of vehicles using the roadway. Indirect energy consumption for construction was determined using the input-output method. This method uses construction cost to estimate energy consumption by multiplying the cost of the project by a MBTU/1977$ ratio provided by Caltrans[3]. This ratio was based on the cost of construction in 1977. In order to apply this ratio, the Caltrans construction cost index[4] was used to relate current construction cost to 1977 construction cost. Other sources of indirect energy consumption were determined by multiplying the roadway length by a MBTU/mile ratio which was provided by Caltrans[3].

Energy Impacts

Energy usage was analyzed for the two build alternatives, as described above, and the no build alternative. The proposed alternatives will improve traffic flow and reduce intersection delay time which will result in less energy consumption when comparing the future build and no build alternatives.

Direct Energy Consumption

[3] Energy and Transportation Systems, Caltrans Transportation Laboratory, Sacramento, CA, July 1983
[4] http://www.dot.ca.gov/hq/esc/oe/cost_index/historical_reports/CCI_1QTR_2014.pdf

Projected direct energy consumption is reported in Table 1, direct energy expenditures range between 84 billion and 102 billion BTU's of energy. There was no change in VMT between the alternatives therefore the difference in energy consumption was a result of reducing delays at intersections. The no build alternative will result in slightly higher fuel consumption caused by increased traffic delays at the intersections. The increased delay is caused by traffic volumes exceeding the capacity of the existing intersections. The build alternatives will reduce traffic congestion and delay times, which will lower the direct energy consumption.

Table 1: Annual Projected Direct Energy Consumption

Description	Existing	2014 Caltrans Alternative	2014 Preferred Alternative	2032 No Build	2032 Caltrans Alternative	2032 Preferred Alternative
Total MBTU's	82,248	67,637	70,137	102,459	84,852	85,532
% Increase over Existing	--	-17.8%	-14.7%	24.6%	3.2%	4.0%
% Change from 2032 No Build	--	--	--	--	-17.2%	-16.5%

Indirect Energy Consumption

Projected indirect energy consumption is reported in Table 2. The no build alternative will result in less indirect energy consumption due to the lack of construction. Indirect energy consumption for the no build alternative will be 68 MBTU's of energy. The indirect energy consumed in road construction and vehicle manufacturing is a onetime non-recoverable consumption of energy, the other sources are reported as a per year expenditure.

Table 2: Projected Indirect Energy Consumption (in MBTU)

Description	Existing	2032 No Build	2032 Caltrans Alternative	2032 Preferred Alternative
Vehicles Maintenance	60	68	68	68
Road Maintenance	482	482	482	482
Road Construction	--	--	7,024	14,047
Vehicle Manufacturing	60	68	68	68

Note: Indirect Energy Consumption Factors were provided by Caltrans**Error! Bookmark not defined.**.

Table 3 shows the annual energy consumption by the City Ukiah compared to the indirect energy consumed by onetime non-recoverable energy expenditures. The energy consumed in the construction of the alternatives is significantly less than the energy consumed by the City; therefore the energy impacts associated with the construction of the project will have minimal impact on the surrounding area.

Table 3: Annual Energy Consumption by the City of Ukiah Compared to the Indirect Non-Recoverable Energy Consumption Associated with the Proposed Alternatives.

Description	Caltrans Alternative	Preferred Alternative
Annual Energy Consumed by the City of Ukiah (MBTU's)	3,195,900,000	3,195,900,000
Indirect Energy Consumed by the Construction of the Alternatives (MBTU's)	7,092	14,115
%Of the Cities Energy Demands Used in Construction	<<1%	<<1%

Conservation Measures

Energy consumption for the build alternatives will have a minimal impact on the surrounding area, but implementing the following conservation measures would help further reduce impacts to the area.

- Use energy efficient lighting at the new intersections; for example, install light emitting diode traffic signals.
- Use of energy efficient construction equipment.
- Limit idle time for construction equipment.
- Promote carpooling for construction crews.
- Recycle construction waste when feasible and select disposal sites in the vicinity of the project area.

Summary and Conclusion

The no build alternative is computed to consume 24.6% more direct energy than the existing conditions due to longer delay times caused by traffic exceeding the capacity of the intersections. The two build alternatives will reduce traffic congestion and delay times resulting in 3.2% to 4.0% more direct energy consumption when comparing them to the existing condition. The small increase over the existing is attributed to the projected increase in traffic volumes due to growth in the area. When comparing the no build to the build alternatives, the build alternatives will consume 16.5% to 17.2% less direct energy than the no build alternative. As stated above, the difference between the build and no build alternatives is due to reduced traffic delays. In terms of indirect energy consumption the build alternatives would use significantly more energy than the no build alternatives due to the amount of energy needed for construction. But when considering the annual energy consumption by the City of Ukiah, the energy used in construction is quite small. The build alternatives show an increase in energy consumption in the early years of operation. Once this initial expenditure of energy has been accounted for the improvements to the intersection will allow for an increase of energy efficiency over the no build alternative.

Appendix A

Indirect Energy Consumption Factors

Road Maintenance	80.3 MBTU/lane-mile
Vehicle Maintenance	0.0014 MBTU/VMT
Road Construction	0.0246 MBTU/1977$
Vehicle Manufacturing	0.001399 MBTU/mile

Note: Energy and Transportation Systems, Caltrans Transportation Laboratory, Sacramento, CA, July 1983

Consumption Factors for 2012 Based on Speed Provided by EMFAC2011

Title : Talmage Road
Version : Emfac2011-LDV V2.50.58.094 Sp: Trip Assign Mendocino County
Run Date : 2014/06/27 14:41:53
Scen Year: 2012 -- All model years in the range 1968 to 2012 selected
Season : Annual
Area : Mendocino
****

Year: 2012 -- Model Years 1968 to 2012 Inclusive --
Emfac2011-LDV Emission Factors: V2.50.58.094 Sp: Trip Assign Mendocino County
County Average Mendocino
Pollutant Name: Gasoline - mi/gal

Speed	ALL
MPH	ALL
0	0
5	7.579
10	10.022
15	12.775
20	15.692
25	18.575
30	21.185
35	23.278
40	24.636
45	25.113
50	24.651
55	23.3
60	21.205
65	18.581

Consumption Factors for 2032 Based on Speed Provided by EMFAC2011

Title : Talmage Road
Version : Emfac2011-LDV V2.50.58.094 Sp: Trip Assign Mendocino County
Run Date : 2014/06/27 14:41:53
Scen Year: 2032 -- All model years in the range 1988 to 2032 selected
Season : Annual
Area : Mendocino
****

Year:	2032	-- Model Years	1988	to 2032 Inclusive --

Emfac2011-LDV Emission Factors: V2.50.58.094 Sp: Trip Assign Mendocino County

County Average	Mendocino
Pollutant Name: Gasoline - mi/gal	
Speed	ALL
MPH	ALL
0	0
5	7.668
10	10.146
15	12.938
20	15.9
25	18.825
30	21.473
35	23.592
40	24.963
45	25.436
50	24.957
55	23.579
60	21.45
65	18.79