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September 29, 2010

383194

DOCKET
09-AFC-2
DATE SEP 29 2010
RECD. SEP 29 2010

Felicia Miller
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Almond 2 Power Plant (09-AFC-02)
Hughson-Grayson 115kV Transmission Line and Substation Project, Revised Draft Environmental Impact Report, dated July 23, 2010, Applicant's Exhibit #__

Hughson-Grayson 115kV Transmission Line and Substation Project, Final Environmental Impact Report, dated November 5, 2009, Applicant's Exhibit #__

Dear Ms. Miller:

Please find attached 2 electronic copies (CD) of the Hughson-Grayson 115kV Transmission Line and Substation Project, Revised Draft Environmental Impact Report, dated July 23, 2010, Applicant's Exhibit #___ and the Hughson-Grayson 115kV Transmission Line and Substation Project, Final Environmental Impact Report, dated November 5, 2009, Applicant's Exhibit #__. This draft EIR is being docketed in response to a request from the Hearing Officer at the Status Conference held on September 16, 2010.

If you have any questions about this matter, please contact me at (916) 286-0249 or Susan Strachan at (530) 757-7038.

Sincerely,

CH2M HILL

Sarah Madams
AFC Project Manager

Attachment

cc: S. Strachan, Strachan Consulting
B. LaFollette, Turlock Irrigation District

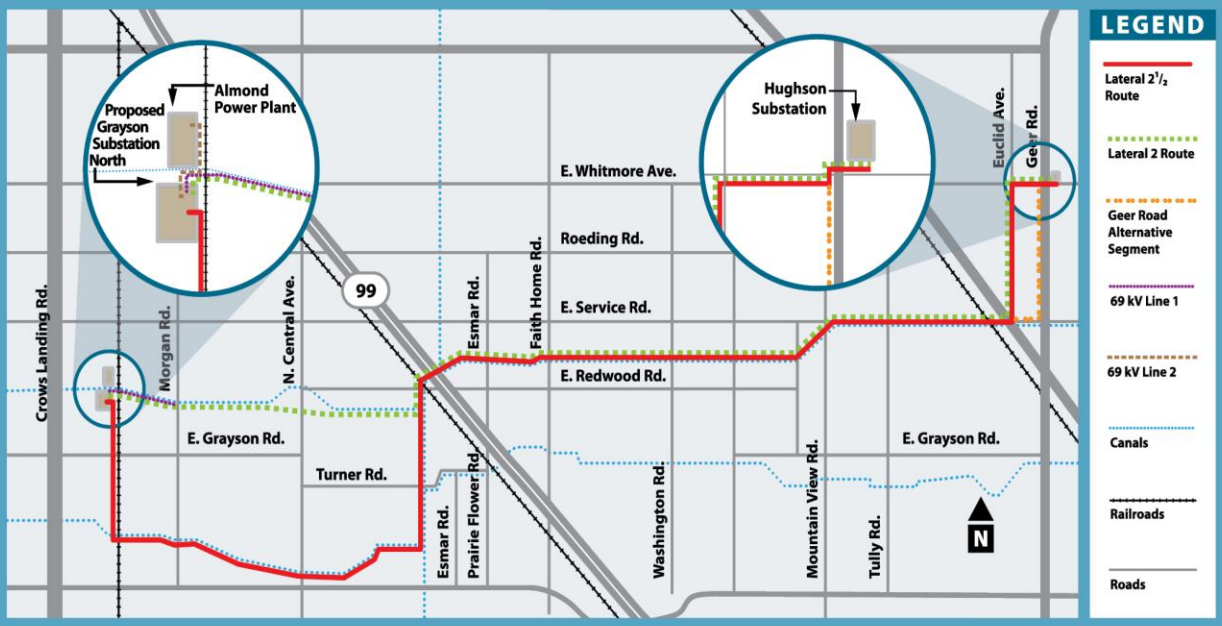
HUGHSON-GRAYSON

115kV TRANSMISSION LINE AND SUBSTATION PROJECT

REVISED DRAFT ENVIRONMENTAL IMPACT REPORT

SCH #: 2009012075

DATE OF RECIRCULATION, JULY 23, 2010



PREPARED FOR:

WATER & POWER
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Turlock Irrigation District

PREPARED BY:

STRACHAN CONSULTING

WITH ASSISTANCE FROM:

PARUS CONSULTING, INC.

Hughson-Grayson 115-kV Transmission Line and Substation Project

Revised Draft Environmental Impact Report

SCH #: 2009012075

Prepared for:

Turlock Irrigation District

Prepared by:

Strachan Consulting

with assistance from

Parus Consulting, Inc.

July 23, 2010

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	assembly bill
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
BPS	best performance standards
CA FID UST	Facility Inventory Database
CADHS	California Department of Health Services
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCIC	Central California Information Center
CDFG	California Department of Fish and Game
CDL	clandestine drug lab
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CHMIRS	California Hazardous Materials Incident Report System
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
Cortese	sites listed by the State Water Resources Control Board, the Integrated Waste Board, and the California Department of Toxic Substances Control
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
dB	decibel
dBA	A-weighted decibel
EDR	Environmental Data Resources, Inc.
EIR	Environmental Impact Report
EMF	electromagnetic field
EMI	toxics and criteria air pollutant emissions data
Envirostor	California Department of Toxic Substances Control sites of known or suspected contamination
FINDS	Facility Index System
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
GO	General Order

HASP	Health and Safety Plan
HAZNET	California Department of Toxic Substances Control data from hazardous waste manifests
HCP	Habitat Conservation Plan
HIST UST	historical underground storage tank
hp	horsepower
ICIS	Integrated Compliance Information System
IS	Initial Study
KOP	key observation point
kV	kilovolt
L50	noise level exceeded 50 percent of the time
L90	typical background noise levels
Ldn	24-hour average sound levels
Leq	equivalent sound level over a given time period
LUST	leaking underground storage tank
mG	milligaus
MID	Modesto Irrigation District
MW	megawatt
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NIEHS	National Institute of Environmental Health Services
NOP	Notice of Preparation
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PCB	polychlorinated biphenyl
PM	particulate matter
PRC	Public Resources Code
ROG	reactive organic gas
SF_6	sulfur hexafluoride
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SWEEPS	Statewide Environmental Evaluation and Planning System
SLIC	Spills, Leaks, Investigations, and Cleanups
SR	State Route

SSTS	Federal Insecticide, Fungicide and Rodenticide Act database
SWPPP	Storm Water Pollution Prevention Plan
TID	Turlock Irrigation District
UPRR	Union Pacific Railroad
URBEMIS	Urban Emissions Model
USFWS	United States Fish and Wildlife Service
UST	underground storage tank

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

In 2009, the Turlock Irrigation District (TID) prepared a Draft Environmental Impact Report (hereinafter referred to as the "2009 Draft EIR") for the proposed Hughson-Grayson 115-kV Transmission and Substation Project (the Project). The 2009 Draft EIR analyzed the "Grayson Road Route," which consists of an approximately 10-mile 115-kilovolt (kV) transmission line from TID's existing Hughson Substation (near the corner of East Whitmore Avenue and Geer Road, east of the City of Hughson) to the Grayson Substation South. The Grayson Substation South is analyzed in the 2009 Draft EIR and would be constructed on East Grayson Road (near the intersection with Crows Landing Road), south of the City of Ceres. The Project also includes the construction of two separate 69-kV transmission lines to provide enhanced interconnectivity and reliability to TID's system.

The 2009 Draft EIR concluded that the Project's Grayson Road Route and related facilities would not result in any significant unmitigated environmental impacts. Following presentation of the 2009 Draft EIR to the TID Board of Directors on November 17, 2009, the Board directed the preparation of analyses of an additional Project route along Lateral No. 2½ and a new alternative route along Lateral No. 2. As a result of public comment received at an April 29, 2010 workshop, the alternative along Lateral No. 2 was elevated to an equal level of consideration as the route along Lateral No. 2½ and the Grayson Road Route. This revised Draft EIR (hereinafter referred to as the "Revised Draft EIR") evaluates the environmental impacts associated with these two new 115-kV routes for the Project: the Lateral 2 Route and the Lateral 2½ Route.

As discussed in this Revised Draft EIR, both the Lateral 2 Route and the Lateral 2½ Route can be constructed to avoid any potentially significant unmitigated environmental impacts. These two additional routes would impact fewer residences than the Grayson Road Route analyzed in the 2009 Draft EIR. However, due to their more remote locations and the necessity of co-location with higher voltage (230-kV) transmission, these additional routes may have negative

impacts on the reliability of the energy provided and TID's ability to construct, operate, and maintain the line.

Also as a result of the April 29, 2010 public workshop, this Revised Draft EIR includes analysis of a design option that can be implemented with the Grayson Road Route, the Lateral 2 Route, or the Lateral 2½ Route. The Geer Road Alternative Segment would replace the 1.25-mile portion of the analyzed project alternatives that that would otherwise parallel East Whitmore Avenue and Eulclid Avenue at the eastern end of the Project. The Geer Road Alternative Segment would instead parallel Geer Road and East Service Road to the Santa Fe Avenue/East Service Road intersection. This segment would be roughly the same length as the equivalent portion (Whitmore Avenue/Euclid Road segment) of the alternative Project routes.

This Revised Draft EIR also includes an additional alternative location for the Grayson Substation. The Grayson Substation North has been identified on a parcel just south of Lateral No. 2, set back from nearby Crows Landing Road and Grayson Road. For clarity, the Grayson Substation as proposed in the 2009 Draft EIR has been re-named the "Grayson Substation South." All Project attributes discussed in the 2009 Draft EIR and this Revised Draft EIR are portrayed in Figure 1.1-1.

Potential impacts to the environment from the construction, operation, and maintenance of the Project have been carefully studied in accordance with local, state, and federal laws. TID is the lead agency for the preparation of the Revised Draft EIR, as required under the California Environmental Quality Act (CEQA). This Revised Draft EIR reevaluates the resources discussed in the 2009 Draft EIR, with updates to address differences in alternative project designs. Combined with relevant information from the original 2009 Draft EIR, this Revised Draft EIR identifies potential Project impacts and evaluates the feasibility of incorporating mitigation measures or adopting alternatives that reduce or avoid these impacts.

The basic objectives of the Hughson-Grayson 115-kV Transmission Line and Substation Project remain the same. As discussed in Chapter 3 of this Revised Draft EIR, these include: providing electric generating capacity for future load growth; increasing reliability on TID's transmission system; relieving load and congestion on the existing 69-kV transmission system; providing voltage support to the west Ceres area by tying in the existing 69-kV transmission network to

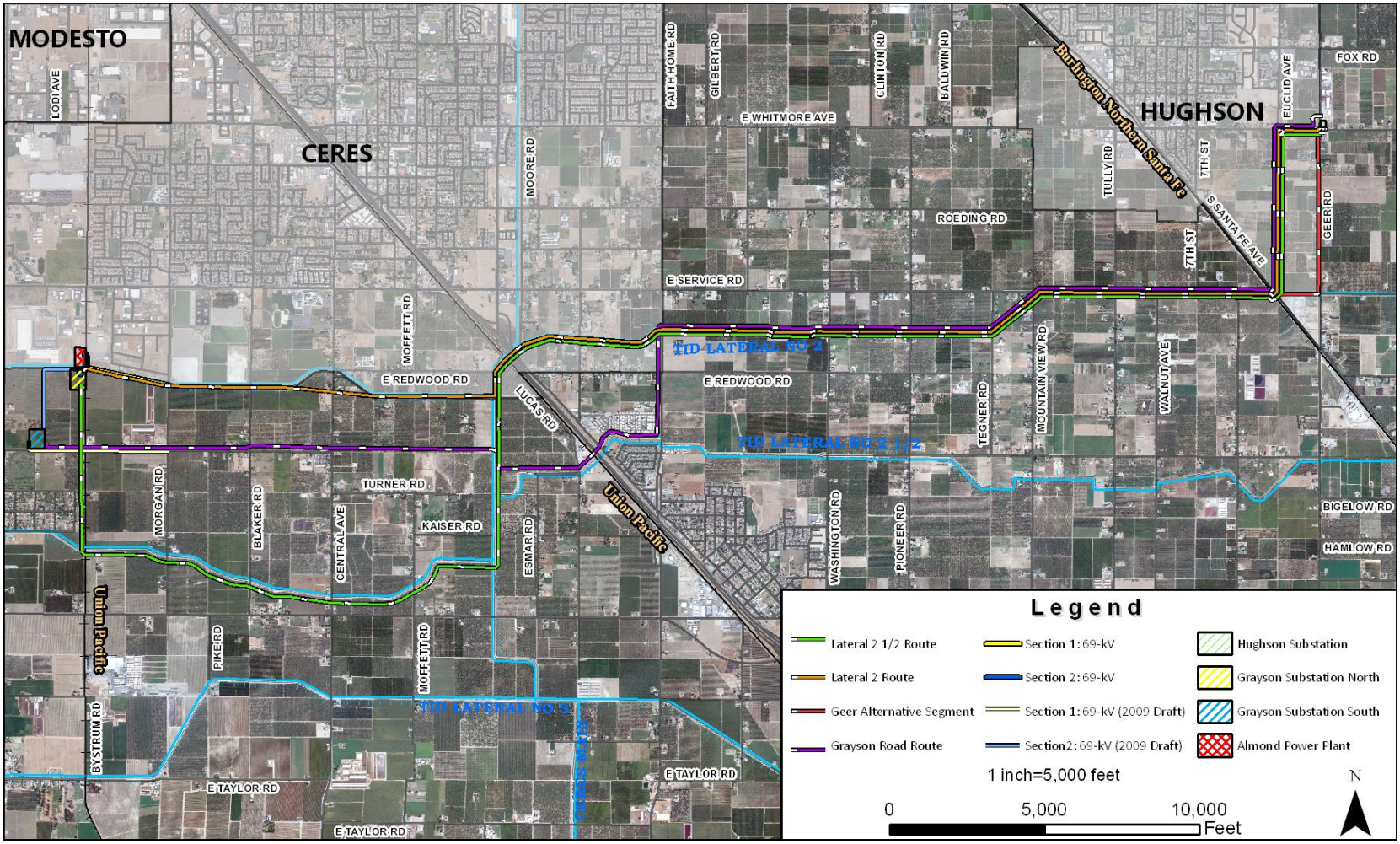

Figure 1.1-1
Overview of all Project Attributes

serve forecasted load growth in the Ceres area; and providing an additional dedicated transmission crossing of State Route (SR) 99.

1.2 PURPOSE OF THIS REVISED DRAFT EIR

This Revised Draft EIR was prepared in compliance with CEQA (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Section 15000 et seq.). An EIR is a full disclosure, public information document in which the significant environmental impacts of a project are evaluated, feasible measures to mitigate significant impacts are identified, and alternatives to the project that can reduce or avoid significant environmental effects are discussed. The purpose of an EIR is not to recommend either approval or denial of a project. CEQA requires decision-makers to balance the benefits of a project against its unavoidable environmental effects in deciding whether to carry out a project.

1.2.1 TYPE OF EIR

The Hughson-Grayson 115-kV Transmission Line and Substation Project EIR is a Project EIR, pursuant to State CEQA Guidelines Section 15161. A Project EIR is an informational document designed to provide a basis for the local planning and decision-making process. A Project EIR is the most common type of EIR. This type of EIR focuses on changes in the environment that would result from a specific development. In accordance with the State CEQA Guidelines, a Project EIR must examine all phases of the Project, including construction and operation.

1.2.2 LEAD AGENCY ROLES AND RESPONSIBILITIES

An EIR is an informational document used in the planning and decision-making process by the lead agency and responsible and trustee agencies. The lead agency is the public agency with primary responsibility over the Project. In accordance with State CEQA Guidelines Section 15051(b)(1), “the lead agency will normally be the agency with general governmental powers, such as a city or county, rather than an agency with a single or limited purpose.” TID is the lead agency for the Project. As such, the TID Board of Directors has the principal responsibility for approving and carrying out the Project and for ensuring that the requirements of CEQA have been met.

1.3 DRAFT EIR SCOPE AND METHODOLOGY

The issues evaluated in this Revised Draft EIR are those anticipated to result from construction and operation of the Project, as determined from comments received on the Notice of Preparation (NOP), Initial Study (IS), Draft EIR, and from public meetings for the 2009 Draft EIR and the Revised Draft EIR. The resource areas discussed in this Revised Draft EIR include the following:

- Land Use and Agriculture
- Visual Resources
- Biological Resources
- Hydrology and Water Quality
- Air Quality
- Greenhouse Gas Emissions
- Geology, Soils, and Mineral Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Noise
- Transportation
- Public Services and Utilities
- Socioeconomics

1.3.1 EFFECTS FOUND NOT TO BE SIGNIFICANT

Under the CEQA statutes and the State CEQA Guidelines, a lead agency may limit an EIR's discussion of environmental effects when they are not considered potentially significant (Public Resources Code Section 21002.1(e); State CEQA Guidelines sections 15128 and 15143). Information used to determine which impacts would be potentially significant was derived from: a review of applicable planning and CEQA documentation; field work; understanding of the Project; comments and feedback from ongoing public and agency consultation; and comments received on the NOP, IS, and 2009 Draft EIR, and at the public meetings for the 2009 Draft EIR

and this Revised Draft EIR. Based on this review, no resource areas have been eliminated from discussion in this document.

1.3.2 PUBLIC REVIEW PROCESS

PREVIOUS ENVIRONMENTAL DOCUMENTS

Consistent with the requirements of CEQA, a good faith effort has been made during preparation of the 2009 Draft EIR and the Revised Draft EIR to contact affected agencies, organizations, and individuals that may have an interest in the Project. This effort included submission of an NOP to the Governor's Office of Planning and Research on January 26, 2009, and subsequent reissuance on February 10, 2009. The NOP is a brief notice sent by the lead agency to notify responsible agencies, trustee agencies, and potentially affected federal, state, and local agencies that the lead agency plans to prepare a Draft EIR and solicits guidance regarding the scope and content of the Draft EIR.

An IS, which is a preliminary analysis conducted by the lead agency to determine whether it is necessary to prepare an EIR or if a Negative Declaration would be sufficient, was circulated in conjunction with the NOP. In accordance with CEQA Guidelines Section 15064(a), an EIR must be prepared if substantial evidence exists indicating that the Project may have a significant effect on the environment. The IS was utilized as a tool to communicate the Project concepts and likely key issues with interested members of the public, as well as trustee and responsible agencies, and to focus issue areas that could be potentially significant. The comments received on the NOP and IS are included in Appendix B of the 2009 Draft EIR.

The 2009 Draft EIR was published on August 10, 2009 and was released for a 45-day public comment period. Comments received on the 2009 Draft EIR and responses to these comments were published on November 5, 2009 and were presented to the TID Board on November 17, 2009.

PUBLIC SCOPING MEETINGS FOR THE 2009 DRAFT EIR

The process of determining the scope, focus, and content of an EIR is known as "scoping." Scoping helps to identify the range of actions, alternatives, environmental effects, methods of

assessment, and mitigation measures to be analyzed in depth. It eliminates from detailed study those issues that are not important to the current proposal. Formal scoping meetings are not required by CEQA; however, TID held a public scoping meeting on February 18, 2009, to provide an opportunity for agencies and the public to provide comments to aid in determining the scope and content of the Draft EIR. A public notice of the meeting was printed in the Modesto Bee on February 14 and 15, 2009. The public notice identified the Project; indicated the dates of the public scoping period; and advertised the date, time, and location of the public scoping meeting.

REVISED DRAFT EIR NOTICING

This Revised Draft is being recirculated pursuant to CEQA Guidelines Section 15088.5, which indicates that notice of recirculation is required as described in Section 15087 of the CEQA Guidelines and consultation is required as outlined in Section 15086 of the CEQA Guidelines. A second NOP is not required.

An informational meeting was held for the public on April 29, 2010 to explain the new Project routes being analyzed in this Revised Draft EIR. Notice of this meeting was published in the Modesto Bee and the Hughson Chronicle, and provided to property owners adjacent to the routes through a direct mailing. Public comments received at this meeting are briefly summarized in Chapter 2.

REVIEW OF THIS REVISED DRAFT EIR

This Revised Draft EIR is being circulated to federal, state, and local agencies, and to interested organizations and individuals that may wish to review and comment on the report. Because the Revised Draft EIR is revised only in part, and because TID, as the lead agency, is recirculating only revised sections or portions of the 2009 Draft EIR in this document, TID is obligated respond to: (i) comments received during the initial circulation period that relate to chapters or portions of the 2009 Draft EIR that were not revised or recirculated; and (ii) comments received during the 45-day recirculation period that relate to the chapters or portions of the 2009 Draft EIR that were revised and recirculated in this Revised Draft EIR. Individuals, agencies, and organizations that wish to comment on this Revised Draft EIR should limit their comments to

only this Revised Draft EIR and the analyses contained herein. Comments submitted on the previously circulated 2009 Draft EIR during the prior comment period have already been responded to in writing in the 2009 Draft EIR response to comments and need not be resubmitted in conjunction with this Revised Draft EIR. During the 45-day public review period, written comments may be directed to Mr. Greg Tucker, Electrical Engineering Department Manager, at the following address:

Turlock Irrigation District

Attention: Greg Tucker

P.O. Box 949
Turlock, CA 95381-0949
Business: (209) 883-8410
Facsimile: (209) 656-2148

Email: gktucker@tid.org

FINAL EIR AND CERTIFICATION

Written and oral comments received in response to this Revised Draft EIR will be addressed in a "response to comments" document. The Final EIR for the Hughson-Grayson 115-kV Transmission Line and Substation Project include the following:

- The 2009 Draft EIR
- Response to comments to the 2009 Draft EIR
- This Revised Draft EIR
- Response to comments to this Revised Draft EIR

TID's Board of Directors will then review the Project, the documents in the administrative record, and public comments to decide whether to certify the Final EIR is in compliance with the requirements of CEQA. If the Final EIR is certified, the Board will then determine whether to approve or deny the Project. Following Project approval, the TID Board will determine the transmission line route to construct from the three routes evaluated.

MITIGATION MONITORING PLAN

Section 15097 of the CEQA Guidelines requires lead agencies to adopt a reporting and mitigation monitoring program for the changes to the Project that it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. Throughout this Revised Draft EIR, mitigation measures have been clearly identified to facilitate establishment of a monitoring and reporting program. Mitigation measures adopted by TID as conditions for approval of the Project have been included in the Project Mitigation Monitoring Plan to document the conditions with which TID must comply. The Mitigation Monitoring Plan is included in Appendix C of the 2009 Draft EIR.

1.4 TERMINOLOGY USED IN THIS REVISED DRAFT EIR

To assist in the understanding of this report, the following descriptions, as found in CEQA (§21060), are provided:

- "Project" means the whole of the action associated with the Hughson-Grayson Transmission Line and Substation Project, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment directly or ultimately.
- "Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.
- "Environment" means the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The area involved shall be the area in which significant effects would occur either directly or indirectly as a result of the Project. The environment includes both natural and man-made conditions.

- "Effects" and "impacts" as used in this document are synonymous. Effects analyzed under CEQA must be related to a physical change. Effects include:
    - direct or primary effects that are caused by the Project and occur at the same time and place; and
    - indirect or secondary effects that are caused by the Project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.
- "Mitigation" includes:
    - avoiding the impact altogether by not taking a certain action or parts of an action;
    - minimizing impacts by limiting the degree or magnitude of the action and its implementation;
    - rectifying the impact by repairing, rehabilitating, or restoring the impacted environment;
    - reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
    - compensating for the impact by replacing or providing substitute resources or environments.
- "Cumulative impacts" refers to two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts:
    - The individual effects may be changes resulting from a single project or a number of separate projects.
    - The cumulative impact from several projects is the change in the environment that results from the incremental impact of the Project when added to other

closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

This Revised Draft EIR uses a variety of terms to describe the level of significance of adverse impacts identified during the course of the environmental analysis. These terms are defined below.

- A "less-than-significant impact" is an impact that is adverse but that does not exceed the standards of significance established in Appendix G of the CEQA Guidelines. Less-than-significant impacts do not require mitigation.
- A "potentially significant impact" is an impact for which there is not enough information to make a finding of less-than-significant impact; however, for the purpose of this Revised Draft EIR, the impact is considered significant. A potentially significant impact is equivalent to a significant impact and requires the identification of feasible mitigation measures or alternatives.
- A "significant impact" is an impact that exceeds the defined standards of significance and would or could cause a substantial adverse change in the environment. Mitigation measures are recommended to eliminate the impact or reduce it to a less-than-significant level.
- A "significant and unavoidable impact" is an impact that exceeds the defined standards of significance and that cannot be eliminated or reduced to a less-than-significant level through the implementation of mitigation measures.

1.5 ORGANIZATION OF THIS REVISED DRAFT EIR

This Revised Draft EIR is organized into chapters, as identified and briefly described below, which coincide with those contained within the 2009 Draft EIR.

CHAPTER 1, INTRODUCTION Chapter 1 describes the purpose and organization of the Revised Draft EIR, context, and terminology used in the Revised Draft EIR.

CHAPTER 2, EXECUTIVE SUMMARY This Chapter summarizes the Project Description, significant environmental impacts that would result from the Project, and mitigation measures proposed to reduce or eliminate those impacts.

CHAPTER 3, PROJECT DESCRIPTION Chapter 3 describes the Project location, Project characteristics, and Project objectives.

CHAPTER 4, ENVIRONMENTAL SETTING, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES For environmental issue areas, this Chapter describes the existing environmental setting, discusses the environmental impacts associated with the Project, and identifies mitigation for the impacts.

CHAPTER 5, ALTERNATIVES ANALYSIS This Chapter describes the alternatives to the Project that are being considered to mitigate the Project's potential environmental impacts while meeting most of the Project's objectives.

CHAPTER 6, CUMULATIVE AND GROWTH-INDUCING IMPACTS This Chapter evaluates the extent to which the Project would contribute to cumulative impacts in the region or induce economic or population growth in Stanislaus County.

CHAPTER 7, REPORT PREPARATION This Chapter identifies the Revised Draft EIR authors and consultants who provided analysis in support of the Revised Draft EIR's conclusions.

CHAPTER 8, REFERENCES This Chapter sets forth a comprehensive listing of all sources of information used in the preparation of the Revised Draft EIR.

APPENDICES Various technical reports, letters, and official publications that have been summarized or otherwise used in preparation of the Revised Draft EIR are provided as appendices to the document.

2.0 EXECUTIVE SUMMARY

This Executive Summary is provided in accordance with the California Environmental Quality Act (CEQA) Guidelines Section 15123. This chapter includes a brief synopsis of the proposed Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project), environmental impacts and mitigation, areas of known controversy, and issues to be resolved during environmental review, in accordance with CEQA Guidelines Section 15132(b). Table 2–1 (at the end of this section) presents a summary of potential environmental impacts, their level of significance without mitigation measures, recommended mitigation measures, and the levels of significance following the implementation of mitigation measures.

2.1 PROJECT ELEMENTS

The Project would expand Turlock Irrigation District's (TID's) ability to serve the growing community of Ceres and improve system reliability. The Project would include approximately 10 miles of new 115-kV electrical transmission line from TID's existing Hughson Substation in Hughson, California to the new Grayson Substation, which would be located on 10 acres north of East Grayson Road and south of the City of Ceres, California. Two 69 kilovolt (kV) transmission line sections would be installed to connect the Project to TID's existing infrastructure. A detailed description of Project components is presented in Chapter 3 of this document.

2.1.1 PROJECT OBJECTIVES

The Project has been designed to accommodate current and projected demand for power distribution in TID's service territory. TID meets this demand through 69 and 115-kV systems. Currently, the Ceres area is only served by the 69-kV system, which is near capacity due to increased electrical demand and lack of expansion.

Beyond increasing supply, the proposed improvements would promote the safety and reliability of the system. Sagging transmission lines often occur when a transmission system operates at or near capacity due to increased heat resulting from high amperage in the lines. The sagging impedes the ability to maintain electrical safety clearances (i.e. the required safe distance from

the line to ground or other conductors). Furthermore, a transmission system operating at or near capacity is more likely to experience local outages.

The Project would eliminate these constraints in several ways. First, the new 115-kV transmission line extending from the Hughson Substation to the Grayson Substation would enable the Ceres area to be served by TID's 115-kV transmission system, increasing system reliability and reducing the strain on the existing 69-kV transmission system. Second, the Section One 69-kV transmission line from Morgan Road to the Grayson Substation would provide a means of interconnecting the Grayson Substation to TID's existing Gilstrap-Westport 69-kV line (which extends from TID's Gilstrap Substation to its Westport Substation). This would result in additional reliability by providing another means of bringing electricity in and out of the area and would also provide voltage support to the west Ceres area to serve forecasted load growth. Third, the Section Two 69-kV transmission line from the existing Almond Power Plant to the Grayson Substation would provide another means of transmitting electricity generated by the existing TID Almond Power Plant to the Ceres Area and the TID transmission system. Finally, the Project would provide additional reliability through a dedicated crossing over State Route (SR) 99, allowing TID to move electricity east-to-west and west-to-east as system conditions dictate.

2.2 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to State CEQA Guidelines Section 15382, a significant effect on the environment is defined as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." Table 2-1 presents a summary of expected environmental impacts and recommended mitigation measures that would avoid or minimize these potential impacts associated with the Project. In the table, the level of significance of each environmental impact is indicated both before and after the implementation of the recommended mitigation measures. For detailed discussions of all expected impacts and mitigation measures, the reader is referred to the environmental analysis presented in Chapter 4 of this document.

2.2.1 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

Detailed mitigation measures have been identified throughout Chapter 4, and are summarized in Table 2-1. These measures are intended to mitigate Project effects to the extent feasible. After implementation of the proposed mitigation measures, all of the adverse effects associated with the Project would be reduced to a less-than-significant level.

2.2.2 PROJECT ALTERNATIVES

State CEQA Guidelines Section 15126.6 requires that all Environmental Impact Reports (EIR) include a comparative evaluation of the Project with alternatives to the Project that are capable of attaining most of the Project's basic objectives, but would avoid or substantially lessen any of the significant effects of the Project. CEQA requires an evaluation of a reasonable range of alternatives, including the "no project" alternative. The 2009 Draft EIR includes a discussion of several Project alternatives. In addition, this Revised Draft EIR provides a discussion of two new Project routes (the Lateral 2½ Route and the Lateral 2 Route), the Geer Road Alternative Segment, and an alternative substation location (the Grayson Substation North).

2.3 CUMULATIVE AND GROWTH INDUCING EFFECTS

Most of the potential impacts associated with the Hughson-Grayson 115-kV Transmission Line and Substation Project would occur during the construction period and would, therefore, be temporary impacts. As discussed in Chapter 6 of this EIR several projects are planned within 1 mile of the proposed transmission lines and substation. Impacts would, generally, occur only if construction of these projects is undertaken concurrently. Assuming these conditions, all effects have been determined to not result in cumulatively considerable impacts.

TID's purpose in implementing the Project is to provide increased reliability and capacity within its electrical network. While TID would provide service to new development approved by local agencies with jurisdiction over lands within TID's service area, TID does not designate the location or attributes of new developments. The Project would not induce population growth. Rather, it would accommodate growth planned in the service area.

2.4 AREAS OF CONTROVERSY, ISSUES RAISED, AND AREAS RESOLVED

Section 15123(b) of the State CEQA Guidelines requires the summary section of a Draft EIR to identify areas of controversy known to the lead agency, including issues raised by agencies and the public. Issues raised with regard to previous iterations of the Project are presented in Section 2.4 of the 2009 Draft EIR.

The following table provides a brief summary of additional issues raised by the public during a public workshop held Thursday, April 29, 2010.

Table 2-2 Comments Received during the April 29, 2010 Public Workshop

Commenter/Agency	Concern
Melanie McGill (Resident)	Routing along Euclid Avenue and potential traffic impacts associated with future projects
Joaquin Benitez (Resident)	Routing along Euclid Avenue
William McMeechan (Resident)	Routing the Lateral 2 Route away from Lateral No.2 near Central Avenue (following the existing 230-kV line). Specific concerns included safety, property value, and the inconveniences associated with construction
Jamie Brown (Resident)	Public health issues
Monty Brown (Resident)	Public health issues, property values, and project necessity
Tim Sylvestor (Resident)	Impacts on property aesthesis and value, as well as operation of an existing well and pipeline
Randy House (Resident)	Routing along Euclid Avenue
O.D. House (Resident)	Routing along Euclid Avenue, and limits to the expansion of Hughson
Gloria McGill (Resident)	Routing along Euclid Avenue and public health

2.4.1 AREAS OF KNOWN CONTROVERSY

The primary areas of controversy center on the initially proposed 115-kV alignment addressed in the 2009 Draft EIR, the Grayson Road Route. Opposition to this route was based on the proximity to residences in the area west of SR 99 and inconsistency with conceptual roadway improvements. In response, TID has expanded its environmental analysis to include routes that would follow its existing utility corridors along Lateral No. 2 and Lateral No. 2½, thereby avoiding many homes and consolidating the Project along existing infrastructure corridors.

2.5 APPROVAL PROCESS

In its review of the Project, the TID Board of Directors will consider the entire environmental evaluation contained in this Revised Draft EIR and response to comments, and the previously published 2009 Draft EIR and response to comments. Upon completion of the environmental review process, the TID Board of Directors will consider certifying the Final EIR and finding that it: (1) has been completed in compliance with CEQA; (2) was presented to the decision-making body of the Lead Agency (i.e., the TID Board of Directors) and was reviewed and considered by the decision-making body prior to approving the Project; and (3) reflects the Lead Agency's independent judgment and analysis (State CEQA Guidelines §15090). Once certified, the Board may select a route to approve as the Project.

2.5.1 OTHER REQUIRED APPROVALS

TID has the primary approval authority over the Project. However, a number of responsible agencies will also have discretionary authority. Approval of the Project would require, at a minimum, the following actions from responsible agencies:

- Issuance of a National Pollution Discharge Elimination System General Construction permit from the Central Valley Regional Water Quality Control Board;
- Verification of the Wetland Delineation and related permitting, if any is required, by the United States Army Corps of Engineers; and
- Encroachment permits from the California Department of Transportation (Caltrans), and Burlington Northern Santa Fe and Union Pacific Railroads.

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
4.1 Land Use and Agriculture			
Impact 4.1-1: Physically divide an established community.	Less than significant	**Mitigation 4.1-1**: No mitigation required	Less than significant
Impact 4.1-2: Conflict with any applicable land use plan, policy, or regulation.	Less than significant	**Mitigation 4.1-2**: No mitigation required	Less than significant
Impact 4.1-3: Conflict with an applicable habitat conservation plan or community conservation plan.	No impact	**Mitigation 4.1-3:** No mitigation required	No impact
Impact 4.1-4: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural uses.	Less than significant	**Mitigation 4.1-4**: As necessary, TID shall coordinate with landowners to determine pole placement that would result in minimal disruption to agricultural operations. TID shall obtain easements for private agricultural land that may be used along the route and compensate landowners for loss of crops, up to the provisions of law. Agricultural land used during construction shall be re-tilled to offset compaction caused by heavy material storage and construction activities, as requested by the landowner.	Less than significant
Impact 4.1-5: Conflict with existing zoning for agricultural use, or a Williamson Act contract.	Less than significant	**Mitigation 4.1-5**: No mitigation required	Less than significant
4.2 Visual Resources			
Impact 4.2-1: Damage scenic resources within a State scenic highway.	No impact	**Mitigation 4.2-1**: No mitigation required	No impact

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.2-2: Substantially affect a scenic vista.	No impact	**Mitigation 4.2-2**: No mitigation required	No impact
Impact 4.2-3: Substantially degrade the existing visual character or quality along the Project route.	Less than significant	**Mitigation 4.2-3**: No mitigation required	Less than significant
Impact 4.2-4: Substantially degrade the existing visual character or quality of the Grayson Substation site, or along the 69-kV transmission lines.	Less than significant	**Mitigation 4.2-4**: No mitigation required	Less than significant
Impact 4.2-5: Create new sources of light and glare affecting views in the area.	Less than significant	**Mitigation 4.2-5**: No mitigation required	Less than significant
4.3 Biological Resources			
Impact 4.3-1: Have a substantial adverse effect on sensitive or special-status species.	Potentially significant	**Mitigation 4.3-1**: Either (1) vegetation removal associated with the proposed construction activities on the property shall be conducted outside of the nesting-bird season, which extends from February 15 to August 31; or (2) a qualified biologist shall conduct a nesting bird survey to identify any potential nesting activity within five days of proposed construction activities. Should construction activities occur during the nesting season for Swainson's hawk (*Buteo swainsoni*) (March 1 through October 31), a survey should be conducted by a qualified biologist along the Project alignment, and within a 250-foot buffer. The surveys should follow the guidance of the *Recommended Timing and Methodology For Swainson's Hawk*	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		Nesting Surveys in California's Central Valley (SWTAC 2000). If an active nest is identified, a 0.5-mile buffer shall be established around the nesting location. Construction activities may commence within the buffer area at the discretion of, and in the presence of, the biological monitor, along with consultation and coordination the California Department of Fish and Game. If passerine birds are found to be nesting, or there is evidence of nesting behavior within 250 feet of the impact area, a 250-foot buffer shall be required around the nests. For raptor species, this buffer should be 500 feet. A qualified biologist should monitor the nests, and construction activities may commence within the buffer area at the discretion and presence of the biological monitor. Prior to ground disturbance activities, a qualified biologist shall conduct a pre-construction survey for burrowing owl (*Athene cunicularia*). If burrowing owls or their sign are determined to be present on the transmission line routes or the Grayson Substation site, mitigation measures for potential impacts to owls should follow the guidelines outlined by the Burrowing Owl Consortium (1993), including passive relocation. Finally, a qualified biologist shall conduct preconstruction surveys for San Joaquin kit fox (*Vulpes macrotis mutica*) in all portions of the project located within the published species' range (USFWS 1997). If occupied kit fox dens are found, California Department of Fish and Game shall be consulted to	

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		develop and implement take avoidance measures before construction in the vicinity commences. TID shall conduct regular tailgate meetings to educate workers about special-status species and the measures that must be undertaken to ensure their protection.	
Impact 4.3-2: Impact riparian habitat or wetlands.	No impact	**Mitigation 4.3-2:** No mitigation required	No impact
Impact 4.3-3: Interfere with wildlife migration or impede the use of wildlife nursery sites.	Potentially significant	**Mitigation 4.3-3**: TID shall implement its *Avian Protection Plan* (TID 2004). This plan includes best management practices (BMPs) for new construction to discourage bird use and to minimize electrocution hazards.	Less than significant
Impact 4.3-4: Conflict with an adopted habitat conservation plan.	No impact	**Mitigation 4.3-4**: No mitigation required	No impact
4.4 Hydrology and Water Quality			
Impact 4.4-1: Violate water quality standards or waste discharge requirements.	Potentially significant	**Mitigation 4.4-1**: TID shall prepare and submit the appropriate Notice of Intent, Stormwater Pollution Prevention Plan (SWPPP), and other engineering plans and specifications for pollution prevention and control. The SWPPP and other plans shall identify and specify the use of erosion sediment control BMPs, means of waste disposal, implementation of approved local plans, non-stormwater management controls, permanent post-construction BMPs, and inspection and maintenance responsibilities. The SWPPP shall also specify the hazardous materials that are likely to be used during construction and that could be present in stormwater drainage and non-stormwater discharges.	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		TID shall conduct quarterly, non-storm water visual inspections, during which TID will observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources. For storm-related inspections, TID shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. TID shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection that could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water. For each inspection required, TID shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format. TID shall ensure that all inspection, maintenance repair and sampling activities at the Project location are performed or supervised by a Qualified SWPPP Practitioner.	
Impact 4.4-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge.	Less than significant	**Mitigation 4.4-2**: No mitigation required	Less than significant
Impact 4.4-3: Alter stormwater runoff patterns in a manner that contributes to erosion, siltation, or flooding.	Less than significant	**Mitigation 4.4-3**: TID shall implement stormwater runoff BMPs, as specified in the SWPPP.	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.4-4: Increased runoff leading to localized or downstream flooding.	Less than significant	**Mitigation 4.4-4**: No mitigation required	Less than significant
Impact 4.4-5: Otherwise degrade water quality.	No impact	**Mitigation 4.4-5**: No mitigation required	No impact
Impact 4.4-6: Place houses within a 100-year floodplain.	No impact	**Mitigation 4.4-6**: No mitigation required	No impact
Impact 4.4-7: Place structures within a 100-year floodplain.	No impact	**Mitigation 4.4-7**: No mitigation required	No impact
Impact 4.4-8: Expose people or structures to risk of flooding.	No impact	**Mitigation 4.4-8**: No mitigation required	No impact
Impact 4.4-9: Result in inundation by seiche, tsunami, or mudflow.	No impact	**Mitigation 4.4-9**: No mitigation required	No impact
4.5 Air Quality			
Impact 4.5-1: Impact Project area air quality as a result of construction.	Potentially significant	**Mitigation 4.5-1**: All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut and fill, activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. When materials are transported off-site, all material shall be	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions;use of blower devices is expressly forbidden.) Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. These enhanced and additional measures shall be instituted when Project conditions warrant: • Limit traffic speeds on unpaved roads to 15 mile per hour. • Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent. • Suspend excavation and grading activity when winds exceed 20 miles per hour*. • Limit area subject to excavation, grading, and other construction activity at any one time.	

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.5-2: Impact Project area air quality as a result of operation.	Less than significant	**Mitigation 4.5-2**: No mitigation required	Less than significant
Impact 4.5-3: Create objectionable odors.	Less than significant	**Mitigation 4.5-3**: No mitigation required	Less than significant
4.6 Greenhouse Gas Emissions			
Impact 4.6-1: Generate greenhouse gas (GHG) emission that may have a significant impact on the environment.	Potentially significant	**Mitigation 4.6-1**: Circuit breakers shall be alarmed and continuously monitored to minimize release of sulfur hexafluoride, a GHG.	Less than significant
Impact 4.6-2: Conflict with the goal of reducing GHG.	Potentially significant	**Mitigation 4.6-2**: Implementation of Mitigation Measure 4.6-1.	Less than significant
4.7 Geology, Soils, and Mineral Resources			
Impact 4.7-1: Exposure to geologic hazard.	Less than significant	**Mitigation 4.7-1**: No mitigation required	Less than significant
Impact 4.7-2: Erosion resulting from grading.	Less than significant	**Mitigation 4.7-2**: TID shall develop a SWPPP that shall identify BMPs to minimize erosion during construction, including: sediment control measures, concrete waste management, and regular inspections.	Less than significant
Impact 4.7-3: Location on, or contribution to, unstable geologic conditions.	Less than significant	**Mitigation 4.7-3**: No mitigation required	Less than significant
Impact 4.7-4: Location on expansive soil.	Less than significant	**Mitigation 4.7-4**: No mitigation required	Less than significant
Impact 4.7-5: Location on soils incapable of adequately supporting the use of septic tanks.	No impact	**Mitigation 4.7-5**: No mitigation required	No impact

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.7-6: Loss of mineral resource availability.	No impact	**Mitigation 4.7-6**: No mitigation required	No impact
4.8 Cultural Resources			
Impact 4.8-1: Cause a substantial adverse change in the significance of a historical resource.	Less than significant	**Mitigation 4.8-1**: No mitigation required	Less than significant
Impact 4.8-2: Cause an adverse change in the significance of an archaeological resource.	Potentially significant	**Mitigation 4.8-2**: Inadvertent discovery measures shall be implemented during all construction activities. Measures will include: (1) a worker education course for all construction personnel; and (2) procedures for discovery of cultural and paleontological resources, including human remains, during construction or ground-disturbing activities.	Less than significant
Impact 4.8-3: Directly or indirectly destroy a unique paleontological resource or site.	Potentially significant	**Mitigation 4.8-3**: Under Mitigation Measure 4.8-2, a worker education course for all construction personnel will be conducted immediately prior to initiation of ground-disturbing activities for each project phase.	Less than significant
Impact 4.8-4: Disturb human remains, including those interred outside of formal cemeteries.	Potentially significant	**Mitigation 4.8-4**: Under Mitigation Measure 4.8-2, during the worker education course for all construction personnel each worker will learn the proper procedures to follow in the event cultural resources or human remains/burials are uncovered during construction activities, including work curtailment or redirection and to immediately contact their supervisor.	Less than significant
4.9 Hazards and Hazardous Materials			
Impact 4.9-1: Transport of hazardous materials and releases of hazardous substances.	Potentially significant	**Mitigation 4.9-1:** TID shall prepare and implement an effective SWPPP and an effective Spill Prevention, Control, and Countermeasures Plan that details the methods for working	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		with hazardous materials during construction. Prior to initiating Project construction, the construction contractor shall furnish training certification or be trained regarding the identification and handling of hazardous materials and spill containment and agency notification procedures.	
Impact 4.9-2: Exposure to health hazards.	Potentially significant	**Mitigation 4.9-2:** TID shall survey the selected substation site and transmission line route to ascertain if there is any observable evidence of a chemical release. Where Project facilities would traverse previously developed properties, the potential for chemical releases or other recognized environmental hazards may be ascertained through Phase I environmental assessment activities. Limited soil sampling and analysis will be conducted only if site assessment activities indicated the potential presence of herbicide and/or pesticide residues in areas proposed for disturbance. A Health and Safety Plan will be prepared for the construction process, consistent with general industry standards and the Occupational Safety and Health Administration, which will address any risks to construction personnel and public safety such that these health and safety risks would be mitigated to an acceptable level. At a minimum, the Health and Safety Plan will address appropriate personal protective equipment, monitoring to protect on-site workers, and the appropriate worker training.	Less than significant
Impact 4.9-3: Increase the risk of wildfires.	Potentially significant	**Mitigation Measure 4.9-3**: BMPs, including the use of spark arrestors, proper storage of flammable materials, and isolation of welding and cutting activities, shall be implemented.	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
		Facility designs shall conform to applicable regulations with respect to required safety features and setbacks between energized facilities and vegetation or other flammable materials. TID shall institute a program of regular inspection along the transmission line route to assure that plant growth subsequent to installation does not prevent conformance with applicable regulations as they apply to required setbacks from vegetation or other flammable materials.	
4.10 Noise			
Impact 4.10-1: Result in a substantial temporary noise impact that could affect adjacent residences.	Potentially significant	**Mitigation 4.10-1**: Construction shall be limited to the hours between 7 a.m. and 8 p.m. Monday through Friday, and 8 a.m. and 8 p.m. Saturday, Sunday, and legal holidays. Signs shall be posted at the construction site that include permitted construction days and hours, expected timeframe for construction, a day and evening contact number for the job site, and a TID contact number for complaints about construction noise. Construction equipment and haul trucks shall be properly maintained and operated (including adherence to speed limit requirements) and equipped with mufflers. Construction staging and parking areas shall be located away from existing residences.	Less than significant
Impact 4.10-2: Increase ambient noise levels in the Project area above existing levels.	Less than significant	**Mitigation 4.10-2**: No mitigation required	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
4.11 Transportation			
Impact 4.11-1: Impair ability to adapt transit systems.	Potentially significant	**Mitigation 4.11-1**: The location of proposed utility infrastructure shall be made available to the Stanislaus County Department of Public Works for review and comment prior to construction, and Hughson's *Street Master Plan* shall be considered when designing pole placement.	Less than significant
Impact 4.11-2: Increase local traffic volumes.	Potentially significant	**Mitigation 4.11-2:** Implement temporary traffic controls to minimize the potential for construction activities to result in traffic disruptions. Controls would follow Caltrans' most recent *Manual of Traffic Controls for Construction and Maintenance in Work Zones*, and road closures would be coordinated with the Stanislaus County inspector. Any traffic control plan to be implemented within Stanislaus County's right-of-way shall be submitted to Stanislaus County Public Works for approval.	Less than significant
Impact 4.11-3: Substantially increase traffic hazards.	Less than significant	**Mitigation 4.11-3**: TID shall consult with county officials in the field regarding the proper placement of poles at intersections on a case-by-case basis. Visibility strips shall be placed on the poles to reduce potential hazards to motorists.	Less than significant
Impact 4.11-4: Result in inadequate emergency access.	Less than significant	**Mitigation 4.11-4**: No mitigation required	Less than significant
Impact 4.11-5: Result in inadequate parking.	Less than significant	**Mitigation 4.11-5**: No mitigation required	Less than significant
Impact 4.11-6: Conflict with the operation of local railways or State Route 99.	Potentially significant	**Mitigation 4.11-6**: Appropriate Burlington Northern Santa Fe, Union Pacific Railroad, and Caltrans procedures shall be followed, including work notification and permit acquisition.	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.11-7: Conflict with adopted programs supporting alternative transportation.	Potentially significant	**Mitigation 4.11-7**: TID shall disclose routing and right-of-way information to identify impacts to future roadway and bikeway path upgrades.	Less than significant
4.12 Public Services and Utilities			
Impact 4.12-1: Result in substantial adverse physical impacts associated with the provisions of new or physically altered government facilities.	No impact	**Mitigation 4.12-1**: No mitigation required	No impact
Impact 4.12-2: Impact existing or proposed schools.	No impact	**Mitigation 4.12-2**: No mitigation required	No impact
Impact 4.12-3: Adversely affect existing utilities.	Potentially significant	**Mitigation 4.12-3**: TID shall coordinate with applicable utility providers to ensure that no damage is implemented on existing facilities. Underground Service Alert shall be notified at least two working days prior to any digging. TID shall provide 48 hours advance notice to customers along the transmission line of any temporary disruptions in service that may result from project construction.	Less than significant
Impact 4.12-4: Conflict with utility construction policies.	Less than significant	**Mitigation 4.12-4**: No mitigation required	Less than significant
Impact 4.12-5: Be served by a landfill with sufficient capacity to accommodate the Project's solid waste needs.	Less than significant	**Mitigation 4.12-5**: No mitigation required	Less than significant
Impact 4.12-6: Exceed wastewater treatment requirements or require construction of new facilities.	Less than significant	**Mitigation 4.12-6**: No mitigation required	Less than significant

Table 2-1 Significance Summary Table

Impact	Level of Significance Without Mitigation	Mitigation Measure	Level of Significance With Mitigation
Impact 4.12-7: Have insufficient water supplies.	Less than significant	**Mitigation 4.12-7**: No mitigation required	Less than significant
4.13 Socioeconomics			
Impact 4.13-1: Induce population growth or concentration.	No impact	**Mitigation 4.13-1:** No mitigation required.	No impact
Impact 4.13-2: Displace substantial numbers of existing people or residences.	No impact	**Mitigation 4.13-2**: No mitigation required.	No impact
Impact 4.13-3: Decrease property values.	Less than significant	**Mitigation 4.13-3**: No mitigation required.	No impact

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

The proposed Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project) would consist of a new 115 kilovolt (kV) transmission line, two 69-kV transmission line sections, the Grayson Substation, and related facilities. The 115-kV transmission line feature of the Project would be approximately 10 miles in length, and would span the distance between the cities of Hughson and Ceres in Stanislaus County, California (Figure 3.1-1).

The eastern terminus of the 115-kV transmission line route would be located at the existing Hughson Substation near the corner of East Whitmore Avenue and Geer Road, east of the City of Hughson. The western terminus of the 115-kV line would be at the proposed Grayson Substation, which would be located near the existing Almond Power Plant, between Lateral No. 2 and East Grayson Road, south of the City of Ceres. Where there are existing 230-kV transmission lines along the route, Project poles would be larger and accommodate co-location of both line types on a single structure. Similarly, existing distribution lines would be underbuilt on the 115-kV towers in many locations.

In 2009, the Turlock Irrigation District (TID) prepared a Draft Environmental Impact Report (hereinafter referred to as the "2009 Draft EIR") for the Grayson Road Route of the Project. The 2009 Draft EIR concluded that the Grayson Road Route would not result in any significant unmitigated environmental impacts. Following presentation of the 2009 Draft EIR to the TID Board of Directors on November 17, 2009, the Board directed the preparation of analyses of an additional Project route along Lateral No. 2½ and a new alternative route along Lateral No. 2. As a result of public comment received at an April 29, 2010 workshop, the alternative along Lateral No. 2 was elevated to an equal level of consideration as the route along Lateral No. 2½ and the Grayson Road Route. A description of these routes, the Lateral 2½ Route and the Lateral 2 Route, is provided in Section 3.5.

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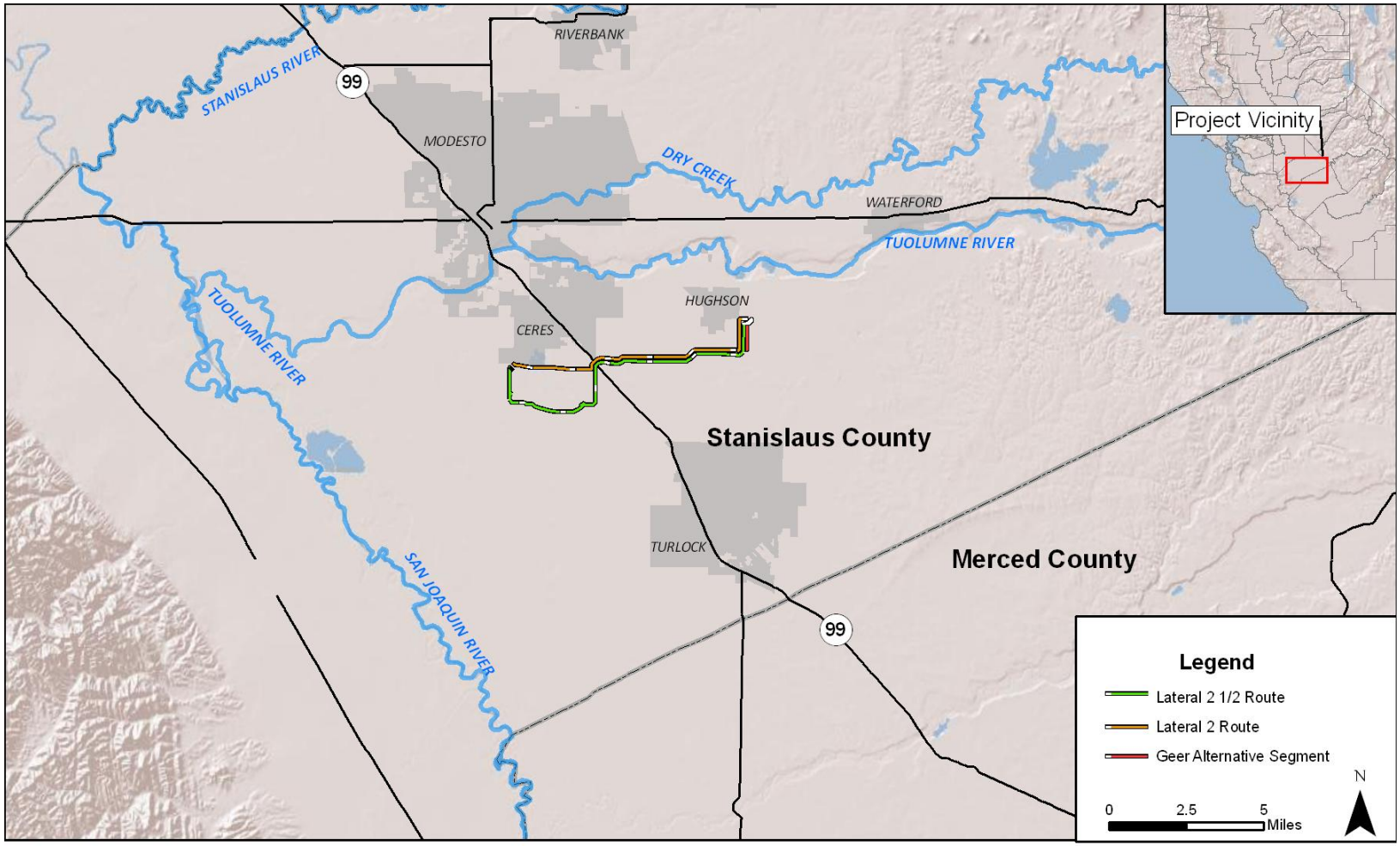


Figure 3.1-1
Project Vicinity Map

All of the potential Project routes analyzed in this Revised Draft EIR and the 2009 Draft EIR would parallel Euclid Avenue for approximately 1 mile near the Project's eastern terminus. Based on input received at an April 29, 2010 public workshop, this Revised Draft EIR also analyzes a Geer Road Alternative Segment that could be implemented with any of the three routes analyzed for the project. It would replace the portion of these routes that run along Euclid Avenue. The two Project routes analyzed in this Revised Draft EIR and the Geer Road Alternative Segment are shown in Figure 3.2-1.

Further, this Revised Draft EIR also includes an alternative location for the Grayson Substation. Specifically, the Grayson Substation North would be located south of Lateral No. 2 and west of the UPRR railroad tracks. For clarity, the Grayson Substation as described in the 2009 Draft EIR has been re-named the "Grayson Substation South," providing for two alternative substation locations. The Grayson Substation North is described in Section 3.6 below.

3.2 BASIC PROJECT OBJECTIVES

The objectives of the Project remain the same as those addressed in Section 3.2 of the 2009 EIR. TID has developed the Project to increase the reliability of the TID system and relieve congestion on TID's existing 69-kV transmission system. The specific objectives of the Project include:

- Capacity for future load growth;
- Increased reliability on TID's transmission system;
- Relieving load and congestions on the existing 69-kV transmission system;
- Providing voltage support to the west Ceres area by tying in the existing 69-kV transmission network to serve forecasted load growth in the Ceres area; and
- Providing an additional dedicated transmission crossing of State Route (SR) 99.

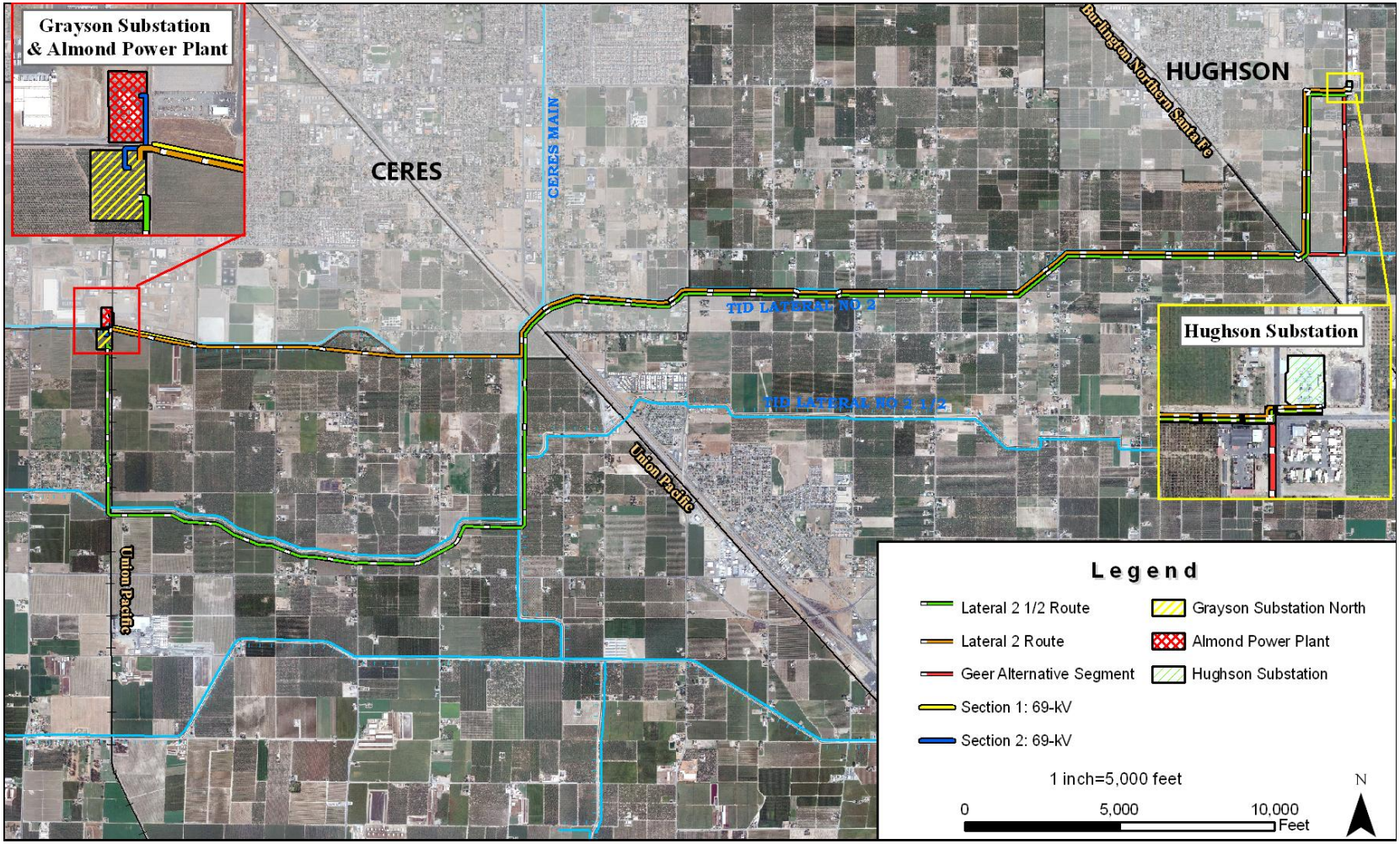


Figure 3.2-1
Project Overview Map

3.3 BACKGROUND

TID was organized under the Wright Act, and operates under the provisions of the California Water Code as a Special District. The Water Code authorizes TID to "provide for the acquisition, operation, leasing, and control of plans for the generation, transmission, distribution, sale, and lease of electric power." Section 22475 grants districts "the right to construct and operate in a manner affording security for life and property electric light and power lines along, over, or under any road."

TID's generation resources include large and small hydroelectric plants, wind generating plants, and three natural gas-fired turbine generating plants. As an irrigation district, TID has access to low cost hydroelectric power and does not produce a profit or pay stockholders. Irrigation districts, such as TID, are managed locally and are unaffected by many federal, state, and local policies.

3.3.1 TURLOCK IRRIGATION DISTRICT WATER AND POWER SERVICES

TID was the first irrigation district formed in the State of California. It was organized in 1887 and began delivering water from the Tuolumne River to farmers through a small irrigation system in 1900. Presently, TID has a 307-square-mile irrigation service area that lies east of the San Joaquin River, between the Tuolumne and Merced rivers, encompassing approximately 6,500 individual parcels. The TID irrigation system includes approximately 250 miles of canals and laterals owned by the district and more than 1,600 miles of ditches and pipelines owned by improvement districts and individual growers.

TID entered the retail electric industry with the construction of the original Don Pedro Dam and Powerhouse in 1923. Today, TID provides electricity to a 662 square mile service area that spans portions of Stanislaus and Merced counties. The 2007 Annual Report for the district indicates that TID served 98,423 accounts at year end.

3.3.2 TID POWER GENERATION SYSTEM

TID generates energy from hydroelectric (154 MW) and natural gas (340 MW) resources (NERC 2008). TID has a 139 megawatt entitlement to the Don Pedro powerhouse and a 250 MW natural gas fired power plant (The Walnut Energy Center). TID also owns smaller hydroelectric sources at La Grange and along its canal system, and additional natural gas-fired turbine generating plants. It also recently purchased a 137 megawatt wind project in Klickitat County, Washington. As a Balancing Authority responsible for the safe and reliable operation of the district-controlled grid, TID integrates resource plans ahead of time, maintains load-interchange-generation balance within its Balancing Authority Area, and supports interconnection frequency in real time.

3.3.3 TURLOCK IRRIGATION DISTRICT'S TRANSMISSION SYSTEM

TID has a 230-kV transmission system that ties into the high voltage California grid, a 115-kV transmission system that runs through the district and connects to other utilities north and south, and a 69- and 115-kV transmission system that distributes power to substations within the district.

The 230-kV intertie was built in 1974 as a joint project by TID and the Modesto Irrigation District (MID). The intertie connects the districts to the 230-kV lines that run north-south through the State of California at the Westley Switchyard. Here, the TID-MID 230-kV system can obtain power through the Western Area Power Administration Tracy Substation and the Pacific Gas and Electric Company 230-kV substations at Tesla and Los Baños.

TID's existing 115-kV transmission system interconnects TID's Oakdale Switching Station with the City and County of San Francisco's Hetch-Hetchy System. The 115-kV system also serves MID's Pioneer Substation south of the Merced River, thereby delivering power to the Merced System. The 115-kV system ties into TID's Westley and Walnut 230-kV Intertie Switching Stations. In total, TID's internal 115-kV system supports seven 115-kV distribution stations, while its 69-kV transmission system distributes power to 16 local distribution substations within the District. The 69-kV stations were TID's original power delivery system.

3.4 PROJECT LOCATION

The Project is located in Stanislaus County, within California's Central Valley (Figure 3.1-1). In general, the Project would be located south of the City of Modesto and north of the City of Turlock, between the cities of Hughson and Ceres (Figure 3.2-1). A small segment of the Section Two 69-kV transmission line on the north side of Lateral No. 2 would be located in the City of Ceres.

3.5 POTENTIAL PROJECT ROUTES

This Revised Draft EIR analyzes two alternative 115-kV transmission line routes to the Grayson Road Route discussed in the 2009 Draft EIR, as described below in sections 3.5.1 and 3.5.2. The Geer Road Alternative Segment is also considered as a potential modification to the Project along Euclid Avenue. The Section One and Section Two 69-kV transmission lines are also re-evaluated in this Revised Draft EIR due to adjustments in placement that would result from implementation of the Grayson Substation North.

3.5.1 LATERAL 2½ ROUTE: 115-KV TRANSMISSION LINE

The Lateral 2½ Route would be approximately 11 miles in total length. The route would begin at the Hughson Substation, connecting to an existing triple-deadend pole at the southeast corner of the substation. The line would exit the south side of the station and continue west across Geer Road to Euclid Avenue, crossing over an existing 69-kV transmission line located on the west side of Geer Road. Between the Hughson Substation and Euclid Avenue, there would be no 12-kV underbuild initially and the existing 12-kV on the north side of Whitmore would not be relocated. From a 90 degree deadend structure at the southeast corner of Euclid and East Whitmore avenues, the line would proceed approximately 1 mile south along the east side of Euclid Avenue. Along Euclid Avenue, the existing 12-kV distribution circuit would be collocated onto the project poles.

At the intersection of Santa Fe Avenue, Euclid Avenue, and East Service Road, the route would cross Santa Fe Railroad at a perpendicular angle and continue along the TID Lateral No. 2 right-

of-way. Along this length (approximately 3.8 miles), the existing 69-kV transmission and 12-kV distribution line would be co-located on poles with the Project's 115-kV transmission. Due to the amount of conductor on the new structures, all the poles placed along the lateral would be steel. The tangent steel poles would be directly embedded into the ground, while poles with angles, such as deadend or angle poles, would have a concrete foundation.

The route would continue west along the north side of Lateral No. 2, crossing perpendicular to SR 99. After crossing the highway, the transmission line would follow the east side of the Ceres Main canal south, crossing to the west side of the canal at Redwood Junction (where the Ceres Main canal meets Lateral No. 2). From Redwood Junction, the Project would extend south to Lateral No. 2½. At Redwood Junction, three existing 230-kV tubular poles would be replaced with two new 230-kV poles on the western edge on the canal. The northern replacement would remain a double-circuit 230-kV line feeding the MID system, while the southern replacement would be a double circuit 230-kV line with 115-kV underbuild.

Between Redwood Junction south to Lateral No. 2½ (1 mile), the Project would consist of 230/115-kV construction. Eight existing 230-kV towers would need to be replaced in this portion. At the intersection of the Ceres Main canal and Lateral No. 2½, the 115-kV transmission would turn west and continue 2.7 miles along the south side of Lateral No. 2½ to the Union Pacific Railroad (UPRR) tracks.

Upon reaching the railroad tracks, the line would turn 90 degrees north on the east side of the railroad. The line would proceed north on the east side of the track approximately 0.3 miles before crossing to the west side of the tracks at a 90 degree tangent. The line would follow two residential lots lines in this area. The line would continue north along the west side of the railroad to Grayson Substation North. The segment between Grayson Road and the substation may be underbuilt with 12-kV lines. The total length of transmission from Lateral No. 2½ to Grayson Substation North would be approximately 1 mile.

Figure 3.5-1 provides an overview of the structures along this route.

LATERAL 2½ ROUTE: PROPOSED TRANSMISSION POLES AND STRUCTURES

The Project would use wood or steel tangent poles, tubular steel angle structures, and tubular steel deadend structures. Along the majority of the project route, the 115-kV transmission structures would be approximately 70 feet in height, increasing to approximately 100 feet at the SR 99 crossing, and would be constructed of COR-TEN® weathering steel.

The Lateral 2½ Route would require an estimated total of 175 tangent poles (101 of which would be steel due to loading of lines where there would be a 69-kV underbuild) and 45 tubular steel angle poles, placed approximately every 250 feet. Of the 45 tubular steel angle poles, approximately three would be steel deadends.

Tangent poles are used for straight lines. An angle pole is used when the transmission line conductor changes direction in less than a 30 degree angle. Deadend structures are used when 90 degree turns are required along the route or when structures are required that can support full line tension from either direction. The steel angle structures would be bolted to concrete foundations typically 4.5 feet in diameter and 18 feet in depth. Tangent poles would typically be buried at 10 percent of their length plus 2 feet, and backfilled with 0.75-inch crushed rock. The tangent pole diameter would be roughly 26 inches. Therefore, a 30 inch hole would be augured to set the wooden poles.

The portion of the route between Redwood Junction and Lateral No. 2½ would support both 115-kV and 230-kV transmission lines. Approximately 10 tubular poles would be installed at an approximate interval of 900 feet. Poles supporting both 115-kV and 230-kV lines would be approximately 130 feet tall and bolted to concrete foundations ranging in size from 5 feet by 30 feet to 7 feet by 40 feet. The poles would be constructed of galvanized steel to appear congruent with the existing 230-kV transmission structures in the area.

In most cases along the route (except from the Hughson Substation to Euclid Avenue) existing 12-kV distribution would be relocated onto the Project's transmission poles to reduce aesthetic impact. Under these circumstances, the existing poles, transformers, cutouts, and other apparatuses would be relocated. Telephone lines may be relocated onto the Project's infrastructure as well, at the discretion of the local provider. Figure 3.5-2 illustrates typical pole designs.

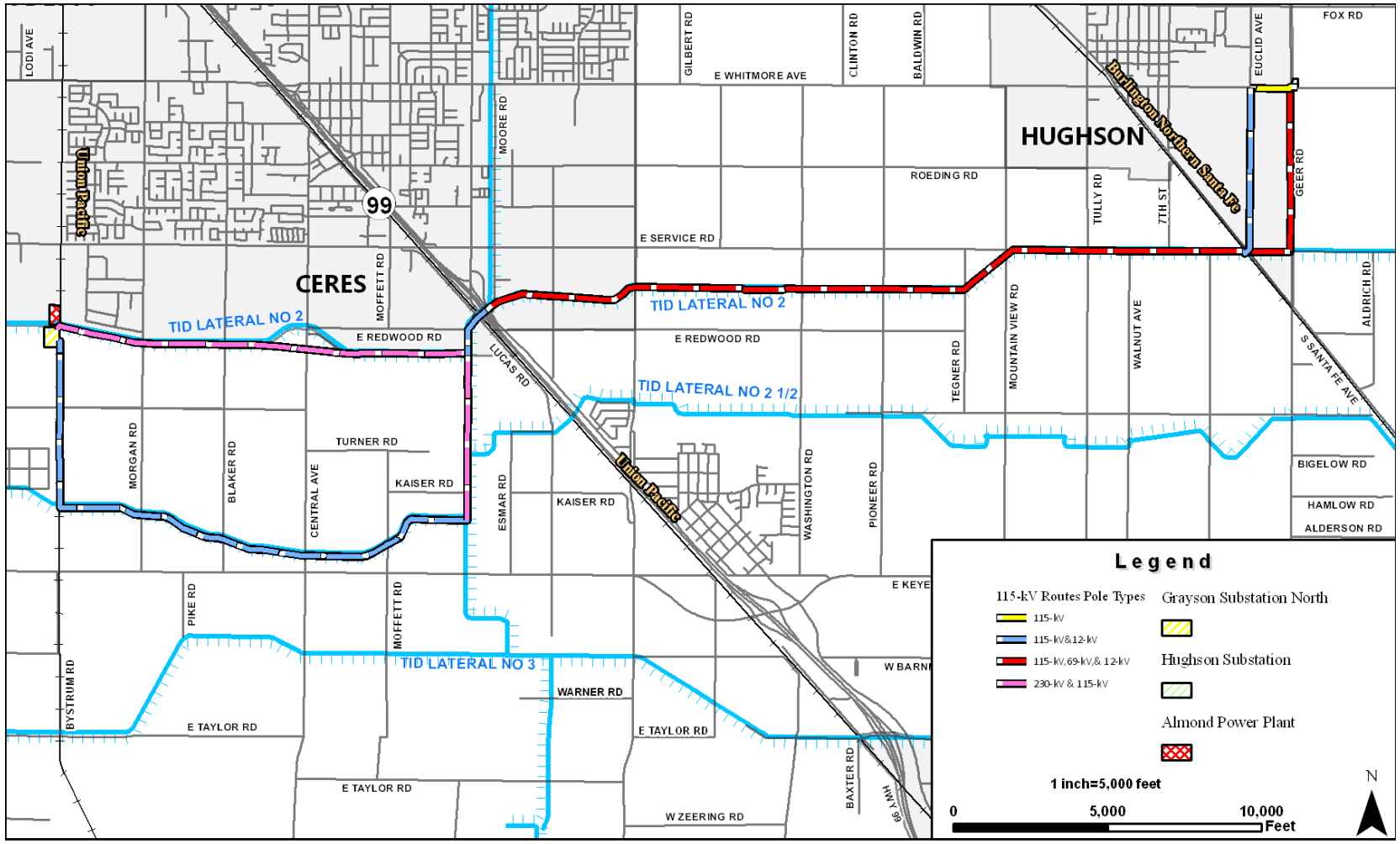
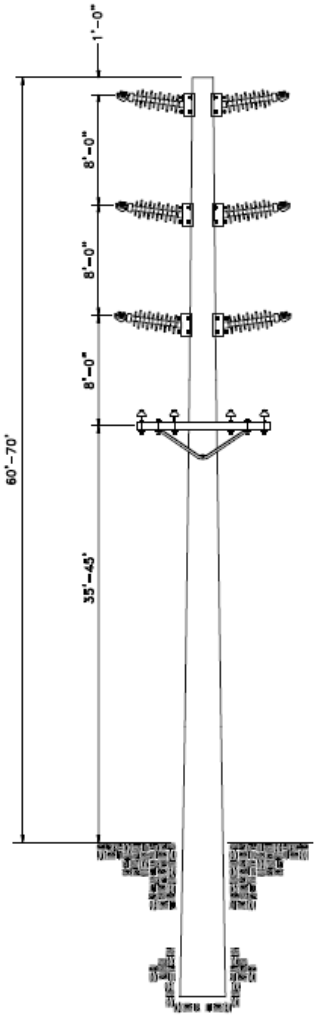
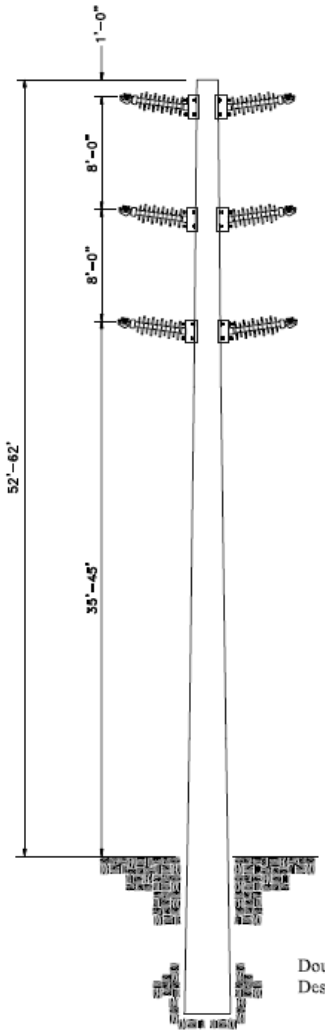


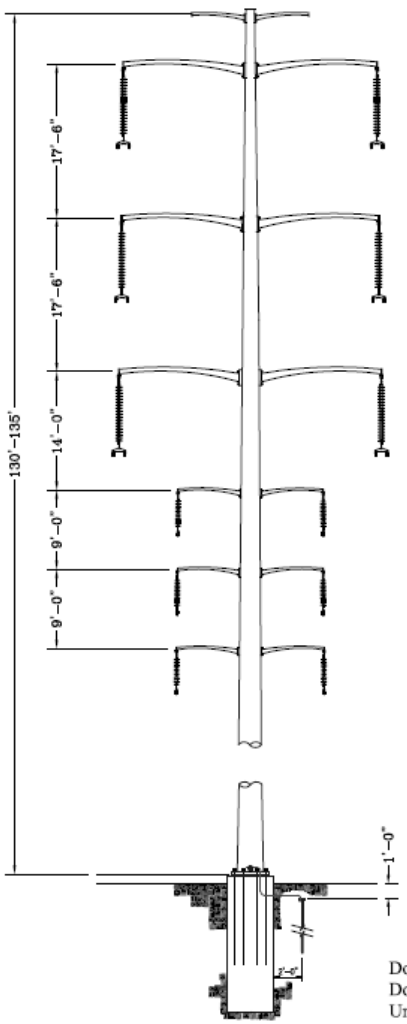
Figure 3.5-1
Types of Transmission along the Project Routes



Double-Circuit 115kV Pole Design with Underbuild



Double-Circuit 115/69kV Design without Underbuil



Double-Circuit 230kV with Double-Circuit 115kV Underbuild Pole Design

Figure 3.5-2

Conceptual Designs of Project Transmission Poles

The 230-kV transmission system would be a double circuit bundled 954AA conductor (two conductors per phase). The 115-kV transmission circuit would consist of 954AA magnolia aluminum conductor, while the 69-kV transmission circuits and 12-kV distribution circuits would be 636AA orchid aluminum conductor. All pole design, conductor spacing, and ground clearances would conform to California Public Utilities Commission General Order 95 and National Electric Safety Council requirements.

The 115-kV transmission line would be constructed within existing or acquired electrical easements (not within the road rights-of-way). Along county road rights-of-way, a 10 foot wide easement adjacent to, and contiguous with, the existing road right-of-way would be established. In open fields, through orchards, or along property lines not near a county road, a 30 foot wide easement would be acquired. Along the canals, TID would use its existing easement (prescriptive or fee title) or obtain a 20 foot wide electrical easement where a new easement is required. The 115/230-kV portion would require a 120 foot wide electrical easement, most of which would be situated on TID fee title land (Ceres Main canal). Where private easements are obtained, TID would consult with applicable landowners concerning pole placement. In these circumstances, landowners would be compensated for the use of their property by TID. Compensation would be commensurate with the provisions of the law.

3.5.2 LATERAL 2 ROUTE: 115-KV TRANSMISSION LINE

The Lateral 2 Route would be the same as the Lateral 2½ Route, discussed above, from the Hughson Substation to the SR 99 crossing. From the SR 99 crossing, the Lateral 2 Route would parallel Mitchell Road for approximately 0.25-mile to Redwood Junction. At Redwood Junction, three existing 230-kV tubular poles would be replaced with two new 230-kV poles on the western edge on the canal. The northern replacement would remain a double-circuit 230-kV line feeding the MID system, while the southern replacement would be a double circuit 230-kV line with 115-kV underbuild. From this southern pole, the line would turn west along Lateral No. 2, replacing 22 existing 230-kV poles with taller structures supporting collocated double circuit 230-kV and double circuit 115-kV transmission.

The transmission line would parallel the north side of Lateral No. 2 from the Ceres Main canal to 0.25-mile east of Central Avenue, where the lateral bends north. Here, the transmission line would follow the path of existing transmission infrastructure and travel due west, bisecting six parcels before rejoining Lateral No. 2. The proposed Lateral 2 Route would then parallel the southern edge of Lateral No. 2 for approximately 1.25 miles to the proposed Grayson Substation North. In total, the Lateral 2 Route would be approximately 9 miles in length.

LATERAL 2 ROUTE: PROPOSED TRANSMISSION POLES AND STRUCTURES

The Lateral 2 Route would use the same basic structures discussed above for the Lateral 2½ Route. Figure 3.5-1 shows the types of transmission along this route, while Figure 3.5-2 illustrates the typical pole designs.

The Lateral 2 Route would require an estimated total of 175 tangent poles (101 of which would be steel due to loading of lines where there would be a 69-kV underbuild) and 45 tubular steel angle poles, placed approximately every 250 feet. Of the 45 tubular steel angle poles, approximately three would be steel deadends.

The portion of the route between Redwood Junction and the Grayson Substation North would support both 115-kV and 230-kV transmission lines. Approximately 22 tubular poles would be installed at an approximate interval of 900 feet. Poles supporting both 115-kV and 230-kV lines would be approximately 130 feet tall and bolted to concrete foundations ranging in size from 5 feet by 30 feet to 7 feet by 40 feet. Along this portion of the Lateral 2 Route, the transmission infrastructure would be located within an existing TID easement.

3.5.3 GEER ROAD ALTERNATIVE SEGMENT

The Grayson Road, Lateral 2½ and Lateral 2 routes could potentially follow Geer Road rather than Euclid Avenue upon exiting the Hughson Substation. Under this option, the 115-kV transmission line would exit the Hughson Substation from an existing pole at the southeast corner of the substation and continue west across Geer Road. Transmission would then proceed south, down the west side of Geer Road.

New poles approximately 100 feet in height would be constructed at an estimated ruling span of 270 feet, replacing all existing transmission infrastructure on the west side of Geer Road. The top of the pole would support double circuit 115-kV, with single-circuit 69-kV and double circuit 12-kV below. Figure 3.5-2 illustrates this transmission pole design. These structures would be located in a 10 foot easement adjacent and contiguous to Geer Road's right-of-way.

Upon reaching Service Road, the transmission route would head west. The existing wooden transmission poles along the northern side of Lateral No. 2 would be removed and replaced with steel poles to accommodate the proposed double circuit 115-kV line on top, with the existing 12-kV distribution line strung below. This portion on the alignment would be within TID's fee title canal land.

3.5.4 69-kV Transmission Sections

In addition to the new 115-kV transmission line, the Project would also include the construction of two 69-kV transmission line sections that would both terminate at the Grayson Substation North, located immediately south of TID's existing Almond Power Plant and Lateral No. 2. The Section One 69-kV transmission line would be located along Lateral No. 2 between the substation and Morgan Road, and the second 69-kV transmission line section (Section Two) would connect the Grayson Substation North to TID's existing Almond Power Plant. The Section One 69-kV may be underbuilt with a 12-kV line. A new bus expansion and circuit breaker would be installed at the power plant to accommodate the transmission line.

In order to provide for enhanced reliability, a new 69-kV double circuit transmission line (Section One) would extend along the north side of Lateral No. 2, from the new Grayson Substation North to Morgan Road. An existing 69-kV transmission line runs north-south on the east side of Morgan Road. The Project would set a steel tubular deadend under the existing line at the northeast corner of the Morgan/Lateral No. 2 intersection.

Similarly, to enhance reliability and to serve the Ceres load, a single-circuit 69-kV transmission line (Section Two) would extend approximately 1,000 feet north from the east side of the Grayson Substation North and would serve to connect the Project to the existing Almond Power Plant. From the proposed substation, the line would pass beneath the existing 230-kV line

running parallel to Lateral 2 and would cross the UPRR tracks. The line would continue north to the existing 69-kV switchyard at the Almond Power Plant, crossing the tracks once more. Two existing 100 foot tall 230-kV tubular towers immediately south of the existing Almond Power Plant would be replaced with 130 foot towers to accommodate the transmission crossings under the existing 230-kV. No conductor attachment (other than 230-kV) would be placed on these taller towers.

3.6 PROPOSED GRAYSON SUBSTATION NORTH

The Grayson Substation North would be located on a 10 acre site in unincorporated Stanislaus County on assessor's parcel number 041-007-005, at the Project's western terminus. The substation would be located immediately south of TID Lateral No. 2 and west of the UPRR tracks on a site that is currently cultivated almond orchard. The Grayson Substation North dimensions would be approximately 500 feet by 640 feet, the same footprint as the Grayson Substation South described in the 2009 Draft EIR.

Access to Grayson Substation North for construction and operation would be along the existing paved access road to the Almond Power Plant, along the north side of Lateral No. 2 from Crows Landing Road. A box culvert bridge would be installed across Lateral No. 2 to provide vehicular access to the substation site. The bridge would be approximately 20 feet wide, and would be located toward the western end of the Grayson Substation North, roughly 625 feet west of the existing railroad crossing of Lateral No. 2. The bridge would be engineered to support the weight of vehicles and substation equipment, while providing unimpeded flow of irrigation water.

The facilities at the Grayson Substation North would consist of two 25 megavolt amperes 115/12-kV transformers. Each transformer would contain approximately 5,000 gallons of cooling oil. The substation would also have one 167 megavolt amperes 69/115-kV transformer, which would contain approximately 20,000 gallons of cooling oil. All transformer oil would be mineral oil that is free from polychlorinated biphenyl compounds. Secondary containment would be provided around the transformers. In addition to the power transformers, the Grayson Substation North would have smaller station service transformers, containing approximately 15 gallons of cooling oil.

The Grayson Substation North would also be equipped with eleven 115-kV circuit breakers, four 69-kV circuit breakers, and eleven 12-kV circuit breakers. The 115-kV and 69-kV circuit breakers would be insulated with approximately 60 pounds of sulfur hexafluoride (SF_6). Gas pressure would be continuously monitored (via alarms for pressure change) to minimize accidental release of SF_6. The 12-kV circuit breakers would be operated under vacuum and would be SF_6 free. Figure 3.6-1 is a site plan of the Grayson Substation North. These are the same facilities as described for the Grayson Substation South in the 2009 EIR.

The Grayson Substation North would also be equipped with two control buildings, one with a restroom for maintenance workers who would be on-site approximately once a month. A one-horsepower (hp), single phase groundwater well would be constructed to provide water for domestic purposes. A small septic tank would also be installed. TID would have a geotechnical report prepared for the Grayson Substation North site. All substation foundations and equipment supports would be designed to meet the seismic requirements of California Code of Regulations Title 24 and the 2007 California Building Code in accordance with the requirements of the International Building Code.

The substation would have a 7 foot high chain link fence around the perimeter. The fence would have vinyl slats to screen views of the equipment. Barbed wire or razor wire would be installed along the top of the fence to preclude unauthorized access to the substation.

Security lighting would be installed at the substation. The lights would be shielded and directed downward to prevent offsite light scatter to the extent possible. The substation would be lined with gravel and either a French drain or stormwater detention pond would be installed to contain stormwater runoff within the substation boundaries.

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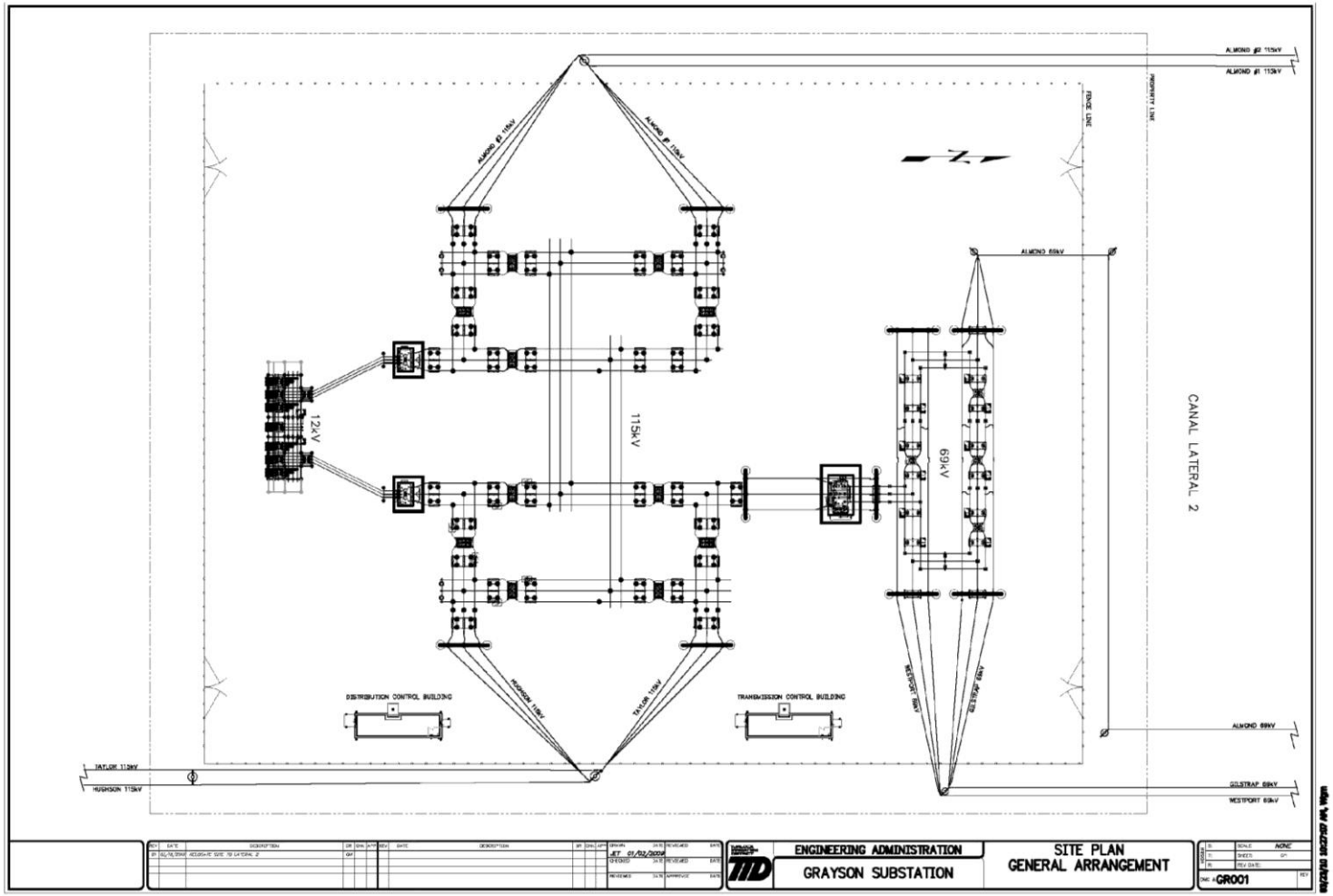

Figure 3.6-1
Preliminary Design of the Grayson Substation North

3.7 ALMOND POWER PLANT

The Almond Power Plant began operation in 1995. The power plant is run on natural gas and capable of generating approximately 48 MW. To accommodate the Section Two 69-kV transmission line, a new bus expansion and circuit breaker would be added to the existing Almond Power Plant switchyard. The Section Two 69-kV line would connect the Grayson Substation North to the Almond Power Plant via the new circuit breaker in the switchyard.

3.8 PROPOSED CONSTRUCTION ACTIVITIES

3.8.1 TRANSMISSION LINES

Construction of the 115-kV and two 69-kV transmission line segments would likely include such activities as: drilling, concrete and crushed rock placement, framing structures, setting structures, stringing, and clipping. Construction crews would deliver transmission poles and other equipment from the staging area to individual pole locations when needed. In most locations, the poles could be placed on the side of a public road, canal, and agricultural roads.

Equipment utilized in the process of constructing the transmission lines would likely include the following: a 240 hp Sterling Boom Truck, a 240 hp Watson 3000 drill, a 240 hp auger truck, a 240 hp aerial line truck, a 79 hp tractor/loader/backhoe, a 250 hp reel truck, a 9.5 yard concrete truck, a one ton service truck, and a 65 ton crane. Pole construction typically requires temporary closure of one lane of traffic where placement is adjacent to the right-of-way of public roads. An area of approximately 50 feet by 20 feet may be temporarily disturbed at each pole site adjacent to public right-of-way. Where poles would be located away from existing roadways and canals; the temporary disturbance area is estimated at 100 feet by 30 feet. During conductor stringing operations, a payout/pulling/tension station will require a temporary disturbance area of approximately 150 feet by 30 feet. There would be approximately 11 of these stringing stations necessary during construction, spaced approximately 1 mile apart along the line.

An approximately 3-acre staging area would be required during construction. The specific location has not yet been determined. However, it would be on a site which has been previously disturbed.

LATERAL 2½ ROUTE TRANSMISSION LINE CONSTRUCTION

The Lateral 2½ Route would require winter construction. The existing 230-kV line can only be taken out of service between October 1 and May 1. Construction timing and proposed outages of the existing 230-kV line would have to be coordinated with MID.

Along the north side of East Service Road, temporary 12-kV electrical distribution lines would be established to provide service to customers during construction. Tree removal may also be required to permit site access. The Lateral 2½ Route would require many light angle and deadend structures due to the irregularity of Lateral No. 2½ (which the route would parallel) and the necessity of avoiding wells along Lateral No. 2½, thus increasing the difficulty of construction. Easements would be necessary for construction of the Lateral 2½ Route along Lateral No. 2½. Tree removal may also be required to permit site access.

LATERAL 2 ROUTE TRANSMISSION LINE CONSTRUCTION

The majority of this route would be along TID canals. West of SR 99, some locations of the double circuit 230-kV with double circuit 115-kV underbuild would require access roads for construction. Where the existing land use is not compatible with a permanent access road, temporary access roads would be established and the original land use would be restored following construction.

The Lateral 2 Route would also require winter construction and coordination with MID. Temporary 12-kV electrical distribution line would be established along the north side of East Service Road to provide service to customers during construction.

GEER ROAD ALTERNATIVE SEGMENT

The Geer Road Alternative Segment would require minimal vegetation and tree timing or removal, and no additional access roads would be required. Construction would occur in the winter, as the existing 69-kV line has system loads low enough between October 1 and May 1 to

be taken out of service. Due to Geer Road's high traffic volume, partial road closures may be required for worker safety. A temporary 12-kV distribution line would be required on the east side of Geer Road to provide electricity during new pole construction.

3.8.2 GRAYSON SUBSTATION NORTH

Construction of the Grayson Substation would consist of grading and site preparation, excavation and concrete pouring, equipment delivery and installation, and wiring and testing. The substation site is large enough to provide laydown area for substation construction materials and equipment. Stormwater control best management practices such as berms, silt fence, or fiber rolls would be installed around the perimeter of the substation site to control stormwater runoff. Construction of the Grayson Substation North would require use of the following, or similar, equipment: a 174 hp grader, a 79 hp tractor/loader/backhoe, a 114 hp roller, a 9.5 yard concrete truck, a Condor manlift, a one tone service truck, a 190 hp 70 ton crane, and a Ditch Witch trencher. Equipment and materials for substation construction would be delivered and stored in a designated area. Hazardous materials such as paints, epoxies, grease, and compounds would be stored in lockers or covered containers within these areas. Transformer oil and caustic electrolyte (battery fluid) would be delivered after the electrical equipment is in place. A crew of approximately 16 workers would be required to construct the substation.

3.9 PROPOSED PROJECT SCHEDULE

3.9.1 CONSTRUCTION ACTIVITIES

Construction is estimated to last approximately one year and would consist of the activities described below. The alternative 115-kV routes would require essentially the same construction time frames. Construction of the transmission lines and substation would occur simultaneously. An approximate construction schedule is presented in Table 3.1.

Table 3-1 Assumed Construction Schedule

Activity	Duration (Total Number of days)
Construct New Transmission Line	
Pour Foundations for Angle	37
Spot Structures	35
Frame Structures	51
Set Structures	58
String Conductor	58
Clip Conductor	52
Energize	0
Total Duration	**214**
Construct New Grayson Substation	
Land Preparation	25
Site Fencing	23
Conduit Installation	28
Concrete Pour	26
Structure Erection	60
Equipment Erection	60
Electrical	60
Testing	27
Total Duration	**250**

3.10 PROPOSED OPERATION AND MAINTENANCE

Once energized, the Project's facilities would be in virtually continuous operation. Operation of electrical transmission systems is essentially inert and automatic, requiring only periodic inspection to maintain reliable operation. Note, however, that the co-location of four transmission circuits, as proposed for the Lateral 2½ and Lateral 2 routes, is inherently less reliable than utilizing separate transmission corridors due to the interdependence of these transmission lines on the integrity of the shared pole structures.

Maintenance to the Project's infrastructure would be performed as deemed necessary through annual or bi-annual inspections or in response to acute events. Equipment damaged would be replaced. Trees and other vegetation would be trimmed to prevent interference with the conductors. Emergency maintenance, such as repairing downed wires during storms and correcting unexpected outages, would be also performed.

During normal operation, transmission lines require very little maintenance. When maintenance is required, the structures supporting double circuit 230-kV with double circuit 115-kV underbuild proposed in the Lateral 2½ and Lateral 2 routes would be challenging for TID to maintain. The poles would be designed with climbing provisions, as TID does not have the appropriate equipment to work on these structures, and thus more line crew hours would be required to complete maintenance activities than on other Project poles.

Substations are also low maintenance facilities and require only routine inspection and occasional washing to prevent build-up of dust. After an extended period of operation, the transformer oil would be filtered. The impurities in the filtrate would be removed and either recycled or disposed in accordance with federal and state requirements. The structures proposed under the Project are anticipated to have a lifetime of approximately 40 to 50 years.

4.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

4.1 LAND USE AND AGRICULTURE

This section addresses the land use and agricultural conditions along the Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project), analyzing the potential for impacts and describing, where necessary, mitigation measures. The Project's consistency with applicable land use and zoning designations, and related policies and code requirements is discussed.

4.1.1 EXISTING CONDITIONS

The affected regional and local environments are consistent with the conditions described in the 2009 Draft EIR. Project routes would be located in unincorporated Stanislaus County, beginning at the Hughson Substation in the City of Hughson's sphere of influence and ending at a proposed substation within the City of Ceres' planning boundary. The Section Two 69 kilovolt (kV) transmission lines would connect to the Almond Power Plant in the City of Ceres. A brief description of the conditions along the proposed transmission line routes and at the substation site follows.

LATERAL 2½ ROUTE

The Lateral 2½ Route traverses an area primarily used for agriculture and rural residences, supporting a varying degree of homes, orchards, and row crops. The intersection of Geer Road and East Whitmore Avenue, where the Hughson Substation is located, is characterized by small businesses and residences. From the Hughson Substation, along East Whitmore Avenue and Euclid Avenue to Santa Fe Avenue, there is a preponderance of orchards and row crops and residences located near the roadway on most parcels. Along Lateral No. 2, from the Santa Fe Avenue/East Service Road/Euclid Road intersection to the State Route (SR) 99 crossing, adjacent land use is more heavily orchards, with some plots used for row crops. Many of these parcels have residences located near the canal.

West of the SR 99 crossing, the Ceres Main canal is characterized by fewer residences and increased agricultural use (primarily orchard). Along Lateral No. 2½, between the Ceres Main

canal and the Union Pacific Railroad (UPRR) tracks, adjacent land use is a mix of farmed parcels, approximately half of which support homes near the canal. Adjacent to the UPRR tracks, between Lateral No. 2½ and Lateral No. 2, most of the area continues to be in agricultural production. A residential development is located west of the UPRR tracks near their intersection with Lateral No. 2½. At the Grayson Road crossing, there is an additional residence and a light industrial facility.

LATERAL 2 ROUTE

The Lateral 2 Route of the 115-kV transmission line would be the same as the Lateral 2½ Route, discussed above, from the Hughson Substation to Gondring Road, just west of the SR 99 crossing. As such, the conditions described above for this portion of the Lateral 2½ Route apply.

From the Gondring Road/Ceres Main canal intersection to the Grayson Substation North, land use is primarily rural agriculture, with residences associated with Gondring Road, Redwood Road, and Central Avenue. Near the western end of the alignment (between Morgan and Blaker roads) the City of Ceres Water Reclamation Facility is located north of Lateral No. 2. West of the reclamation facility, the area north of the canal is in light commercial/industrial use.

GEER ROAD ALTERNATIVE SEGMENT

Land use along Geer Road is very similar to land use along Euclid Avenue. Residences are located near the two lane road and are surrounded by land in agricultural production. There are two small commercial operations and a mobile home park located near the intersection of Geer Road and East Whitmore Avenue.

GRAYSON SUBSTATION NORTH

An almond orchard is located on the Grayson Substation North property. Land use to the north is industrial and includes a WinCo Foods distribution center, the Almond Power Plant, and several other commercial uses. Land use to the south, east, and west is agricultural.

4.1.2 REGULATORY SETTING

The regulatory setting is consistent with the conditions described in the 2009 Draft EIR. The area is zoned exclusive agriculture, see Figure 4.1-1. Parcels adjacent to the proposed Project routes under Williamson Act contract are depicted in Figure 4.1-2.

4.1.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

Land use impacts are evaluated in this section by determining if the Project is in compliance with the goals, policies, and land use designations set forth by the State of California, Stanislaus County, and the City of Ceres. This discussion evaluates the anticipated project-related impacts on existing and proposed land uses, including those lands currently in agricultural production or under Williamson Act contract.

THRESHOLDS OF SIGNIFICANCE

The following thresholds have been developed as significance criteria for evaluation of the Project's potential impacts. They are derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Impacts could be considered significant if the Project would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to, a general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect;
- Conflict with any applicable habitat conservation plan (HCP) or natural community conservation plan (NCCP);
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use or involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses; or

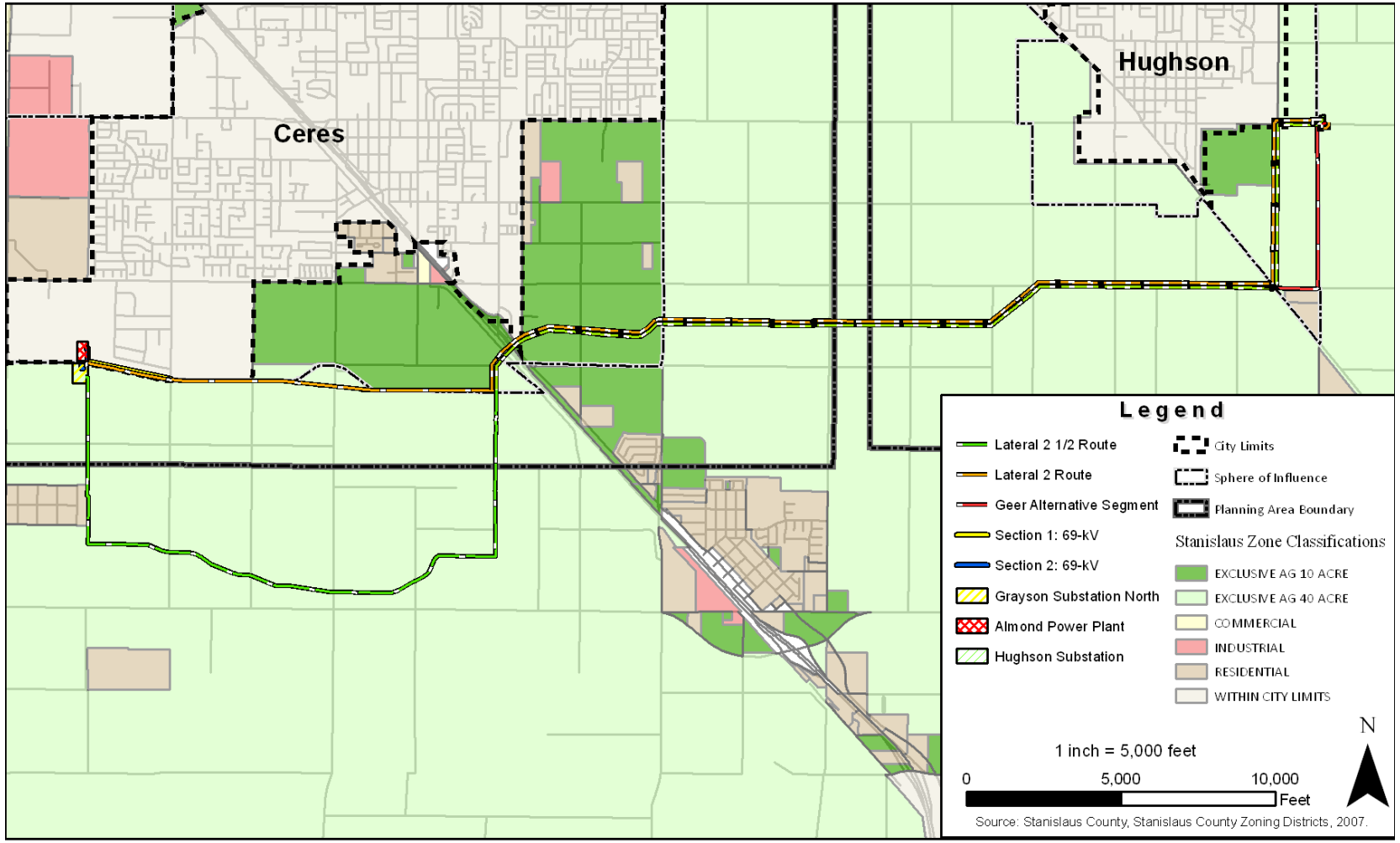

Figure 4.1-1
Stanislaus County Zoning Designations

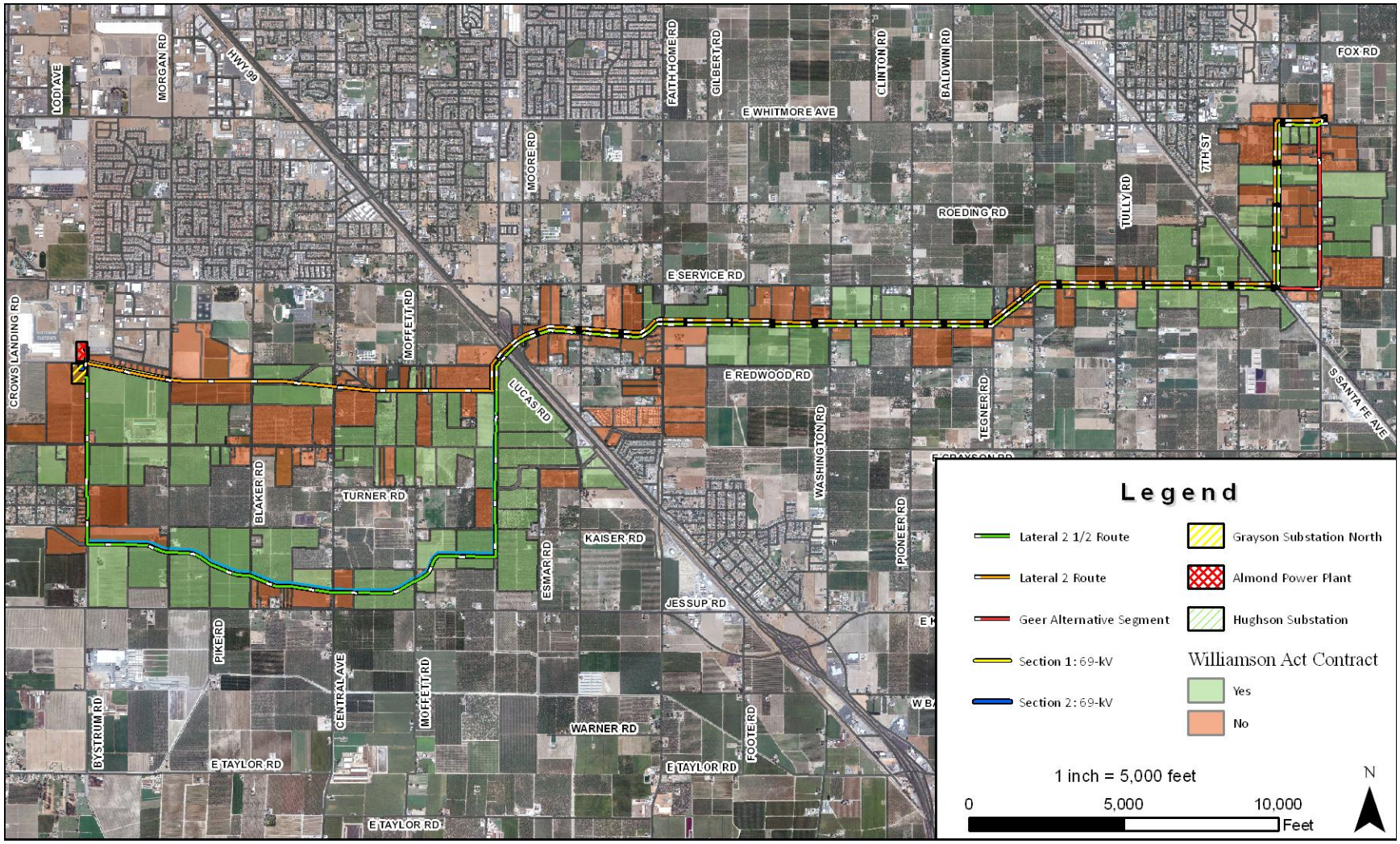

Figure 4.1-2

Parcels under Williamson Act Contract

- Conflict with existing zoning for agricultural use, or a Williamson Act contract.

IMPACT ANALYSIS

IMPACT 4.1-1

Physically divide an established community. *The Project would not divide any established community. Therefore, the impact associated with the implementation of this Project would be* ***less than significant.***

As proposed, the 115-kV transmission line route and two 69-kV transmission line sections would generally follow established roadways, canals, or field boundaries within Stanislaus County and would run between and within the City of Hughson's sphere of influence and the City of Ceres without adverse effect. The transmission lines would not hinder travel between established communities or otherwise provide a division.

MITIGATION MEASURE 4.1-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.1-2

Conflict with any applicable land use plan, policy, or regulation. *The Project is consistent with Stanislaus County and the City of Ceres' major goals and objectives for development. The implementation of the Project would result in* ***a less than significant*** *impact.*

The Project is consistent with the goals, policies, and land use designation of the *Stanislaus County General Plan* (2007a). Although it would remove some land from agricultural production, agricultural uses could continue around the transmission poles and underneath the transmission lines. The Grayson Substation North is located on a parcel which is currently in agricultural production. However, this land is not under a Williamson Act contract.

Pursuant to County Zoning Code Section 21.080.020C (2009) overhead transmission lines and poles are an allowable use in agricultural districts. However, when the lines are not within a public street or highway, the routes must be submitted to the County Planning Commission for review and recommendation prior to acquisition of right-or-way. In addition, County Zoning

Code Section 21.20 allows facilities for public utilities, such as substations, in agricultural districts with the issuance of a use permit.

The Project is consistent with the land use designation and goals and policies of the *City of Ceres General Plan*. The Project would not affect the city's ability to develop in the manner envisioned in the general plan. In addition, the city's Municipal Code allows utility structures within any zone, with an approved Conditional Use Permit.

Although the substation and portions of the transmission lines are within the city's planning and reserve areas, the *Stanislaus County General Plan* goals, policies, and zoning designations apply in these areas. As stated above, the Project is consistent with the goals and policies of the County General Plan and the County's zoning designation. Moreover, as a duly formed irrigation district, Turlock Irrigation District (TID) has plenary authority over the siting, construction, and operation of its transmission system and related facilities. While local jurisdictions do not issue permits to TID for the construction of its electrical facilities, including transmission lines, poles, and substations, the Project is nevertheless consistent with local land use policies.

MITIGATION MEASURE 4.1-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.1-3

Conflict with any applicable HCP or NCCP. *The Project would not conflict with any HCP or NCCP. Therefore,* ***no impact*** *would occur.*

There are no applicable habitat HCPs or NCCPs affected by the Project.

MITIGATION MEASURE 4.1-3

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.1-4

Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural uses. *The Project would have a **less than significant** impact related to conversion of Farmland to non-agricultural uses and would not result in other changes to the existing environment which could result in conversion of Farmland to non-agricultural uses.*

The Project would be located in an area designated as Farmland by the Farmland Mapping and Monitoring Program (Figure 4.1-3). Construction of the Project would result in potential short-term and permanent impacts to agricultural operations. These potential impacts are discussed below.

TEMPORARY IMPACTS Most of the routes would be located in existing canal rights-of-way. Construction of electrical facilities in these areas would not significantly impact adjacent agriculture. Construction of towers along the Ceres Main canal (in the case of the Lateral 2 ½ Route) and through agricultural properties near Central Avenue (in the case of the Lateral 2 Route), however, may require the installation of temporary access roads. Within the easement areas adjacent to roadways, there would be a temporary interruption of farming while the transmission poles and conductors are installed. However, the 115-kV transmission line would be placed along property boundaries of the parcels where, in many cases, there is an existing disturbed area. Construction at each pole location would last approximately three to seven days. The disturbance would be temporary, and most of the area would be restored after construction. Impacts to agricultural property would have a less than significant affect on the conversion of agricultural land to non-agricultural uses in the general project region.

PERMANENT IMPACTS The Project routes would be located along Prime Farmland, while the substation would not be located on a parcel designated as Farmland. Only the footprint of the required poles would be permanently removed from agricultural uses. Once the poles are constructed, crops such as oats, alfalfa, barley, etc. can grow up to the base of the poles. Trees underneath the transmission line would be maintained at a height of 15 feet above ground. Areas within the transmission line easement would remain in agricultural production. While the specific placement of the poles would be determined during detailed engineering (providing an

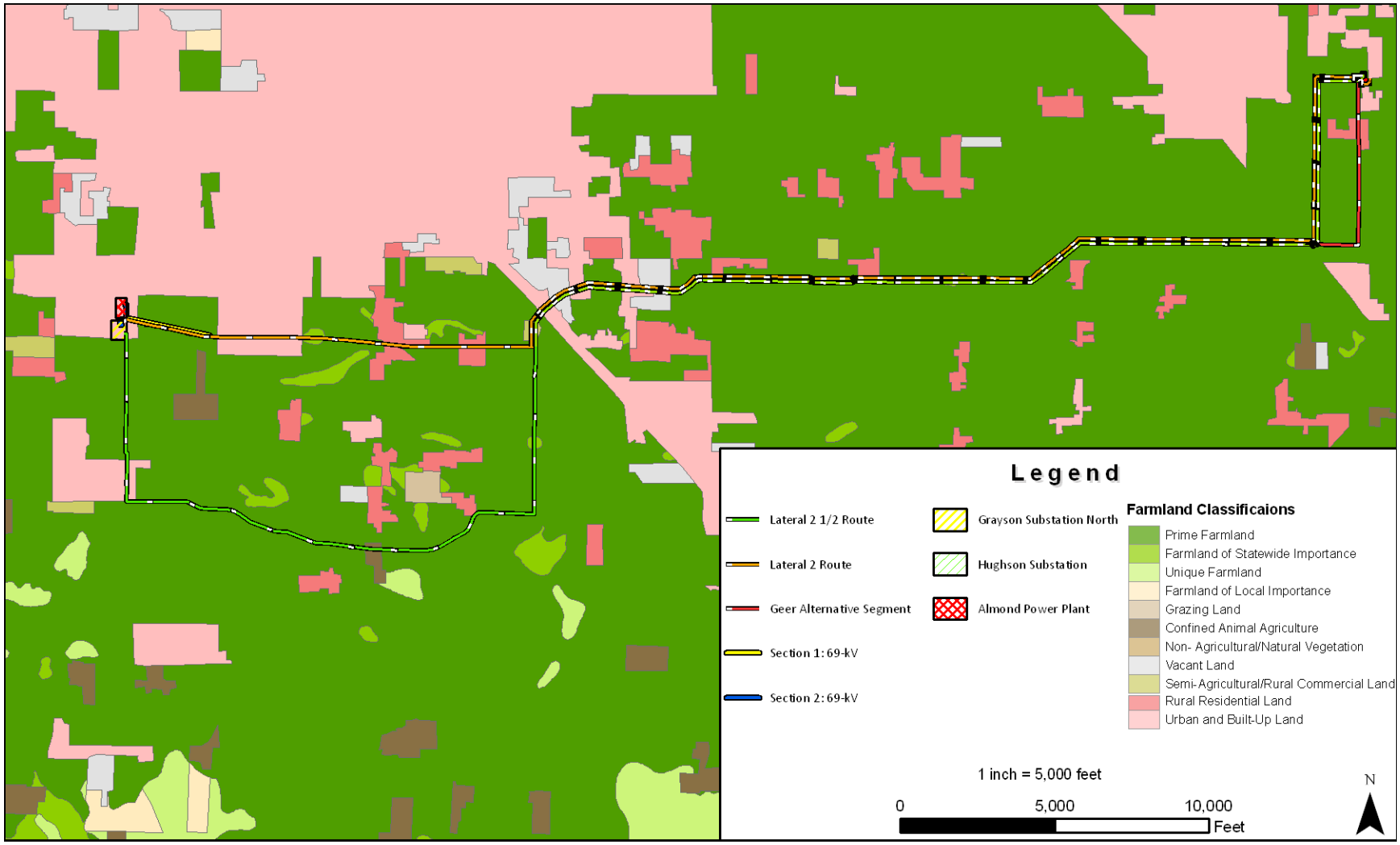

Figure 4.1-3
Farmland Classifications

opportunity to avoid farming operations where feasible), assuming a worst case scenario in which each pole would be placed in Prime Farmland, a maximum total of 0.04 acres of Prime Farmland could be permanently removed from agricultural production for placement of the transmission poles under the two routing alternatives. Additionally, construction of the Grayson Substation North would permanently remove 10 acres of Farmland from agricultural production. This would represent a relatively small amount of the Farmland in the Project area and, as discussed in Impact 4.1-2, would be consistent with local land use policies. Therefore, this impact is considered less than significant.

Beyond lands physically removed from agricultural production, placement of utility structures has the potential to impact farming operations. Poles within orchards, fields, and livestock operations could affect the operation of mechanical equipment used for planting, harvesting, fertilization, and pruning. Transmission lines installed as part of the Project may interfere with the aerial application of pesticides and herbicides, requiring ground-level application techniques to be used, or necessitating a change in flight patterns that may decrease crop dusting efficiency and may affect the practicality of flying small fields adjacent to the lines.

MITIGATION MEASURE 4.1-4

As necessary, TID shall coordinate with landowners to determine pole placement that would result in minimal disruption to agricultural operations. TID shall obtain easements for private agricultural land that may be used along the route and compensate landowners for loss of crops, up to the provisions of law. Agricultural land used during construction shall be re-tilled to offset compaction caused by heavy material storage and construction activities, as requested by the landowner.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.1-5

Conflict with existing zoning for agricultural use, or a Williamson Act contract. *The Project would have a* ***less than significant*** *impact on existing agricultural operations on lands under Williamson Act Contract.*

The Project is consistent with existing zoning for agricultural uses, which allow for transmission lines and related facilities within agricultural zones. There are parcels along the 115-kV transmission line that are under Williamson Act contracts. However, Stanislaus County Zoning Ordinance Section 21.20.045 allows transmission lines to be constructed on Williamson Act land. The Project would not significantly compromise the long-term productive agricultural capability of the affected parcels.

The Project would not significantly displace or impair current or reasonably foreseeable agricultural operations. Moreover, the Project would not result in the significant removal of adjacent contracted land from agricultural or open-space use. Further, the Project is consistent with Williamson Act uses since it involves the erection, construction, and maintenance of electric facilities.

MITIGATION MEASURE 4.1-5

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.2 VISUAL RESOURCES

This section discusses the visual setting and potential impacts upon existing visual resources resulting from development of the Project. The baseline characterization of the site and environs and the ensuing analysis draw upon elements of broadly accepted visual assessment methods and the general body of visual resource evaluation that has been prepared in accordance with the requirements of the CEQA and its Guidelines.

Analysis of visual resources and aesthetics can never be entirely objective, nor precisely quantified. Complex conditions affect the visual environment, including physical characteristics (e.g., topography, vegetation, natural and/or man-caused conditions, uniqueness and regional/local context), viewer attitude, and mode of travel (e.g., car, foot, etc.). Although assessment of visual impacts must be partially based on subjective criteria, visual impacts are among the most potentially significant to existing environmental quality.

4.2.1 EXISTING CONDITIONS

The general visual character of the Project area is described in Section 4.2.1 of the 2009 Draft EIR.

VISUAL FEATURES OF THE PROJECT AREA

A brief description of the present characteristics and visual resources along the Project are presented below.

LATERAL 2½ ROUTE

HUGHSON SUBSTATION TO EAST SERVICE ROAD/SANTA FE RAILROAD TRACKS From the existing Hughson Substation, the 115-kV transmission line would follow an approximately 0.25 mile portion of East Whitmore Avenue before turning south along the eastern side of Euclid Road for a distance of about 1 mile to the intersection of Euclid Road/East Service Avenue near the Santa Fe Railroad tracks. Visual features along two-lane Euclid Avenue include several one-story residences, located on both sides of the roadway, along with extensive almond orchards. Several of the residences are screened by trees, other landscaping, and ancillary structures associated with agricultural operations. Power and communication lines on approximately 40-foot high

poles parallel the eastern side of Euclid Road. Additional power lines extend west and east from the roadway to supply electricity to homes and pumps along Euclid Avenue (Figure 4.2.1).

Figure 4.2-1
View west from Euclid Avenue, showing expanse of orchards, extant power lines, and flat topography

SANTA FE AVENUE TO GONDRING ROAD Between Santa Fe Avenue and Gondring Road, the alignment would parallel Lateral No. 2, which is currently used as a utility corridor with established electrical infrastructure. For approximately 1.4 miles, the transmission infrastructure would be located between the canal and East Service Road (Figure 4.2-2). The remaining 3.6 miles would be bordered on either side by agricultural lands, with occasional two-lane road crossings.

CERES MAIN CANAL The Ceres Main canal is an established utility corridor, with 105-foot 230-kV painted transmission poles along the canal. Land use to the east and west is agricultural, primarily developed as orchards. Direct observation points from which to view the 1.25 miles of the canal that the Lateral 2½ Route would parallel are limited; however, due to the height of these structures, they are evident in the distance from surrounding county roadways.

LATERAL NO. 2½ There are existing transmission and distribution lines present along much of Lateral No. 2 between the Ceres Main canal and the UPRR tracks. This corridor is prominently viewed from roadways that cross the lateral.

UNION PACIFIC RAILROAD Along the UPRR tracks, land use is similar to the remainder of the alignment; primarily agricultural land. Near Lateral No. 2½, there is a small neighborhood. The backsides of approximately nine lots in this development abut the railroad tracks. Existing utility poles are located along the UPRR from Grayson Road to approximately 0.25-mile south of Grayson Road.

Figure 4.2-2
View west at divergence between Lateral No. 2 and East Service Road, showing residence, canal, orchards, and extant power lines

LATERAL 2 ROUTE

The Lateral 2 Route would have the same alignment as the Lateral 2½ Route from the Hughson Substation to Gondring Road west of SR 99. At Gondring Road, the route would generally follow Lateral 2 to the Grayson Substation North. This portion of the alignment is discussed below.

LATERAL NO. 2 WEST OF SR 99 Along Lateral No. 2 west of SR 99, the route would be located where the existing 230-kV line is. The alignment would be adjacent to Gondring Road and the lateral for approximately 0.7-miles before continuing west through approximately 0.5 miles of

agricultural land away from the canal. For the remaining 1.2 miles to the Grayson Substation North, the transmission line would be located along the canal. Existing poles are 100 feet tall.

GEER ROAD ALTERNATIVE SEGMENT

The Geer Road Alternative Segment would be located on the west side of Geer Road, and along Service Road to its intersection with Euclid Avenue. These areas have existing transmission infrastructure. The steel poles are about 70 feet in height, while the wooden poles are about 60 feet tall. The setting is characterized by rural agricultural, with several homes located near the roadway, including a mobile home community at the southeastern corner of Geer Road and East Whitmore Avenue.

GRAYSON SUBSTATION NORTH

The Grayson Substation North site is currently developed as an almond orchard. The site is bordered to the north by Lateral No. 2, to the east by the UPRR railroad tracks, to the south by additional orchard, and to the west by orchard. There are limited opportunities to view the site, which is visible from Crows Landing Road and the WinCo Foods distribution center to the northwest.

69-KV TRANSMISSION LINE: SECTION ONE

The Section One 69-kV transmission line would be located along Lateral No. 2, and would connect the Grayson Substation North to an existing pole on Morgan Road. Land on the south side of the canal is in agricultural production, while the land north of Lateral No. 2 is primarily vacant, with some light industrial development. Several relatively large 230-kV transmission line poles are visually prominent features in this area. The Section One 69-kV line would run parallel to the existing 230-kV transmission line.

69-KV TRANSMISSION LINE: SECTION TWO

From the Grayson Substation North, the Section Two 69-kV Transmission Line would cross TID Lateral No. 2 and the existing 230-kV transmission line, and continue to the existing Almond Power Plant. As indicated above, this area has been developed for industrial uses and is characterized by prominent power generation infrastructure. The poles for the existing 230-kV

transmission line would increase in height from 100' to 130' to accommodate the 69-kV crossing.

4.2.2 REGULATORY SETTING

Local Regulations applicable to the project are presented in Section 4.2.2 of the 2009 Draft EIR.

4.2.3 IMPACTS AND MITIGATION MEASURES

This section examines the visual setting and potential impacts upon existing visual resources resulting from development of the Project. The characterization of the affected project area and environs and the ensuing analysis draw upon factors that affect the value and importance of visual resources (e.g., uniqueness, prominence, scale, local significance). Such factors have been considered as part of this visual resources evaluation. Analysis of visual resources and aesthetics can never be entirely objective, or precisely quantified. Complex conditions affect the perception of the visual environment, including physical characteristics (e.g., topography, vegetation, natural and/or man-caused conditions, uniqueness and regional/local context), viewer attitude, and mode of travel (e.g., car, foot, etc.).

METHODS OF ANALYSIS

Evaluation of the landscape is characterized by two primary considerations: (1) visual resource characteristics and quality, and (2) viewer response (based upon exposure and attitude/sensitivity). Viewer response is a function of both objective factors (i.e., visibility, view duration, number of viewers) and more subjective elements (e.g., viewer expectations, view quality, and surrounding uses and setting). Analysis of potential visual impacts has emphasized visual change in terms of visual contrast (major factors that include color, form, line, and texture) and dominant elements that may be visible from major public viewpoints. Other interrelated visual factors include: (1) motion that can be perceived even at great distances with effects ranging from dominant to inconsequential; (2) unity, which is relevant to scale, color, and the ability to integrate into the surrounding environment; and (3) distance and its association with relative size, in which foreground changes (i.e., generally within about a one-quarter mile) are considered more important than middle ground changes (i.e., over one-quarter to less than one mile) and distant views (i.e., greater than one mile). In addition, recognition of the

importance or significance of a visual resource (e.g., scenic view, scenic highway, unique visual feature), through formal designation by public agencies (i.e., local, regional, state or federal), is also considered as part of the evaluative considerations.

Consistent with the evaluation methodology, five existing locations were selected as representative of the kinds of publicly accessible, important, and/or sensitive views or visual resources that may be affected by the Project. The viewpoint locations, or key observation points (KOP's), shown in Figure 4.2-3 were selected from an extensive reconnaissance of the viewshed in proximity to the Project.

They include the following locations:

- KOP 1: Geer Road between East Whitmore Avenue and East Service Road (Geer Road Alternative Segment)
- KOP 2: Euclid Avenue between East Whitmore Avenue and East Service Road (Lateral 2½ Route and Lateral 2 Route)
- KOP 3: SR 99 crossing (Lateral 2½ Route and Lateral 2 Route)
- KOP 4: Grayson Substation North location
- KOP 5: Lathrop Road towards UPRR tracks (Lateral 2½ Route)

To graphically represent and illustrate the level of potential impacts from the Project upon existing visual resources, computer simulations were prepared (Figures 4.2-4 through 4.2-8). The simulations incorporate proposed facilities consistent with the Project Description.

THRESHOLDS OF SIGNIFICANCE

Consistent with the significance criteria set forth in Appendix G of the CEQA Guidelines, impacts would be considered significant if the Project would:

- Damage scenic resources within a State scenic highway;
- Substantially affect a scenic vista;
- Substantially degrade existing visual character or quality; or
- Create new sources of light and glare that would affect views in the area.

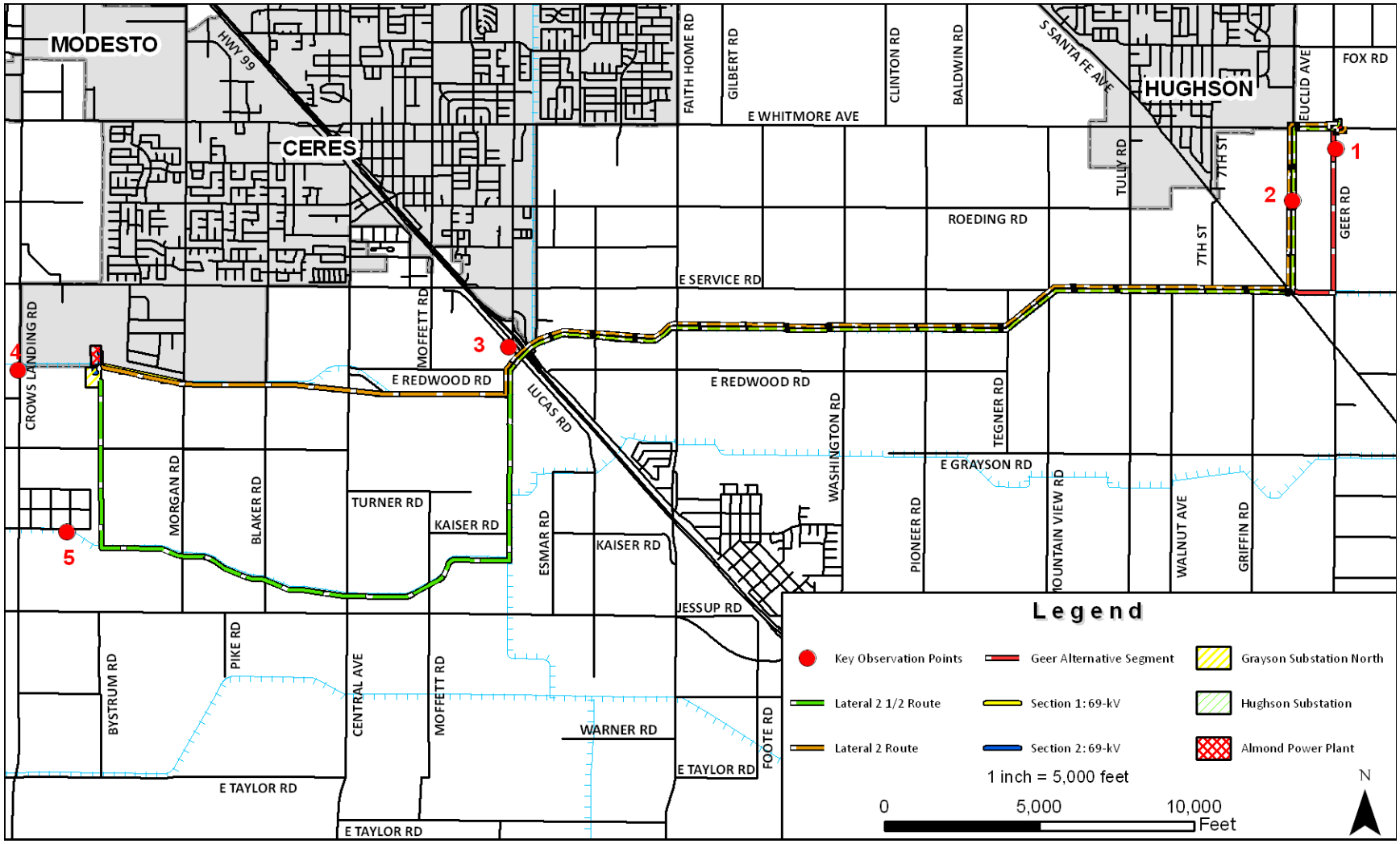

Figure 4.2-3
Key Observation Points

IMPACT ANALYSIS

IMPACT 4.2-1

Damage scenic resources within a State scenic highway. *The Project would have* ***no impact*** *on scenic resources within a State scenic highway.*

SR 99 is the only State highway in proximity to the Project. SR 99 is not designated as a scenic highway. Therefore, the Project will not damage scenic resources within a scenic highway.

MITIGATION MEASURE 4.2-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.2-2

Substantially affect a scenic vista. *The Project is not visible from any designated scenic vista. Therefore, the Project would have* ***no impact*** *on scenic vistas.*

Because the Project is not visible from a scenic vista, it would not impact any such resource.

MITIGATION MEASURE 4.2-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.2-3

Substantially degrade the existing visual character or quality along the Project route. *Residences in proximity to the transmission line facilities would not be substantially impacted by the proposed electrical facilities. Impact on the quality and character of visual features and views would be* ***less than significant.***

Overhead utility poles, carrying electricity in distribution lines and communications to rural residences, are common within the agricultural areas that comprise much of the landscape of the Project. Implementation of the Project would result in the placement of overhead utility poles that are between 70 and 130-feet high. In most cases, existing distribution and transmission lines

would be relocated to the new poles to minimize visual effects. Given the temporary nature of the construction activities, placement and relocation would be a less-than-significant impact.

For residents in proximity to the new poles and lines with foreground views (e.g., Euclid Road), the visual impact, though individually subjective, would be considered less than significant because of the presence of existing distribution facilities within the right-of way. While motorists along public roads would discern a change to the size and type of utility poles and lines, their views would be brief and generally consistent with the visual character of the area. With gaps between the poles and the lines, existing vistas, which are already frequently obscured or interrupted by other utility lines, structures, and vegetation, middle ground and distant views of existing visual features (e.g., orchards, other agricultural lands, distant Coastal Range, Sierra Nevada) would not substantially change.

Although the substation would add a new visual element to the area, it is consistent with the existing view of the industrial area to the north. The transmission line poles, additional horizontal wires, transformers, and other related substation equipment would be visible, along with the slat fence surrounding the substation, from area roadways and adjacent industrial facilities. However, no existing important or scenic views or resources would be significantly affected.

Construction-related impacts on the visual quality of the area are considered less than significant because impacts would be short term (less than one year) and should not exceed the impacts of the Project once operational.

LATERAL 2½ ROUTE

HUGHSON SUBSTATION TO EAST SERVICE ROAD/SANTA FE RAILROAD TRACKS From the Hughson Substation to Euclid Avenue, the project would add 115-kV transmission line and associated utility poles. For the distance down Euclid Avenue, the existing 12-kV line would be co-located on the proposed poles, as depicted in Figure 4.2-4, below. Note that the after-Project image represents a worst case scenario in which the existing telecommunications lines are not co-located onto the Project poles, and existing poles are sawed off and left in place. Existing communications lines could be co-located on the proposed poles, at the discretion of the

Existing Condition at 3230 Euclid Avenue

With Project Condition at 3230 Euclid Avenue

Figure 4.2-4
KOP 1: 3230 Euclid Avenue

telephone company. The larger poles would modify the existing character of the roadway, but would be generally consistent with existing uses.

SANTA FE AVENUE TO GONDRING ROAD Along Lateral No.2 between Santa Fe Avenue and Gondring Road, the Project would co-locate the proposed 115-kV line with existing 69 and 12-kV lines. The resulting transmission poles would be taller than those that currently present. These poles would be visible along East Service Road, from roadways that cross the canal (Tully Road, Mountain View Road, Faith Home Road, etc), and at the SR 99 crossing. This modification of existing transmission poles would not present a significant potential to degrade the character of the route. Existing conditions at the SR 99 crossing from Lucas Road (a frontage road west of SR 99) and a simulation of the Project are presented in Figure 4.2-5.

CERES MAIN CANAL The Ceres Main canal is an established utility corridor, with 230-kV galvanized transmission poles on both sides. The Project would add 115-kV underbuild to these lines, removing three existing poles and constructing two new poles. The constructed poles would be galvanized, to visually unify the proposed poles with existing structures, but would be approximately 30 feet taller than existing poles. Given that the surrounding land use is agricultural and the change to the existing poles would not be large, this is not considered a significant impact.

LATERAL NO. 2½ Along Lateral No. 2½, the existing 12-kV line would be co-located onto the taller Project poles, where present. The increased height of the poles would be apparent to residents along the canal and motorists traveling roadways that cross the canal. This change is not anticipated to degrade the existing visual character or quality along the Project route.

UNION PACIFIC RAILROAD The existing 12-kV line would also be co-located along the portion of the route that parallels the UPRR tracks. This portion on the alignment would be visible from the neighborhood west of the alignment, and homes and businesses near the intersection with East Grayson Road. The view of the Project area from the neighborhood to the west, and the anticipated view with the implementation of the Lateral 2½ Route are presented in Figure 4.2-6.

View of the SR 99 Crossing from Lucas Road

View of the SR 99 Crossing from Lucas Road

Figure 4.2-5
KOP 3: SR 99 Crossing

View northeast from Lathrop Road

View northeast from Lathrop Road with Project

Figure 4.2-6
KOP 5: Lathrop Road

LATERAL 2 ROUTE

The Lateral 2 Route would have the same alignment as the Lateral 2½ Route from the Hughson Substation to Gondring Road west of SR 99. The impact would be less than significant, as stated in the description above.

LATERAL NO. 2 WEST OF SR 99 The Lateral 2 Route would be co-located with the existing 230-kV line along Lateral No. 2 west of SR 99. This would require replacement of existing 100 foot tall poles with new, 130 foot tall poles. The existing poles are already prominent features of the landscape, and the modification of the poles to accommodate the 115-kV line would not degrade the existing visual quality of the landscape.

GEER ROAD ALTERNATIVE SEGMENT

The Geer Road Alternative Segment would be located on the west side of Geer Road, and along Service Road to its intersection with Euclid Avenue. All existing transmission poles on the west side of Geer Road would be removed, and the power lines would be moved onto Project poles. The Project would result in taller poles along Geer Road, as shown in Figure 4.2-7. The change would be noticeable to residents along Geer Road and motorists that frequent the roadway, but would not significantly impact the visual character of the area.

GRAYSON SUBSTATION NORTH

Development of the Grayson Substation North would result in a change in land use from orchard to industrial development. The properties to the north of the site are industrial in character, and the substation would afford views of a similar nature. Views of the site from Crows Landing Road before and after substation construction are presented in Figure 4.2-8. The station would be largely shielded from view by existing almond orchard and there would be so significant impact to motorist views from Crows Landing Road.

69-KV TRANSMISSION LINE: SECTION ONE

The Section One 69-kV transmission line would be located along Lateral 2, where there are several relatively large transmission poles. Addition of the Section One 69-kV Transmission Line would be consistent with the visually prominent features in this area.

Southwest view of existing transmission on Geer Road

Southwest view of proposed transmission on Geer Road

Figure 4.2-7
KOP 2: Geer Road

KOP 4 – View of Grayson Substation North Site, looking east from Crows Landing Road

View of Grayson Substation North Site with Project Implementation, looking east from Crows Landing Road

Figure 4.2-8
KOP 4: Grayson Substation North

69-kV Transmission Line: Section Two

The Section Two 69-kV transmission line would cross Lateral No. 2, connecting the Grayson Substation North to the Almond Power Plant. This short section of line (and the raising of two 230-kV poles to accommodate the line) would have a negligible impact on views of the area (see Figure 4.2-8).

Mitigation Measure 4.2-3

No mitigation required

Level of Significance After Mitigation

Less than significant

Impact 4.2-4

Create new sources of light and glare affecting views in the area. *Additional sources of light and glare would be minimal and would have a* ***less-than-significant impact*** *on area views.*

Approximately eight lights would be installed at the substation site. These lights would be illuminated at night for security purposes. However, the light fixtures would be hooded and directed downward and onsite to minimize light and glare. Low-pressure sodium lamps and non-glare type fixtures would be specified. For areas where continual lighting is not required for security purposes, light switches would be provided. These areas would then only be illuminated when in use. The lights associated with the substation would result in a less than significant impact because of the measures taken to reduce offsite visibility. The substation structures and fencing surrounding the substation would have a glare-reducing finish. Therefore, there would be no glare associated with the substation.

Further, there would be no lights associated with the transmission line routes. In addition, the majority of the transmission poles would be COR-TEN® steel (i.e. weathering steel) with a rust-colored finish. Where galvanized poles would be constructed, they would replace existing poles. The new poles would be approximately 30 feet taller than existing structures and may be initially more reflective. With time, the poles will dull. There would not be considerable glare associated with the transmission poles.

Construction would occur during daytime hours. No construction-related lighting would be required. There may be some glare associated with the sun reflecting off construction equipment. However, it would be short term in nature. There would be no impacts associated with light and glare associated with construction.

MITIGATION MEASURE 4.2-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.3 BIOLOGICAL RESOURCES

This section describes the existing biological setting and potential effects of Project implementation. The descriptions and analysis in this section are based on information contained in the *Biological Resources Identification Survey* (AEC 2009), a *Wetland Delineation/Jurisdictional Waters Report* prepared by Natural Investigations Company (2009), and an updated field reconnaissance on March 30, 2010 and 2010 *Wetland Delineation/Jurisdictional Waters Report* prepared by Parus Consulting, Inc. (Appendix A).

4.3.1 EXISTING CONDITIONS

The general geographic, watershed, and wildlife community characteristics of the Project area are provided in Section 4.3.1 of the 2009 Draft EIR.

4.3.2 REGULATORY SETTING

The regulatory setting for biological resources is described in Section 4.3.2 of the 2009 Draft EIR and is incorporated into this discussion. No additional regulatory issues were identified.

4.3.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

The *Biological Resources Inventory Survey* consisted of a literature review and biological assessments for special-status plant and wildlife species. The literature review provided a baseline from which to evaluate the biological resources potentially occurring in the Project area, as well as in the surrounding vicinity. Federal register listings, protocols, and species data provided by the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) were reviewed in conjunction with anticipated federal and state-listed species potentially occurring in the vicinity.

The special-status plant species considered for review in this document were compiled from the following resources: the California Natural Diversity Database (CNDDB), the California Native Plant Society online inventory, an online list obtained from USFWS, and biological literature

pertaining to the region (see Appendix D of the 2009 Draft EIR). The database searches identified a total of seven special-status plant species, one of which has been recorded within 5 miles of the Project. All special-status plants were listed by California Native Plant Society as List 1B, which are plants that are rare, threatened, or endangered in California and elsewhere.

The special-status wildlife species considered for review in this document are also listed and discussed in the *Biological Resources Identification Survey* (Appendix D of the 2009 Draft EIR). This list was compiled from the query results of the USFWS Sacramento office online listed species database, the CNDDB, and the California Wildlife Habitat Relationships for Stanislaus County for the Ceres and Denair United Status Geological Survey 7.5-minute quadrangles, which the Project traverses. Several regionally-occurring special-status animals were determined not to have the potential to occur within the Project vicinity, either because the range of the species does not extend into the vicinity, or because the habitat or habitat elements (e.g., caves, rocky cliffs, mature tree stands, and riparian and aquatic habitat) required by the species were not present.

Field surveys were conducted in April and May of 2009, and again in March 2010. Special attention was focused on sensitive habitats or those areas potentially supporting special-status flora and fauna. The biological survey focused on three primary objectives: general habitat assessment, vegetation/habitat mapping, and an assessment for special-status animal and plant species. Any sensitive or unusual biological resources identified during the literature review were ground-truthed during the biological surveys for mapping accuracy. Plant communities within the Project vicinity were classified at a general level of detail using the widely accepted descriptions provided in Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (1986 and 1996 update), with modification as appropriate.

THRESHOLDS OF SIGNIFICANCE

Biological resource impacts resulting from the implementation of the Project would be considered significant if the Project would:

- 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 CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS;
- 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;
- 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 wildlife nursery sites; or
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, an adopted HCP, or NCCP.

IMPACT ANALYSIS

IMPACT 4.3-1

Have a substantial adverse effect on sensitive or special-status species. *There are special-status wildlife species with the potential to occur in the vicinity of the Project. The Project would have a* ***potentially significant*** *impact on these species.*

SPECIAL-STATUS PLANT SPECIES The biological survey indicated that only one special-status plant species has been recorded within 5 miles of the Project. This species, San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), is limited in distribution to the Southern Sierra Foothills Region of the San Joaquin Valley and is no longer found in Stanislaus County. Further, the Project area does not contain the seasonal pool habitat required by this plant species. As such, the Project is not expected to adversely impact any special-status plant species.

SPECIAL-STATUS WILDLIFE SPECIES Sensitive wildlife species are generally more numerous in relatively undisturbed areas, such as the riparian wetland and woodland habitats within the San Joaquin River riparian corridor. There is a low likelihood of occurrence of sensitive wildlife

species along roads, edges of fields, and the outside banks of canals, where the majority of the transmission line sections are proposed. Nevertheless, much of the weedy or ruderal grassland or open, cultivated fields may provide foraging habitat for raptors and migrating birds. Several special-status wildlife species have been recorded in the vicinity of the Project. A discussion of each of these species is included below. Mitigation measures have been proposed to avoid or reduce potential indirect impacts to these species.

Burrowing owl The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern that is found in a variety of open habitats, including shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and artificial areas throughout most of the state. The burrowing owl requires large, open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal (e.g., ground squirrels, rabbits, etc.) burrows. The Project area may contain small mammal burrows or active ground squirrel colonies; however, no such burrows or colonies were detected in the *Biological Resources Identification Surveys* conducted for the Project. Note also that the integrity of canals could be compromised by fossorial animals (i.e. animals adapted for burrowing or digging), so canal berms are actively managed to exclude any burrowing animals; including the use of rodenticides where necessary. Occupancy of suitable burrowing owl habitat can be verified at a site by an observation of at least one burrowing owl, molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing the same burrows year after year.

Although not detected along the 115-kV transmission line routes, 69-kV transmission line sections, or at the Grayson Substation North, nor recorded in the CNDDB 5-mile radius map (see Figure 4.3.1 in the 2009 Draft EIR), marginal habitat occurs across areas where low lying vegetative coverage and open agricultural fields exist. Impacts to burrowing owls generally include:

- Disturbance within 160 feet of active burrows (burrows are considered active during the breeding and nesting season [February 1 to August 31], unless CDFG verifies that the site is not in use);
- Destruction of burrow entrances; and

- Degradation of foraging habitat adjacent to occupied burrows.

If burrows are present during construction, burrowing owl could be adversely affected. As such, mitigation should be implemented to avoid any potential impacts to this species.

Sharp-shinned hawk Sharp-shinned hawks (*Accipiter striatus*) are a migratory species that winter in a variety of habitats, including urban and suburban areas throughout the Project area (Cornell 2009). They also actively hunt small birds by flying through woodland, forests, or orchards in an attempt to surprise their prey. The Project area provides some suitable foraging habitat. Mitigation is necessary to avoid potential impacts to migratory bird species.

Suisun song sparrow The Suisun song sparrow (*Melospiza melodia maxillaris*) is a California endemic species and a California Species of Special Concern. Its year-round range is confined to tidal salt and brackish marshes fringing the Carquinez Strait and Suisun Bay east to Antioch, at the confluence of the San Joaquin and Sacramento rivers, roughly 50 miles northwest of the Project area (Grinnell and Miller 1944, as cited in Shuford 2008). In addition, Suisun song sparrow was not detected during Project surveys. As such, no significant impact to the species is likely to occur.

Swainson's hawk Swainson's hawk (*Buteo swainsoni*) is a state-listed, threatened species that breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural and ranch lands. Swainson's hawks require adjacent suitable foraging areas such as grasslands, or alfalfa and/or grain fields supporting rodent populations. The majority of the Project area consists of agricultural fields that provide suitable foraging habitat for the species. According to the CNDDB, two nesting locations for this species have been recorded within a 5-mile radius of the Project (see Figure 4.3.1 in the 2009 Draft EIR). If raptors are present in Project area, Project construction could adversely affect protected bird species.

Tricolored blackbird The tricolored blackbird (*Agelaius tricolor*) is a California Species of Special Concern. Although canals occur adjacent to portions of the Project alignment, there is no associated vegetation to support riparian bird species. The limited habitat does not represent conditions to support viable populations of the species. Based on the lack of riparian habitat and

suitable vegetation, this species is not expected to occur in the Project area. As such, no further action for these species is required.

San Joaquin kit fox The Project area is located within the historic range of the San Joaquin kit fox (*Vulpes macrotis mutica*). San Joaquin kit fox most commonly use old ground squirrel burrows for cover and denning, although this species is also known to use man-made structures such as culverts for cover. San Joaquin kit fox burrows usually have entrances 5 to 8 inches wide, and are usually at least 3 feet deep. San Joaquin kit fox are found primarily in the foothills west of the Project; however, the species' range extends out on to floor of the Central Valley around Patterson, California. No San Joaquin kit foxes or their signs were observed during the surveys; the species is secretive and is rarely observed during the day. No focused surveys were conducted for this species.

The Project area does not contain significant quantities of small mammal burrows or active ground squirrel colonies. Nevertheless, suitable kit fox denning habitat may exist along canal berms and fallow fields in the Project area. Agricultural fields including row crops, sod farms, and sometimes orchards provide potential foraging areas for San Joaquin kit fox. The primary mechanisms of impacts to San Joaquin kit fox are loss of potential or actual foraging habitat and temporary construction disturbance in the vicinity of any active dens. Project development could result in significant indirect impacts to San Joaquin kit fox.

NESTING BIRD SPECIES The Project is in an area that contains ornamental trees and utility poles that could provide suitable nesting habitat for avian species protected by federal and state laws during the nesting season. Mitigation is necessary to protect these species from potential impacts.

AQUATIC SPECIES The majority of the Lateral 2½ Route and the Lateral 2 Route would be located along TID's canals. These canals are concrete-lined trapezoidal ditches, often having maintained patrol roads. Sensitive wildlife species requiring an aquatic environment and/or riparian habitat are not likely to occur because the canals are kept free of all plant matter. In addition, no vernal pools were identified in the *Biological Resources Identification Survey* (AEC 2009) or *Jurisdictional Waters Report* (Appendix A). Therefore, special-status aquatic species, such as fairy shrimp (*Branchinecta lynchi*), are not expected to occur.

SUMMARY Based on literature research and assessment of the Project area, the Project may have an adverse indirect effect on special-status wildlife species, which include the aforementioned burrowing owl, Swainson's hawk, and San Joaquin kit fox. In addition, the Project has the potential to impact nesting birds protected by federal and state laws. As such, mitigation measures are provided below in order to avoid and/or reduce impacts to these species to a less-than-significant level.

MITIGATION MEASURE 4.3-1

TID shall ensure that pole removal and vegetation removal or trimming associated with the proposed construction activities be conducted outside of the nesting season, which typically extends from late February to early September; or, if activities are to occur during the nesting season, shall have a qualified biologist conduct a nesting bird survey to identify any potential nesting activity within five days of proposed construction activities. Should construction activities occur during the nesting season for Swainson's hawk (March 1 through October 31), a raptor survey shall be conducted by a qualified biologist along the transmission lines and at the Grayson Substation North site, as well as within a 250-foot survey area surrounding these features. The survey shall follow the guidance of the *Recommended Timing and Methodology For Swainson's Hawk Nesting Surveys in California's Central Valley* (SWTAC 2000). If an active nest is identified, a 0.5-mile buffer shall be established around the nesting location. Construction activities may commence within the buffer area only at the discretion of, and in the presence of, a qualified biological monitor, along with consultation and coordination with the CDFG.

If other types of birds are found to be nesting, or there is evidence of nesting behavior, within 250 feet of the impact area, a 250-foot buffer shall be required around the nests. For raptor species, this buffer should be 500 feet. A qualified biologist shall monitor the nests, and construction activities may commence within the buffer area at the discretion and presence of the biological monitor.

Prior to ground disturbance, TID shall engage a qualified biologist to conduct a pre-construction survey for burrowing owl in accordance with the Burrowing Owl Consortium's 1993 *Burrowing Owl Survey Protocol and Mitigation Guidelines*. If, upon completion of site surveys burrowing

owls are determined to be present, the following mitigation measures shall be commenced prior to breeding season.

- If possible, a 160 foot no disturbance buffer shall be established around all identified active burrows during the nesting season (February 1 to August 31), and 6.5 acre buffer of foraging habitat shall be maintained.
- If a burrow must be destroyed, it shall be replaced (i.e. created via artificial burrow) at a 1:1 ratio in adjacent, suitable habitat. This mitigation shall require the creation of a Mitigation Monitoring Plan and submission of an annual report to CDFG.

Finally, a qualified biologist shall conduct preconstruction surveys for San Joaquin kit fox in all portions of the Project area located within the published species' range (USFWS 1997). If any potential dens are identified by the qualified biologist, consultations with the USFWS and CDFG shall be consulted. Mitigation measures to avoid potential impacts to San Joaquin kit fox shall be implemented, including: restricting project vehicles to established roads, construction areas, and other designated locations; covering (with plywood or a similar product) all steep-walled holes or trenches, or equipping such holes with earthen or wooden ramps, to minimize the risk of entrapment; and visual inspection of holes and pipes with a diameter greater than 4 inches for trapped animals prior to filling, burying, or capping. In addition, construction exclusion zones of 50 feet from potential dens and 100 feet from active dens shall be established. Work within these exclusion zones may require a take authorization/permit from USFWS (USFWS 1999).

To ensure that these measures are undertaken, as appropriate, TID shall perform regular construction tail-gate meetings to educate workers about special-status species and the measures that must be undertaken to ensure their protection.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.3-2

Impact riparian habitat or wetlands. *The Hughson-Grayson 115-kV Transmission Line and Substation Project would not involve construction activities within, or require the placement of fill in, any protected water feature. Therefore,* ***no impact*** *would occur.*

A formal delineation of Waters of the United States for the Hughson-Grayson 115-kV Transmission Line and Substation Project area was conducted in the spring of 2009 and 2010 (Appendix E to the 2009 Draft EIR and Appendix A of this Revised Draft EIR, respectively). Delineation methods followed procedures developed by the United States Army Corps of Engineers. Based upon these analyses, four water features were identified: the Ceres Main canal and three of its lateral canals. The delineation does not recommend that the canals are determined to be Waters of the United States because they appear to lack the permanency and significant nexus requirements for a jurisdictional determination. No streams and no wetlands, vernal pools, or other isolated waterbodies were detected within the Project area.

Project construction would not occur within, nor impact, any water feature. Since the transmission lines would span all TID canals crossed, there would be no cumulative or incremental impacts on the biology of these features. There would be no placement of fill in potential wetlands or other water features, and no in-channel construction. Consequently, the Project would result in no impact to potentially-jurisdictional wetlands or other water features.

MITIGATION MEASURE 4.3-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.3-3

Interfere with wildlife migration or impede the use of wildlife nursery sites. *The area does not facilitate aquatic and terrestrial wildlife movement or support a wildlife nursery; however the impact to the migration of avian species could be* ***potentially significant****.*

The Project is located in an existing agricultural and rural setting; a fragmented natural landscape where human developments have created a mosaic of wildlife corridors and barriers. Transmission lines and substations do not represent physical barriers that would substantially impede migration of terrestrial or aquatic wildlife.

However, birds may perish from contact with transmission lines and other power equipment. Raptors and other large aerial-perching birds are most susceptible to electrocution because of their size and behavior. The design characteristics of transmission poles appear to be a major

factor in raptor electrocutions because raptors and other large aerial-perching birds often perch on tall structures that offer optimal views of potential prey. Electrocution occurs when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission or distribution pole with insufficient clearance between these elements. Bird mortality may also occur by collision with transmission lines. Thus, power equipment and facilities represent a potentially significant adverse impact upon birds, especially raptors.

MITIGATION MEASURE 4.3-3

TID's Engineering and Operations Administration is working toward elimination of powerline risks to birds through implementation of its *Avian Protection Plan* (TID 2004). This plan involves mapping the TID service area in order to identify high bird use areas and identify focus areas for field surveys; performing field surveys to document high-risk structures, relative bird use, preferred perches, and historic bird mortality; habitat classification relative to bird use and movement; a relative risk ranking system of poles surveyed; and retrofitting measures prioritized by the risk ranking system to either discourage bird use or to mitigate electrocution hazards.

This *Avian Protection Plan* includes best management practices (BMPs) for new construction to discourage bird use and to minimize electrocution hazards, including the following: install covers for bushings and jumpers; retire the use of gap arresters; provide at least 60 inches of separation between phase-to-phase in eagle habitat; gap or eliminate pole-top grounds; crossarm braces made of non-conducting wood; deadends with insulating links at center phase; and insulation of primary jumpers with less than adequate separation. With implementation of this *Avian Protection Plan* and the use of BMPs for new construction, the risk of bird mortalities from collision and electrocution will be reduced to a less than significant level.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.3-4

Conflict with an adopted HCP. *The Project would not result in conflicts with local ordinance, habitat, or natural community conservation plans.* ***No impact*** *is anticipated.*

Impacts from clearing of vegetation for Project build-out would occur to agricultural, ruderal, and developed land. No impacts would occur to natural habitats, such as valley oak (*Quercus lobata*) woodlands and riparian habitats. Stanislaus County was recently awarded a grant to enable local officials to initiate development of the Western Stanislaus County Habitat HCP/NCCP. The regional plan will include 388,000 acres in western Stanislaus County. Stanislaus County will partner with other local agencies, as well as federal and state agencies, to develop this HCP/NCCP.

Project implementation (construction or operation of the 115-kV transmission line, two 69-kV transmission line sections or the Grayson Substation North) would not conflict with any of the identified policies of the Stanislaus County General Plan Conservation and Open Space Element. In addition, it would not conflict with the intent of the Western Stanislaus County HCP/NCCP that is currently being developed. Thus, no adverse impact to local ordinances or adopted NCCPs is expected.

MITIGATION MEASURE 4.3-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

4.4 HYDROLOGY AND WATER QUALITY

This section describes the natural and constructed surface waterbodies in the Project area, as well as local surface and groundwater hydrology. Surface and groundwater quality are also discussed. Potential impacts include sedimentation and accidental spills from construction activity in the vicinity of surface waters, as well as the effect of a new low-volume drinking water well on groundwater supplies. Mitigation measures are recommended for potentially significant effects.

4.4.1 EXISTING CONDITIONS

The Project is located in the San Joaquin Valley, an alluvial basin that is about 250 miles long and averages 50 miles wide. It is bound by the Diablo Range to the west, the Sierra Nevada Mountains to the east, and the Tehachapi Mountains to the south. Regional hydrology, precipitation, and erosion and flood potential are as described in Section 4.4.1 of the 2009 Draft EIR.

PROJECT AREA HYDROLOGY

The elevation of the Project area ranges from a high of 130 feet at the Hughson Substation to a low of 76 feet at the proposed Grayson Substation North, indicating that drainage via gravity flow along the Project route is generally east to west. Beyond irrigation ditches located on agricultural properties, discontinuous roadside ditches are present. These ditches have no apparent nexus to surface waterbodies and do not support wetland species (Appendix A). County stormwater system improvements are absent except for occasional drop inlets along major roads such as Crows Landing Road and Service Road.

4.4.2 REGULATORY SETTING

The regulatory setting is described in Section 4.4.2 of the 2009 Draft EIR.

4.4.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

This analysis is based on available information regarding the existing hydrology and water quality in the Project area. Potential impacts to existing conditions are measured against applicable regulations, as defined in Section 4.4.2 of the 2009 Draft EIR.

THRESHOLDS OF SIGNIFICANCE

In accordance with the CEQA Guidelines, impacts would be considered significant if the Project would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a substantial deficit in aquifer volume or a substantial lowering of the local groundwater level;
- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation or flooding on- or off-site;
- 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;
- Otherwise substantially degrade water quality;
- 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.
- Place within a 100-year flood area structures which would impede or redirect flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; or
- Be subject to inundation by a seiche, tsunami, or mudflow.

IMPACT ANALYSIS

IMPACT 4.4-1

Violate water quality standards or waste discharge requirements. *The Project would increase soil erosion due to grading and excavation activities. This would be considered a* ***potentially significant*** *impact.*

The Project would run adjacent to, and also cross, local irrigation canals including the Ceres Main canal, Lateral No. 2, and Lateral No. 2½. Where poles would be located adjacent to TID's canals, they would generally be placed on the embankment. These areas are packed earth and drain away from the canals. In other portions of the alignment, the poles would be placed on relatively flat earth. These surfaces are permeable, and any precipitation received during the construction period would be expected to infiltrate directly into the groundwater before reaching any surface waterbody. No substantial impacts to water quality are anticipated during construction activities.

Construction would disturb over an acre of land and would require TID to obtain a National Pollutant Discharge Elimination System (NPDES) General Permit for construction activities. As mandated by NPDES permit regulations, the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) describing construction activities and identifying construction BMPs to reduce erosion of disturbed soils, and prevent release of hazardous materials into water courses, would be required.

A septic tank and leach field would be installed at the Grayson Substation North to accommodate restroom facilities for occasional workers. The tank and leach field would be self containing and would provide capacity to serve the proposed development. Therefore, the Project would be consistent with Stanislaus County's Measure X, which requires that a project have or tie into a primary and secondary sewage treatment system.

MITIGATION MEASURE 4.4-1

As required under the NPDES stormwater permit for general construction activity, TID shall prepare and submit the appropriate Notice of Intent, SWPPP, and other necessary engineering plans and specifications for pollution prevention and control. The SWPPP and other plans shall identify and specify the use of erosion sediment control BMPs, means of waste disposal,

implementation of approved local plans, non-stormwater management controls, permanent post-construction BMPs, and inspection and maintenance responsibilities. The SWPPP shall also specify the hazardous materials that are likely to be used during construction and that could be present in stormwater drainage and non-stormwater discharges.

Water quality BMPs shall be applied according to the California Stormwater Quality Association's *Stormwater Best Management Practices Handbooks*. BMPs shall be designed to mitigate stormwater runoff through minimization, infiltration, or treatment. Construction will adhere to all appropriate BMPs. Sediment control measures, including silt fencing, fiber rolls, and street sweeping and vacuuming, shall be put in place to prevent off-site discharge of sediment generated by erosion of disturbed areas during construction.

According to the assessment criteria in Construction General Permit No. 2009-0009-DWQ, the proposed project is ranked Risk Level 1. Therefore, TID shall conduct quarterly, non-storm water visual inspections, during which TID will observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources. For storm-related inspections, TID shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.

Within 48 hours prior to each qualifying rain event, TID shall visually observe (inspect): (1) all storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources; and (2) all BMPs to identify whether they have been properly implemented in accordance with the SWPPP. If needed, the discharger shall implement appropriate corrective actions. Within 48 hours after each qualifying rain event, TID shall conduct post rain event visual observations to: (1) identify whether BMPs were adequately designed, implemented, and effective; and (2) identify additional BMPs and revise the SWPPP accordingly. TID shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection that could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

For each inspection required, TID shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format. TID shall ensure that all inspection, maintenance repair and sampling activities at the Project location are performed or supervised by a Qualified SWPPP Practitioner. The Qualified SWPPP Practitioner may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.4-2

Substantially deplete groundwater supplies or interfere substantially with groundwater recharge. *A groundwater well would be installed at the control building for the proposed substation. This would be considered a* ***less-than-significant*** *impact.*

GROUNDWATER SUPPLY The Project would overlay the 347,000 acre Turlock Subbasin of the San Joaquin Valley Groundwater Basin. A 1 hp, single phase groundwater well would be constructed at the Grayson Substation North to provide water to a restroom. The restroom would be used only by employees, who would visit the site approximately one a month.

Appropriate permits for well construction would be obtained from Stanislaus County Department of Environmental Resources. The department's standards are consistent with the California Water Code and the well standards contained in the Department of Water Resources' Bulletins 74-81 and 74-90. Reports required by these standards shall be produced prior to well drilling. Provided the limited use of groundwater at the Grayson Substation North, and the regulatory oversight in place to ensure the proper siting and construction of the proposed well, the effect of the new well on groundwater supplies would be less than significant.

Only a minimal amount of water would be used in the construction of the Project, primarily for dust control and concrete mixing. This water would be taken directly from local irrigation canals, fire hydrants, or other non-potable sources and would not impact subsurface water supplies. Short term effects on groundwater supplies as a result of construction would not be significant.

GROUNDWATER RECHARGE Recharge of the groundwater basin would not be significantly impeded by Project implementation. The Project would not substantially increase the amount of impermeable surfaces along the Project route; the concrete pole foundations would not be of sufficient size or distribution to have an effect on recharge. At the Grayson Substation North, the site would be covered in crushed aggregate, which would generally allow infiltration of rainwater.

The Grayson Substation North site is currently in agricultural use. Within the TID service area, surface water supplies most of the water used for agriculture. As this surface water is applied and percolates into the groundwater table, it serves to recharge the subbasin. Therefore, while the single well at the substation may use less water annually than is currently used to support the orchard, there may be a localized, negative impact on groundwater. However, given that the 10 acre substation site would be approximately 0.0003 percent of the total extent of the Turlock Subbasin, this impact is not considered significant.

MITIGATION MEASURE 4.4-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.4-3

Alter stormwater runoff patterns in a manner that contributes to erosion, siltation, or flooding. *The Project would not alter any existing drainage patterns, nor have any impact on a stream or river course. This impact would be considered* ***less than significant****.*

Implementation of the Project would create small areas of impervious surfaces (e.g., transmission pole footings, substation structure footings, and substation buildings) along the transmission line route and at the substation. The topography of the project area is extremely flat and the potential for erosion is very small. The relatively small footprint of the impervious areas, combined with their dispersal over the area of effect, indicate that the potential runoff from Project implementation would not result in a significant mobilization of sediment. Mitigation should be implemented, however, to ensure that construction activities do not cause erosion or sediment transport during rain events.

MITIGATION MEASURE 4.4-3

TID shall implement sediment and erosion control BMPs during construction, as specified by the SWPPP.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.4-4

Increased runoff leading to localized or downstream flooding. *Addition of impervious surfaces, in the form of footings and related structures, is not expected to substantially increase the potential for site flooding. The impact associated with the implementation of this Project is considered* ***less-than-significant****.*

County stormwater system improvements are absent in the general vicinity of the Project, except for occasional drop inlets along major boulevards such as Crows Landing Road and Service Road. Similar to the laterals of the Ceres Main canal, stormwater in the area gravity flows westward to the San Joaquin River basin.

Due to the small footprint size of towers and poles, and the fact that the substation would not be paved, the Project would not significantly increase the amount of impervious surfaces. Much of the Project area, including the transmission line corridors and substation site, is currently unimproved, with few unnatural impervious surfaces. Addition of the proposed impervious surfaces is not expected to alter existing drainage patterns, or otherwise increase the rate or amount of site runoff.

Overall acreage of impervious surfaces on the substation site and along the Project route would increase. The substation would be designed to contain all storm runoff either through a French drain or a stormwater basin. No surface water would leave the substation site. The Project is not expected to substantially alter site drainage patterns in a manner that would result in site flooding. Therefore, this impact would be considered less than significant.

MITIGATION MEASURE 4.4-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.4-5

Otherwise degrade water quality. ***No impact*** *to water quality, beyond the construction-related effects previously discussed, would be anticipated with Project implementation.*

No impacts to water quality, beyond the construction-related impacts identified in Impact 4.4-1, are anticipated with Project implementation. Therefore, the BMPs and post-construction erosion and sediment control measures identified in Mitigation Measure 4.4-1, which would ultimately be included in the SWPPP for the Project, are determined to be sufficient to protect area water quality.

MITIGATION MEASURE 4.4-5

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.4-6

Place houses within a 100-year floodplain. *No buildings are planned within a 100-year floodplain. Therefore,* ***no impact*** *is anticipated.*

The Project would not place any structure within a 100-year flood hazard area.

MITIGATION MEASURE 4.4-6

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.4-7

Place structures within a 100-year floodplain. *No buildings are planned within a 100-year floodplain. Therefore,* ***no impact*** *is anticipated.*

No portion of the Project is located within a Federal Emergency Management Agency designated floodplain.

MITIGATION MEASURE 4.4-7

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.4-8

Expose people or structures to risk of flooding. *The Project is not located in an area known to flood, or subject to flooding as a result of dam or levee failure. Therefore,* ***no impact*** *is anticipated.*

The Project is not located in an area subject to dam or levee failure. Therefore, no impacts related to flooding or dam failure would be anticipated with Project implementation.

MITIGATION MEASURE 4.4-8

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.4-9

Result in inundation by seiche, tsunami, or mudflow. *There are no waterbodies in the vicinity of the Project of sufficient size to result in a substantial seiche, tsunami, or mudflow.* ***No impact*** *is anticipated.*

The Project is not located in an area subject to seiches, tsunamis, or mudflow. Therefore, no impacts related to these events would be anticipated with Project implementation.

MITIGATION MEASURE 4.4-9

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

4.5 AIR QUALITY

This section describes current air quality conditions in the Project vicinity and identifies sensitive land uses that could be affected by air pollution. The impact analysis discusses the expected emissions associated with the Project and evaluates potential effects on residents and sensitive receptors near the substation and along the transmission line routes. Mitigation measures are identified for significant effects, followed by identification of the residual impact significance after mitigation measures are implemented.

4.5.1 EXISTING CONDITIONS

The Project is located within Stanislaus County and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD is the regional government agency charged with improving the health and quality of life for all valley residents through efficient, effective and entrepreneurial air quality-management strategies.

The 2009 Draft EIR includes a discussion of regional topography, climate, and meteorology, as well as air quality. The 2009 Draft EIR also explains the effects of air pollutants. These discussions remain relevant to the project, as proposed, and are hereby incorporated into this EIR.

With regard to sensitive receptors, the nearest existing residence is located approximately 2,000 feet south of the Grayson Substation North and many residences are located along the Project routes. Residences would be located within 50 feet of the construction corridor of the Lateral 2½ Route (along Euclid Avenue and near Mountain View Road, Pioneer Road, Esmar Road, Central Avenue, and East Grayson Road), the Lateral 2 Route (along Euclid Avenue and near Mountain View Road, Pioneer Road, Esmar Road, and Central Avenue), and the Geer Road Alternative Segment. Both the Lateral 2½ Route and the Lateral 2 Route would be located within 20 feet of a residence at the northwest corner of Esmar Road and Lateral No. 2.

4.5.2 REGULATORY SETTING

The regulatory context is as described in the 2009 Draft EIR.

4.5.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

The impact analysis for this section was prepared using the SJVAPCD requirements and air quality issues identified in Appendix G of the CEQA Guidelines. The impact analysis involves qualitative and quantitative discussions of emissions likely to be generated during construction and a quantitative discussion of the types of emission sources associated with operation of the Project. Annual increases in emissions associated with the Project were estimated using the California Air Resource Board-approved Urban Emissions Model (URBEMIS 2007, version 9.2.4) computer program based on the Project description and default assumptions contained in the model (Appendix B).

THRESHOLDS OF SIGNIFICANCE

The SJVAPCD has established thresholds of significance for construction impacts, Project operations, and cumulative impacts. For construction impacts, the pollutant of greatest concern is particulate matter of 10 micrometers or less (PM_{10}). The entire San Joaquin Valley Air Basin (SJVAB) is a nonattainment area for PM_{10} state standards and any addition to the current PM_{10} problem could be considered significant. However, rather than require quantification of construction-related emissions, the SJVAPCD has adopted a set of PM_{10} Fugitive Dust Rules collectively called Regulation VIII. The SJVAPCD determines compliance with Regulation VIII for all sites and implements other control measures as appropriate, depending on the size and location of the project site, which would reduce PM_{10} impacts to a level considered less-than-significant (SJVAPCD 2002). The SJVAPCD recognizes that construction equipment also emits carbon monoxide and ozone precursor emissions. However, the SJVAPCD has determined that these emissions may cause a significant air quality impact only in the cases of very large or very intense construction projects.

The SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) also includes significance criteria for evaluating operational-phase emissions from direct and indirect sources associated with a project. Indirect sources include motor vehicle traffic associated with the Project and do not include stationary sources covered under permit with the SJVAPCD.

Operation-related emissions from projects within the SJVAB that exceed 10 tons per year for reactive organic gas (ROG) or nitrogen oxide (NO_x) are considered to have significant air quality impacts.

According to the CEQA Guidelines, adverse impacts to air quality would be considered significant if the Project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Air quality impacts were evaluated for construction and operation of the Project. Construction of the Project would produce dust and emissions from diesel and gasoline-powered equipment. Vehicle trips associated with the operation and maintenance of the substation and transmission line would also produce dust and emissions, but at a minimal level.

IMPACT ANALYSIS

The following analysis is applicable to the Lateral 2½ Route and the Lateral 2 Route, as well as the implementation of the Geer Road Alternative Segment. While the Lateral 2½ Route is approximately 2 miles longer than the Lateral 2 Route, the Lateral 2 Route requires the construction of more 230/115-kV poles. The height and relative complexity of these poles are assumed to require more time, and result in more emissions per location, than 115/12-kV poles. The similarity between the Geer Road Alternative Segment and the equivalent potion of either route indicates that there would not be a significant change in air quality impacts with is

implementation. For the purpose of this EIR analysis, construction of the Project was assumed to occur over a 12 month period.

IMPACT 4.5-1

Impact Project area air quality as a result of construction. *The construction of a new transmission line and substation has the potential to contribute to existing or projected air quality violations. Therefore the impact would be considered* ***potentially significant****.*

Short-term construction emissions are typically generated by clearing, grading, excavating, and using heavy equipment or trucks. Emissions are also generated from commute vehicles for construction workers, trucks hauling equipment and materials, and stationary construction equipment used on-site. Construction-related emissions consist primarily of ROGs, NO_x, and PM_{10}. Emissions of ROGs and NO_x are generated primarily by the operation of gasoline- and diesel-powered motor vehicles. Emissions of PM_{10} are generated primarily by wind erosion of exposed graded surfaces. Construction-generated emissions would vary from day to day, depending on the specific activities being conducted and meteorological conditions.

Per the SJVAPCD's GAMAQI, the SJVAPCD's approach to CEQA analyses of construction PM_{10} impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emissions. From the perspective of the SJVAPCD, compliance with Regulation VIII for all sites and implementation of other control measures, depending on the size and location of the project site, would constitute sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant. Compliant with Regulation VIII, Rule 8021 a dust control plan would be submitted to the Air Pollution Control Officer to ensure that proper mitigation of construction activities occurs.

Construction equipment, on-road heavy-duty trucks, and construction-worker vehicles would generate criteria air pollutant emissions. Emissions from construction-worker commute trips would be minor compared to emissions from heavy-duty trucks. Criteria pollutant concentrations of ROG and NO_x from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period.

The URBEMIS 2007 computer model was run to calculate the site-grading emissions and exhaust emissions from construction for ROG, NO_x, and carbon monoxide (CO) (Appendix B). Table 4-1 shows the number of crew and equipment usage assumed for the Project. The

emissions presented in Table 4-2 are the highest annual emissions modeled by URBEMIS 2007 for the construction of the Project without mitigation. While PM_{10} quantities are not required by the SJVAPCD, PM_{10} results from URBEMIS 2007 are also included. As shown in Table 4-3, the level of ROG and NO_x would not exceed the significance criteria of 10 tons per year. This would be a less-than-significant impact.

In recent years, the standard for CO has not been exceeded in the SJVAB; however, background concentrations are still high enough for CO hot spots to be potential problems in urban areas with high levels of traffic congestion. The Project would be located in rural areas outside of city limits where traffic levels are expected to be low. Therefore, CO emissions from Project-related construction activities would result in a less-than-significant impact.

Table 4-1 Typical Project Construction Equipment and Crew

Project Element	Quantity	Hours Per Day	Days of Work
Transmission Line			
240-hp Sterling Boom Truck	1	8	35
240-hp Watson 3000 drill	1	8	35
240-hp auger truck	2	8	90
240-hp aerial line truck	3	8	90
79-hp tractor/loader/backhoe	1	5	90
250-hp reel truck	1	8	45
9.5 yd Concrete truck	2	8	35
1-ton service truck	3	10	230
65 Ton crane	1	5.5	90
Crew	17	10	35-55
Substation			
174-hp grader	1	6	25
79-hp tractor/loader/backhoe	1	6	65
114-hp roller	1	6	25
9.5 yd Concrete Truck	1	4	13
Condor manlift	1	6	150

Table 4-1 Typical Project Construction Equipment and Crew

Project Element	Quantity	Hours Per Day	Days of Work
1-ton service truck	2	4	250
70 Ton Crane, 190-hp	1	6	12
Ditch Witch Trencher	1	6	13
Crew	7	8	60-250

Source: TID 2009

Table 4-2 Typical Project Construction Emissions

Emissions	Pollutant (Tons Per Year)			
	ROG	CO	NO_x	PM_{10}
Substation Construction Emissions[a]	0.21	0.81	1.74	0.96
Transmission Line Construction Emissions[a]	0.75	2.43	7.63	0.28
Total Project Construction Emissions[a]	0.96	3.24	9.37	1.24
Significance Thresholds[b]	10	NA[c]	10	NA[d]
Are Thresholds Exceeded?	No	NA[c]	No	NA[d]

Source: Miller Environmental Consulting 2010

Note: Emissions were calculated using the URBEMIS 2007 emissions model.

[a] Calculations include emissions from numerous sources, including site grading, construction worker trips, stationary equipment, diesel and gas mobile equipment, off-site haul import for aggregate material, and off-site haul export for soil.

[b] Per the SJVAPC GAMAQI, 2002, page 45.

[c] The SJVAPC refers to the California Ambient Air Quality standards for CO (9 ppm) for operations, and does not have a tons per year limit. The SJVAPCD recognizes that construction equipment also emits carbon monoxide. However, the SJVAPCD has determined that these emissions may cause a significant air quality impact only in the cases of very large or very intense construction projects. The SJVAPCD will advise Lead Agencies on quantification procedures and significance on a case by case basis.

[d] The SJVAPCD's approach to CEQA analyses of construction PM10 impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emissions.

Table 4-3 Daily Operational Emissions–2010

	Criteria Air Pollutants (Tons Per Year)			
	ROG	CO	NOx	PM_{10}
Substation Operational Emissions[a]	0.04	0.26	0.15	0
Transmission Line Operational Emissions[a]	0.02	0.26	0.15	0
Total Project Operational Emissions[a]	0.06	0.52	0.30	0
Significance Thresholds[b]	10	NA[c]	10	NA[d]

Table 4-3 Daily Operational Emissions–2010

	Criteria Air Pollutants (Tons Per Year)			
	ROG	**CO**	**NOx**	**PM_{10}**
Are Thresholds Exceeded?	No	NA[c]	No	NA[d]

Source: Miller Environmental Consulting 2010

Note: Emissions were calculated using the URBEMIS 2007 emissions model.

[a] Calculations include emissions primarily from vehicle trips related to substation and transmission line maintenance needs. Assumptions include: two truck trips per month to the Grayson Substation North, 10 miles one-way; and two truck trips per year to each pole 10 miles one-way.

[b] Per the SJVAPC GAMAQI, 2002, page 26.

[c] The SJVAPC refers to the California Ambient Air Quality standards for CO (9 ppm) for operations, and does not have a tons per year limit.

[d] The SJVAPCD does not have a tons per year limit for operational PM_{10} impacts.

NA = Not available

MITIGATION MEASURE 4.5-1

The following controls, derived from Regulation VIII, are required to be implemented at all construction sites (SJVAPCD 2002):

- All disturbed areas, including storage piles that are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant; or through covering with a tarp or other suitable cover, or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container shall be maintained.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is

expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions; use of blower devices is expressly forbidden.)

- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
- Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.

The SJVAPCD will recommend these enhanced and additional measures when project conditions warrant (e.g. potential for impacting sensitive receptors, construction sites of significant size, or any other conditions that may justify additional emission reductions):

- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- Suspend excavation and grading activity when winds exceed 20 miles per hour[1].
- Limit area subject to excavation, grading, and other construction activity at any one time.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT4.5-2

Impact Project area air quality as a result of operation. *Due to the small number of vehicle trips generated by the Project, operations would not result in significant vehicle emissions that would violate any air quality standard or contribute substantially to an existing air quality violation. Therefore the impact would be considered* ***less than significant****.*

Long-term emissions would be generated primarily from vehicle trips to and from the Project area. The Project would generate approximately 26 truck trips per year for substation and transmission line related maintenance needs. Project operational emissions have been estimated

1 Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.

using the URBEMIS 2007 computer model (Appendix B). As shown in Table 4-3, daily operational emissions from the Project would not generate more than 10 tons per year of ROGs or NO_x, and would not result in a significant impact related to these pollutants. CO levels shown in Table 4-3 are also very low and traffic level of service in the Project area is expected to remain at acceptable levels. The Project, therefore, would not be expected to violate any air quality standard or contribute to an existing or projected air quality violation in the Project vicinity. Impacts from operational emissions associated with the Project would be less than significant.

MITIGATION MEASURE 4.5-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.5-3

Create objectionable odors. *The Project would not create objectionable odors that would affect a substantial number of people. Therefore the impact would be considered* ***less than significant.***

In general, the types of land uses that pose potential odor problems include refineries, chemical plants, wastewater treatment plants, landfills, composting facilities, and transfer stations. No such uses are proposed.

Diesel engines would be used for some construction equipment. Odors generated by construction equipment would be variable, depending on the location and duration of use. Diesel odors may be noticeable to some individuals at certain times, but would not affect a substantial number of people. This is a less-than-significant impact.

MITIGATION MEASURE 4.5-3

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.6 GREENHOUSE GAS EMISSIONS

This section provides background information regarding greenhouse gasses (GHGs) and an analysis of the Project's potential contribution to global climate change. The impact analysis discusses the consistency of the Project's expected emissions with State policy. This section is written to comply with the new CEQA Guidelines to address GHGs, released on March 18, 2010.

4.6.1 EXISTING CONDITIONS

The Project is located in unincorporated Stanislaus County, the City of Ceres, and within the spheres of influence for the cities of Ceres and Hughson. There are no GHG inventories that address the Project area. A background discussion regarding GHG is provided in Section 4.6.1 of the 2009 Draft EIR.

4.6.2 REGULATORY SETTING

To assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project specific GHG on global climate change, the SJVAPCD has adopted *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* and the *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. The guidance and policy rely on the use of performance-based standards, known as best performance standards (BPS), to assess significance of project-specific GHG emissions on global climate change during the environmental review process, as required by CEQA.

Use of BPS is a method of streamlining the CEQA process of determining significance and is not a required emission reduction measure. Projects implementing BPS would be determined to have a cumulatively less than significant impact. Otherwise, demonstration of a 29 percent reduction in GHG emissions, from business-as-usual, is required to determine that a project would have a less than cumulatively significant impact. The guidance does not limit a lead agency's authority in establishing its own process and guidance for determining significance of project related impacts on global climate change. The SJVAPCD has developed BPS for the following

stationary sources: boilers; steam generators; gasoline dispensing facilities; dry cleaners; oil and gas extraction, storage, transportation, and refining operations; and co-generation (SJVAPCD 2009).

There is currently no plan, policy, or regulation adopted by Stanislaus County or the cities of Ceres or Hughson for the purpose of reducing the emissions of GHGs. The City of Ceres is currently working with the San Joaquin Valley Clean Energy Organization to review the City's Energy Efficiency and Conservation Strategy with the aim of refining the City's near-term and long-term implementation plan that may include a GHG emissions inventory and a climate action plan to reduce greenhouse gas emissions by 30 percent by 2020 (RECOVERY.GOV 2010).

Additional information on the regulatory setting with regard to GHG is provided in Section 4.6.2 of the 2009 Draft EIR.

4.6.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

The impact analysis for this section was prepared using the guidelines described below. The impact analysis involves qualitative and quantitative discussions of emissions likely to be generated during construction and operation of the Project. Annual increases in carbon dioxide emissions associated with the Project were estimated using the California Air Resources Board (CARB) -approved URBEMIS 2007 (version 9.2.4) computer program, based on the project description and default assumptions contained in the model (Appendix B). The significance criteria in the amendments to the CEQA guidelines do not specifically address the potential impacts of climate change on the Project, as described in Section 4.6.1. However, one of the primary reasons for Assembly Bill (AB) 32 is to protect the environment from sea level rise, changes in the snow pack, and increases in wildfires. Therefore, the impact section also includes an analysis to ensure the Project is not susceptible to these climate change effects.

For this Project, the proposed action would be considered to have a significant impact if the Project would be in conflict with the AB 32 State goals for reducing GHG emissions. It is assumed that AB 32 will be successful in reducing GHG emissions and reducing the cumulative

GHG emissions statewide by 2020. It is important that the state has taken these measures, because no project individually could have a major impact (either positively or negatively) on the global concentration of GHG. Given this, the Project was reviewed to make sure it does not conflict with the goals of AB 32.

THRESHOLDS OF SIGNIFICANCE

Amendments and additions to the CEQA Guidelines were forwarded by the governor's Office of Planning and Research in April 2009; and the State Resources Agency implemented the regulations on March 18, 2010. These CEQA Guideline amendments provide direction to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. In addition, the amendments add a new set of environmental checklist questions (VII. Greenhouse Gas Emissions) to the CEQA Guidelines, Appendix G.

Consistent with Appendix G of the CEQA Guidelines, impacts would be considered significant if the project:

- Generates GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflicts with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

IMPACT ANALYSIS

This impact analysis employs the same assumptions outlined for air quality impacts in the previous section. The following analysis is applicable to the Lateral 2½ Route and the Lateral 2 Route, as well as the implementation of the Geer Road Alternative Segment. While the Lateral 2½ Route is approximately 2 miles longer than the Lateral 2 Route, the Lateral 2 Route requires the construction of more 230/115-kV poles. The height and relative complexity of these poles are assumed to require more time, and result in more emissions per location, than 115/12-kV poles. No significant change in GHG-creating activities is anticipated with the implementation of the Geer Road Alternative Segment.

IMPACT 4.6-1

Generate GHG emission that may have a significant impact on the environment. *The Project could release SF_6, a known GHG that could contribute to global climate change. This impact is* ***potentially significant****.*

Project construction GHG emissions would be approximately 930 metric tons/year of carbon dioxide equivalents (CO_2e) and Project operations would be approximately 487 metric tons/year of CO_2e (including emissions from maintenance-related vehicle trips and indirect emissions from the use of electricity for lighting at the substation) (Appendix B). The Project would not be classified as a major source of GHG emissions (actual construction emissions would be about four percent of the lower reporting limit, which is 25,000 metric tons/year of CO_2e, and operational emissions would be about two percent of the lower reporting limit). Therefore, no mitigation is required.

Sulfur hexafluoride (SF_6), a GHG that contributes to climate change if accidentally released, is widely used as an insulator in electrical equipment in the utility industry. SF_6 has a high global warming potential and an atmospheric lifetime of 3,200 years. The International Panel on Climate Change considers SF_6 to be the most potent GHG it has evaluated. Although SF_6 emissions accounted for only 0.5 percent of the worldwide GHG emissions in 1995, it has been included in the Kyoto Protocols on climate change. There are currently no substitutes for SF_6 for substation equipment.

Each circuit breaker will be installed with approximately 60 pounds of SF_6. Under normal substation operation, SF_6 would remain sealed inside the circuit breaker equipment. However, SF_6 has the potential to contribute to global climate change should it be released accidentally, as leaks or during maintenance. Thus, this would be considered a potentially significant impact.

MITIGATION MEASURE 4.6-1

Each breaker shall be alarmed and monitored to prevent release of SF_6. TID shall keep current records on the use of SF_6 at the substations and shall inspect and maintain the substation facilities to prevent SF_6 leakage.

IMPACT 4.6-2

Conflict with the goal of reducing GHG. *The Project could conflict with implementation of state goals for reducing GHG emissions and thereby could have a negative effect on global climate change. Therefore the impact would be* ***potentially significant****.*

The SJVAPCD has adopted the *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* and *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. The guidance and policy rely on the use of BPS to assess significance of project-specific GHG emissions on global climate change during the environmental review process. The SJVAPCD has developed BPS for the following stationary sources: boilers; steam generators; gasoline dispensing facilities; dry cleaners; oil and gas extraction, storage, transportation, and refining operations; and co-generation (SJVAPCD 2009).

Electrical transmission lines would not be considered to be stationary sources of emissions, and therefore it is unnecessary for the SJCAPCD to develop BPS's for transmission lines. Transmission lines do not directly emit GHGs, but connect power plants to users of the electricity. BPS's and/or other statewide regulations will focus on reducing emissions from both the power plants and the end users, but not the transmission lines themselves. Substations can also be a source of GHG emissions because they use SF_6, which is a potent GHG.

The site of the proposed Grayson Substation North is currently developed as almond orchard, and would require grading and installation of substation equipment. As with other individual and relatively small projects (i.e., projects that are not cement plants, oil refineries, electric generating facilities, co-generation facilities, hydrogen plants, or other stationary combustion sources that emit more than 25,000 metric tons/year of CO_2e), the specific emissions from this Project would not be expected to individually have an impact on Global Climate Change (AEP 2007). Furthermore, GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008).

Four types of analyses are used to determining whether the Project could conflict with the State goals for reducing GHG emissions. The analyses are as follows:

1. Any potential conflicts with the CARB's 39 recommended actions included in their Climate Change Proposed Scoping Plan (the recommended actions are discussed in the 2009 Draft EIR).

2. The relative size of the Project. The Project's GHG emissions will be compared to the size of major facilities that are required to report GHG emissions2 to the state; and the Project size will be compared to the estimated GHG reduction state goal of 169 million metric tons per year of CO_2e emissions by 2020. As noted above, the 25,000 metric ton annual limit identifies the large stationary point sources in California that make-up approximately 94 percent of the stationary emissions. If the Project's total emissions are below this limit, its total emissions are equivalent in size to the smaller projects in California that as a group only make up six percent of all stationary emissions. It is assumed that the activities of these smaller projects generally would not conflict with State's ability to reach AB 32 overall goals. In reaching its goals the CARB will focus upon the largest emitters of GHG.

3. The basic energy efficiency parameters of a project to determine whether its design is inherently energy efficient.

4. Any potential conflicts with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHG.

With regard to Item 1, the Project could pose an apparent conflict with the CARB recommended actions. Measure No. H-6 recommends SF_6 leak reduction and recycling in electrical applications. SF_6 has the potential to contribute to global climate change should it be released accidentally, as leaks or during maintenance. Thus, this would be considered a potentially significant impact, as discussed under Impact 4.6-1.

With regard to Item 2, Project construction GHG emissions would be approximately 930 metric tons/year of CO_2e and Project operations would be approximately 487 metric tons/year of CO_2e (including emissions from maintenance-related vehicle trips and indirect emissions from the use

of electricity for lighting at the substation) (Appendix B). The Project would not be classified as a major source of GHG emissions (actual construction emissions would be about four percent of the lower reporting limit, which is 25,000 metric tons/year of CO_2e, and operational emissions would be about two percent of the lower reporting limit).

When compared to the overall State reduction goal of approximately 169 million metric tons/year of CO_2e, the maximum GHG emissions for the Project (930 metric tons/year of CO_2e or 0.0006 percent of the State goal during construction and 487 metric tons/year of CO_2e or 0.0003 percent of the State goal during operations) are quite small and should not conflict with the State's ability to meet the AB 32 goals.

With regard to Item 3, the nature of the Project does not lend itself to incorporating basic energy efficiency parameters. However, in 2006 TID adopted a renewable energy policy that is expected to reduce the District's potential contributions to global climate change.

With regard to Item 4, the Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHG. While the SJVAPCD has not established BPS for substations and associated equipment, the Project would be expected to incorporate best management practices for substations (see Mitigation Measure 4.5-1) and transmission poles. The Project would be consistent with the SJVAPCD's approach of implementing BPS.

The review of Items 1 through 4 indicates that the Project could potentially conflict with one of the State goals in AB 32 and therefore this impact would be potentially significant. Specifically, the Project would use SF_6, which has the highest known GHG warming potential.

MITIGATION MEASURE 4.6-2

Implementation of Mitigation Measure 4.6-1 would reduce the threat of SF_6 release. No further mitigation required.

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2 The State of California has not provided guidance as to quantitative significance thresholds for assessing the impact of GHG emissions on climate change and global warming concerns. Nothing in the CEQA Guidelines directly addresses this issue.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.7 GEOLOGY, SOILS, AND MINERAL RESOURCES

This section describes the geology, soils, seismic setting, and mineral resources in the vicinity of the Project and includes an analysis of potential impacts that could result from project implementation, No potentially significant impacts are identified.

4.7.1 EXISTING CONDITIONS

The Project would traverse relatively flat, alluvial deposits associated with the San Joaquin Valley. The valley is flanked on the east and west by the Sierra Nevada foothills and the Coastal Range, respectively. Alluvial deposits, consisting of unconsolidated and semi-consolidated lake, terrace, and playa deposits from the Pleistocene epoch, have eroded from the surrounding seismically active regions and form the central plain of the valley. Soil types in the Project vicinity are presented in Figure 4.7-1 and provided in Table 4-4. Elevations within the Project area are about 100 feet above mean sea level.

Table 4-4 Soils Present in the Area of Potential Disturbance

Soil Type Code	Description
DgA	Delhi loamy sand, silty substratum, 0 to 3 percent slopes
DkA	Dello loamy sand, 0 to 1 percent slopes
DrA	Dinuba sandy loam, 0 to 1 percent slopes
DsA	Dinuba sandy loam, shallow, 0 to 1 percent slopes
DtA	Dinuba sandy loam, deep, 0 to 1 percent slopes
DuA	Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes
DwA	Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
DyA	Dinuba sandy loam, shallow, slightly saline-alkali, 0 to 1 percent slopes
DzA	Dinuba sandy loam, very poorly drained variant, slightly saline- alkali, 0 to 1 percent slopes
FrA	Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
FsA	Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes
FtA	Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes
FuA	Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes
GvA	Greenfield sandy loam, deep over hardpan, 0 to 3 percent slopes
HbpA	Hanford fine sandy loam, moderately deep over silt, 0 to 1 percent slopes
HdA	Hanford sandy loam, 0 to 3 percent slopes

Table 4-4 Soils Present in the Area of Potential Disturbance

Soil Type Code	Description
HdB	Hanford sandy loam, 3 to 8 percent slopes
HdC	Hanford sandy loam, 8 to 15 percent slopes
HddA	Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes
HdpA	Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
HdsA	Hanford sandy loam, deep over silt, 0 to 1 percent slopes
HfA	Hilmar loamy sand, 0 to 1 percent
HkbA	Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes
HrA	Honcut sandy loam, 0 to 1 percent slopes
TpA	Traver sandy loam, slightly saline-alkali, 0 to 1 percent slopes
TuA	Tujunga loamy sand, 0 to 3 percent slopes

Detailed information on local topography, soils, mineral resources, seismic conditions, and liquefaction potential are provided in Section 4.7.1 of the 2009 Draft EIR.

4.7.2 REGULATORY SETTING

Regulations and standards related to geology, soils, and seismicity are adopted to protect public safety and to conserve open space. A brief summary of the regulatory context under which soils and geologic hazards are managed at the federal, state, and local level is provided in Section 4.7.2 of the 2009 Draft EIR.

4.5.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

An assessment of existing conditions was derived from technical reports and information published by the United States Geological Survey and the United States Department of Agriculture, as well as other relevant environmental documents. A site reconnaissance of the Project area was conducted to visually confirm landforms, slopes, and general geologic conditions. No subsurface geotechnical investigations or detailed analysis have been performed in conjunction with the EIR process.

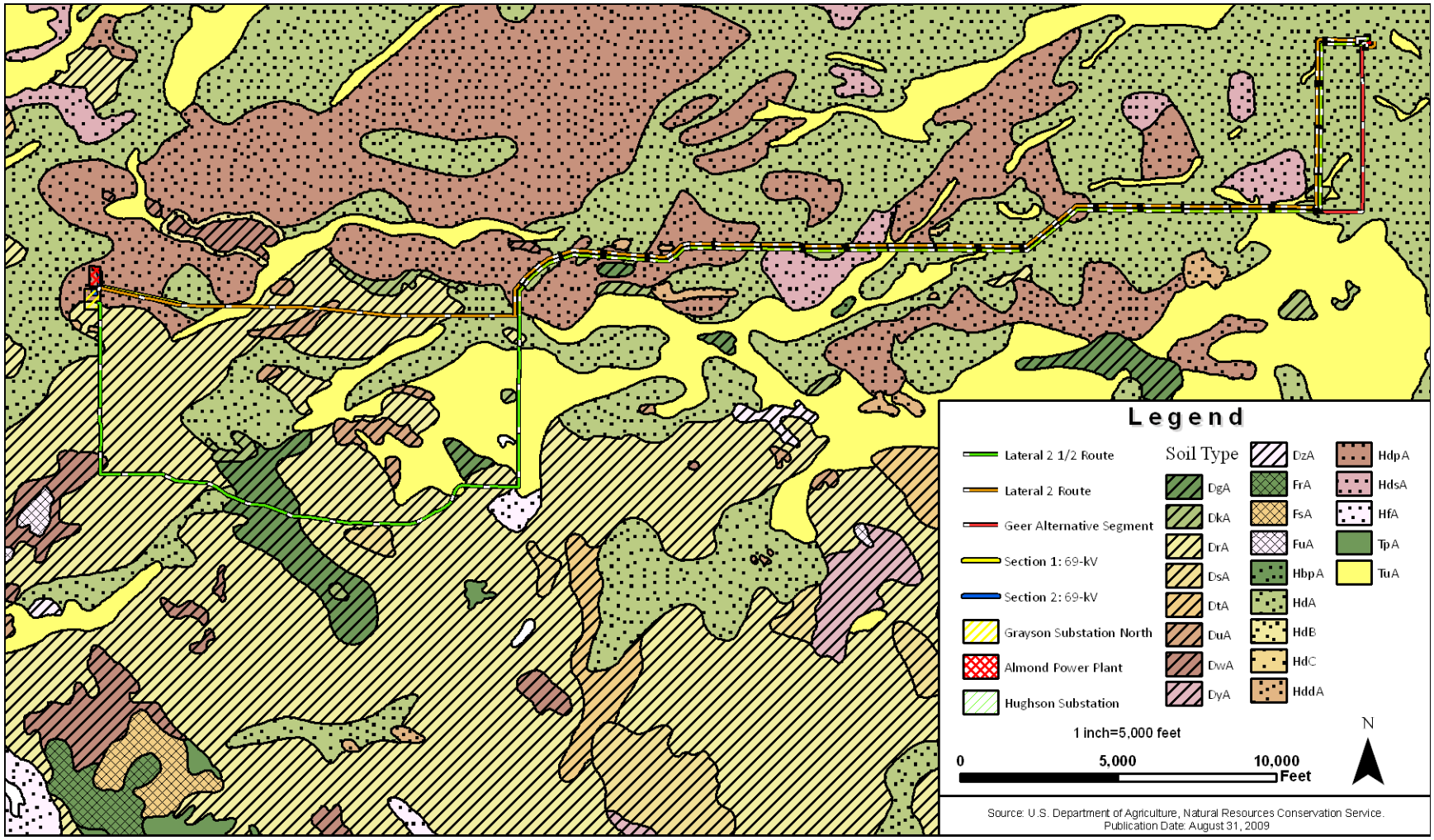


Figure 4.7-1
Soil Types in the Project Area

The analysis of geologic and soil impacts is qualitative and evaluates the extent to which development activities could affect, or be affected by, known geologic and soil conditions. The significance of impacts is based on the Thresholds of Significance presented in the following section.

THRESHOLDS OF SIGNIFICANCE

Impacts would be considered significant if the Project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of an earthquake fault, seismic ground shaking, seismic-related ground failure, landslide, expansive soils, or other geologic or soil-related hazard;
- Result in substantial soil erosion or the loss of substantial topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially results in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- Be located on an expansive soil, creating substantial risk to property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater; or
- Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.

IMPACT 4.7-1

Exposure to geologic hazard. *The Project is in an area of low geologic hazard potential and would not increase the potential for hazard. Therefore, this impact would be considered* ***less than significant****.*

The Project would be located in a relatively flat area, with low potential for seismic ground shaking and little chance of liquefaction. As discussed in the 2009 Draft EIR, there are no faults in the greater project vicinity.

This Project involves the construction and installation of utility lines, power poles, and a substation. Most structures, including electrical poles and substation structures, are potentially subject to damage from earthquakes. These hazards are unavoidable; but would be rendered less than significant, as all structures would be constructed in accordance with applicable California Building Code, General Order (GO) 95 and Institute of Electrical and Electronics Engineers standards and regulations.

MITIGATION MEASURE 4.7-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.7-2

Erosion resulting from grading. *Excavation and grading of soil could result in localized erosion during Project construction. This would be considered a* ***less-than-significant*** *impact.*

Placement of concrete pads and footings to structurally support the Project would require that a relatively small degree of excavation be conducted during construction. These activities could lead to soil erosion or the loss of topsoil. The potential for erosion is directly related to the amount of ground disturbance, soil type, vegetation removal, steepness of slope, and amount of surface water runoff. The cumulative area of soil disturbance at all pole locations would be approximately 1,977 square feet for the Lateral 2½ Route and 1,988 square feet for the Lateral 2 Route. The Geer Road Alternative Segment could slightly increase the overall disturbance area due to the larger foundations required for poles capable of supporting the necessary co-location. The Project would also require earthmoving at the substation site and each pole location.

At directly embedded pole locations, the soil removed (typically 3-4 yards) would be spread over the area adjacent to the pole. Soil excavated for construction of steel pole foundations (averaging approximately 6 yards at each location) would be given to the landowner or other interested parties (such as TID for nearby canal repairs). Soil would be trucked to the nearest location,

typically less than 1 mile away. In total, approximately 1,262[3] cubic yards of surplus soil would be produced through excavation for the proposed transmission poles associated with the Lateral 2½ Route and 1,2544 cubic yards under the Lateral 2 Route. The Geer Road Alternative Segment may result in a negligible increase in the quantity of surplus soil if implemented with either route.

Most of the 10 acre Grayson Substation North area would be graded prior to construction. Excess soil that may result from this process would be distributed over the adjacent agricultural fields, with landowner permission and in conjunction with the landowner's preparation of the field for crops. Total soil disturbance resulting from the Project would be approximately 10 acres.

Erosion is most likely to occur via wind action, as the soil types present along the route generally do not have a high potential for water-driven erosion. Construction of the proposed substation would occur on relatively level ground, and impacts from erosion as a result of unstable soil conditions are not expected to be significant. The Project would not result in a substantial increase in impervious surfaces over the length of the transmission line and substation. Impervious surfaces would be limited to pole footings and some locations at the substation. The proposed substation would be covered in crushed rock to reduce impervious surface areas to the greatest degree possible. Rainfall would continue to infiltrate into the subsurface. In addition, a French drain would also be installed at the site bounds. Therefore, there would not be any increase in surface water runoff, or subsequent erosion, as a result of the Project.

MITIGATION MEASURE 4.7-2

To ensure grading activities do not directly or indirectly discharge sediments into surface waters as a result of construction activities, TID shall develop a SWPPP. The SWPPP shall identify BMPs that would be used to minimize erosion during construction. TID shall prepare plans to control erosion and sediment, preliminary and final grading plans, and plans to control urban

3 Assumes 171 tangent poles at 2.5 feet in diameter and 9 feet deep, 42 steel angle poles at 4.5 feet in diameter and 18 feet deep, three steel angle dead end poles at 6 feet in diameter and 30 feet deep, and 10 230/115-kV poles at 7 feet in diameter and 40 feet deep.

runoff from the Project area during construction. The SWPPP's BMPs shall include, but shall not be limited to, the following components:

- Sediment control measures, including silt fencing, fiber rolls, water dust suppression, and street sweeping and vacuuming to prevent off-site discharge of sediment generated by erosion of disturbed areas during construction;
- Concrete waste management shall include designing a wash area for concrete mixers intended to eliminate the discharge of concrete or rinse slurries into stormwater or watercourses; and
- The adequacy of BMP execution shall be evaluated by the contractor during site inspections, which shall be conducted prior to a forecasted storm, after a rain event that causes runoff from the construction site, at 24-hour periods during extended rain events, weekly during the rainy season, and every two weeks during the non-rainy season. These reports shall be documented on a standard inspection checklist developed by the contractor to be kept on file at the Project site.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.7-3

Location on, or contribution to, unstable geologic conditions. *Based on the available geologic information, the Project would not result in impacts related to unstable geologic units or soils. Therefore this is considered a* ***less-than-significant*** *impact.*

Review of data available from the Natural Resource Conservation Service indicates that the soils present in the areas potentially affected by the Project are characterized by very shallow slopes and generally high clay content (Figure 4.7-1). The area has a low potential of landslide, liquefaction, and lateral spreading. The Project would not alter the overall topography of the area, nor place a heavy load on unstable soils.

4 Assumes 105 tangent poles at 2.5 feet in diameter and 9 feet deep, 18 steel angle poles at 4.5 feet in diameter and 18 feet deep, 12 steel angle dead end poles at 6 feet in diameter and 30 feet deep, and 22 230/115-kV poles at 7 feet in diameter and 40 feet deep.

MITIGATION MEASURE 4.7-3

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.7-4

Location on expansive soil. *Moderately expansive soils present in the Project area would not pose a significant risk to the proposed infrastructure. Therefore, potential impacts would be* ***less than significant****.*

Expansive soils in this area are found in the upper 5 feet of soil. Foundations, which are typically effected by expansive soils, would be necessary to support the steel angle poles and the poles supporting both 115 and 230-kV lines. These concrete foundations are not likely to be impacted by the shallow expansive soils due to the depth of the footings (approximately 18-40 feet). Any potential expansion and contraction would not likely exert enough pressures on the structures to cause cracking. The substation pads and piers would be designed and constructed so that they would not be adversely affected by the moderately expansive soils.

MITIGATION MEASURE 4.7-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.7-5

Location on soils incapable of supporting the use of septic tanks. *Implementation of the Project would require installation of a septic tank. Site soils are capable of supporting this proposed improvement. Therefore,* ***no impact*** *would be anticipated.*

Improvements at the Grayson Substation North would include the installation of a septic tank. The substation would be constructed on moderately deep Hanford sandy loam over silt and Dinuba sandy loam, both with slopes of zero to one percent (Figure 4.7-1). This soil is well drained and has moderately rapid permeability (USDA 1999).

MITIGATION MEASURE 4.7-5

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.7-6

Loss of mineral resource availability. *Implementation of the Project would not be expected to render important mineral resources inaccessible. Therefore,* ***no impact*** *to mineral resources would be anticipated with Project development.*

As illustrated in Figure 4.7-2, there are no known mineral resources located near the proposed transmission line and substation. Therefore, the Project would not be expected to render important mineral resources inaccessible. No impacts on mineral resources would be anticipated with Project implementation.

MITIGATION MEASURE 4.7-6

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

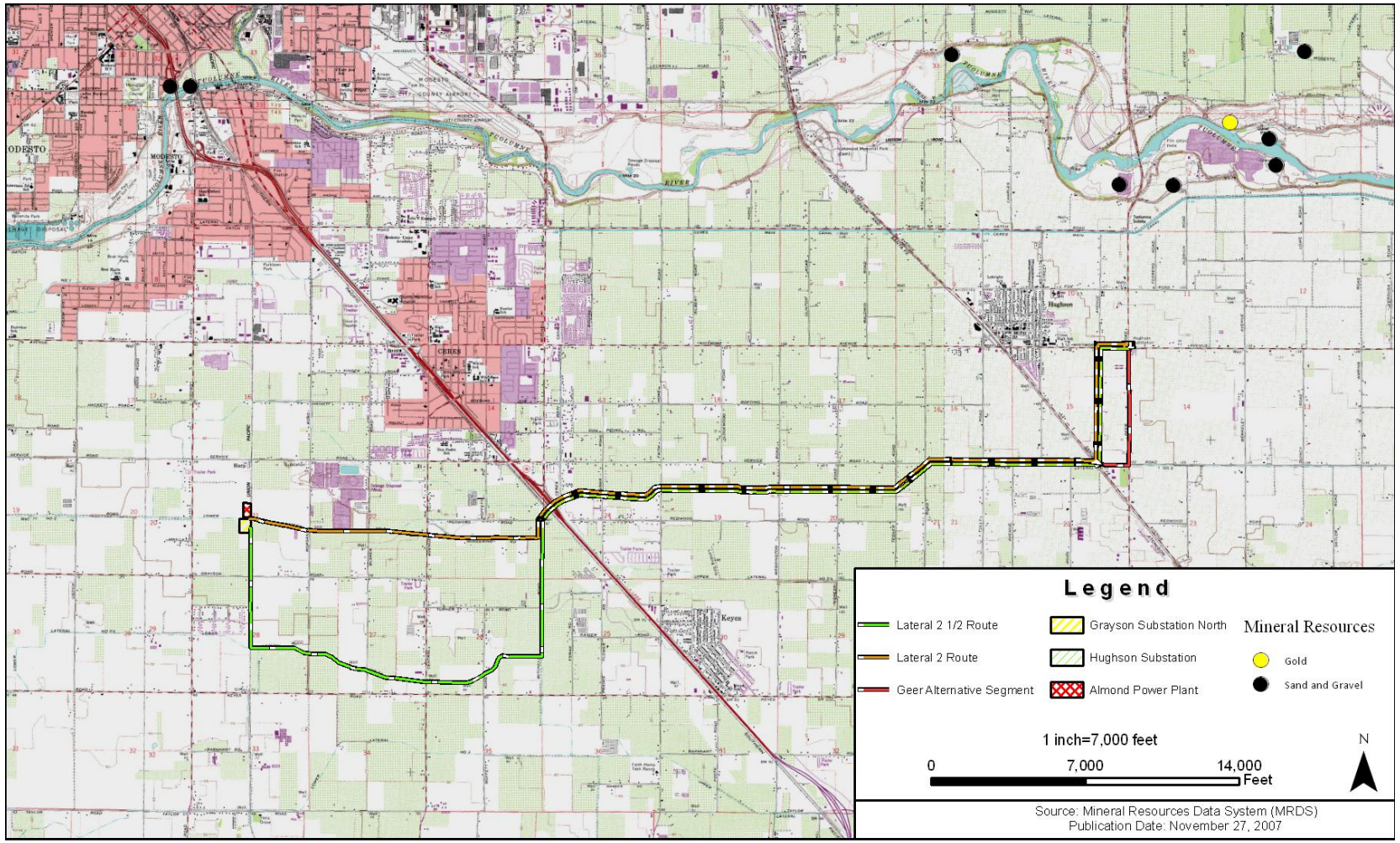


Figure 4.7-2
Mineral Resources in the Project Vicinity

4.8 CULTURAL RESOURCES

This section describes known cultural resources located within the Project area, and identifies the potential for unknown cultural resources to occur. The impact analysis discusses the potential for the Project to affect cultural resources. Cultural resources include archaeological sites, features and isolated finds, built resources over 50 years of age, and paleontological resources.

The information is summarized from the *Cultural Resources Inventory* for the 2009 Draft EIR (Arrington and Harrington 2009), which includes a literature search by the Central California Information Center (CCIC) at California State University, Stanislaus, a Sacred Lands File search by the Native American Heritage Commission (NAHC) and related communication with local Native American groups and individuals, and pedestrian survey conducted in February and March 2009 of approximately 300 acres in the Project area; as well as the *Supplemental Cultural Resources Survey* for the Project (Appendix C), which includes a literature search by the CCIC and pedestrian survey conducted in April and May 2010; plus a search of the California Museum of Paleontology database. Cultural resource surveys conducted for this project are provided in Appendix C.

4.8.1 EXISTING CONDITIONS

The cultural setting for the project is as described in Section 4.8.1 of the 2009 Draft EIR.

KNOWN CULTURAL RESOURCES WITHIN THE PROJECT AREA

Based on the cultural resources studies (Arrington and Harrington 2009; Sikes 2010), four known cultural resources are located within the Project area. Table 4-5 lists these resources and their eligibility for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). Although two of the resources are adjacent to the proposed substation parcel, none of the known cultural resources are located on the site of the proposed substation.

Table 4-5 Known Cultural Resources within the Project Area

Resource Name	Other Identifier*	Eligibility for NRHP/ CRHR	Project Attribute					
			Lateral 2½ Route 115-kV	Lateral 2½ Route 115-kV	Section One 9-kV	Section Two 69-kV	Grayson Substation North	Geer Road Alternative Segment
Atchison Topeka & Santa Fe Railroad	CA-STA-424H (P-50-002006)	Not eligible	C	C				
Southern Pacific Railroad	CA-STA-350H (P-50-000001)	Not eligible	C	C				
Tidewater Southern Railway	CA-STA-425H (P-50-000083)	Not eligible	C, P	C	C	P	P	
TID Water Conveyance System	CA-STA-426H (P-50-000073)							
	TID Main Ceres Canal	Not eligible	C, P	C, P				
	TID Lateral No. 2	Not eligible	C, P	C, P	C, P	C	P	P
	TID Lateral No. 2½	Not eligible	C, P					

C=route crosses cultural resource; P=route or substation parcel parallels cultural resource.
* Resource identifiers have been updated subsequent to the 2009 Draft EIR.

The Atchison Topeka & Santa Fe Railroad (CA-STA-424H) intersects with the 115-kV portion of the Project in the eastern extent of the Project area. Constructed between 1895 and 1898, the former San Francisco & San Joaquin Valley Railroad was purchased by the Atchison Topeka & Santa Fe Railroad in 1898, which merged with the Burlington Northern Railroad in 1995. While the San Francisco & San Joaquin Railroad/Atchison Topeka & Santa Fe appears eligible for listing in the NRHP and CRHR under Criterion B/2 for its association with a leading California merchant, Claus Spreckels, and under Criterion A/1 for being a major railroad transportation line constructed by populist support in opposition to a rail monopoly held by the Southern Pacific Railroad, the 0.02-mile segment within the Project area has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards, and other related equipment and lacks

historical integrity. Thus, the segment within the Project area does not qualify as a historic property or historical resource, and is recommended not eligible for inclusion on the NRHP or CRHR.

The Southern Pacific Railroad (CA-STA-350H) intersects with the central portion of the Project. Construction of this rail line through the Central Valley into southern California began in 1869 with the section of track from Lathrop to Bakersfield. Acquired by UPRR in 1996, the Southern Pacific Railroad is associated with the "Big Four" (Leland Stanford, Collis Huntington, Charles Crocker, and Mark Hopkins) who built the first transcontinental railroad, the Central Pacific Railroad, in 1861. While the Southern Pacific/Union Pacific Railroad line appears eligible for listing in the NRHP and CRHR under Criterion A/1 for its significant role in the transportation history of the United States, and under Criterion B/2 for being associated with the men who built the first transcontinental railroad, the 0.1-mile segment within the Project area has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards, and other related equipment and lacks historical integrity. Thus, the segment within the Project area does not qualify as a historic property or historical resource, and is recommended not eligible for inclusion on the NRHP or CRHR.

The Tidewater Southern Railway (CA-STA-425H) intersects once with the 115-kV portion of both the Lateral 2½ Route and the Lateral 2 Route, as well as with the Section One 69-kV line. In addition, the Lateral 2½ Route would parallel the railway for approximately 1.1 mile. Constructed between 1910 and 1918, this electric interurban railway was converted to diesel in the late 1940s. Majority ownership of the railway changed several times, and it was merged into the UPRR in 1987. While the Tidewater Southern Railway line appears eligible for listing in the NRHP and CRHR under Criterion A/1 for being an important interurban railroad transportation line, the segment within the Project area has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards, and other related equipment and lacks historical integrity. Thus, the segment within the Project area does not qualify as a historic property or historical resource, and is recommended not eligible for inclusion on the NRHP or CRHR.

The Project crosses a historic-era water conveyance system (CA-STA-426H) in multiple areas (Table 4-5). Construction of TID's original earthen canals and laterals was completed between 1898 and 1900. Between 1910 and 1917 the canals and laterals were lined with concrete or

gunite; water diversion features (e.g., regulator gates, concrete culverts) and bridges were built between 1917 and 1920. The proposed lines would cross the Ceres Main canal, TID Lateral No. 2, or TID Lateral No. 2½. Although the TID water conveyance system appears eligible for listing on the NRHP and CRHR under Criterion A/1 for its association with the development of the first publicly owned irrigation district in California, the historic fabric of the individual canal segments crossed by the Project have been altered by continued upkeep and maintenance and lack integrity. Thus, the segments within the Project do not qualify as historic properties or historical resources, and are recommended not eligible for inclusion on the NRHP or CRHR.

No sites of traditional Native American religious or cultural significance, including sacred sites or contemporary use areas, have been identified in the Project area through formal processes, including a Sacred Lands File search by the NAHC and related communication with local Native American groups and individuals.

Based on the cultural resources inventory (Arrington and Harrington 2009) and supplemental survey (Sikes 2010) summarized above, no significant cultural resources, including historic properties or historical resources, are therefore known to be found within the Project area. Nevertheless, considering the results of the literature search, the pattern of land use during prehistoric and ethnographic periods, as well as local historic land use, the Project area is considered highly sensitive for the discovery of prehistoric, ethnohistoric, or historic cultural material or subsurface deposits.

One hundred seventy-five fossil localities occur within Stanislaus County, ranging in age from the Late Cretaceous (99–65 million years ago) to the Pleistocene (1.8–0.1 million years ago) (UCMP 2009). The localities, many of which are in the Sierra Nevada foothills, contain mostly invertebrate fossils. Per the University of California Museum of Paleontology (2009) database, no significant paleontological fossils have been produced in the Project area or vicinity, which is underlain by recent alluvial fan deposits, recent river – and major stream – channel deposits, and recent basin deposits.

4.8.2 REGULATORY SETTING

Cultural resources that may be present in the Project area could include some or all of the following types of resources, which would be subject to applicable regulations:

- Historic properties/historical resources;
- Native American cultural items;
- Native American sacred sites;
- Archaeological sites; or
- Other cultural resources.

A summary of applicable regulations is provided in the 2009 Draft EIR.

4.8.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

The information presented in Section 4.8.1 of this document is based on the following: literature searches by the CCIC at California State University, Stanislaus; a Sacred Lands File search by the NAHC and related communication with local Native American groups and individuals; pedestrian survey conducted in February and March 2009 of approximately 300 acres and supplemental pedestrian surveys conducted in April and May 2010 of approximately 172 acres in the Project area (see Appendix C); and a search of the UCMP database.

This impact analysis is based on the data provided on existing conditions and relevant regulations. The Project was analyzed in terms of its potential to affect known cultural resources (Atchison Topeka & Santa Fe Railroad [CA-STA-424H, P-50-002006]; Southern Pacific Railroad [CA-STA-424H, P-50-000001]; Tidewater Southern Railway [CA-STA-425H, P-50-000083]; TID Water Conveyance System [CA-STA-426H, P-50-000073]); and undocumented and potentially significant cultural resources, including buried human remains, within the Project area.

THRESHOLDS OF SIGNIFICANCE

For purposes of this analysis, the Project would have a significant adverse impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in the CEQA Guidelines, Section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to the CEQA Guidelines, Section 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site; or
- Disturb any human remains, including those interred outside of formal cemeteries.

IMPACT ANALYSIS

IMPACT 4.8-1

Cause a substantial adverse change in the significance of a historical resource. *There are no documented historical resources within the Project area. Therefore this impact would be* ***less than significant.***

The segments of cultural resources identified within the Project area — the Atchison Topeka & Santa Fe Railroad (CA-STA-424H), Southern Pacific Railroad (CA-STA-350H), Tidewater Southern Railway (CA-STA-425H), and TID Water Conveyance System (CA-STA-426H) — have been recommended not eligible for listing on the NRHP and CRHR, and thus do not qualify as historic properties or historical resources. Further, the proposed transmission line alignment crossings would have no impact on the material integrity of the segments of these resources within the Project area.

During Project construction in the vicinity of the Atchison Topeka & Santa Fe Railroad, Southern Pacific Railroad, or Tidewater Southern Railway, construction activities will not occur within existing railroad rights-of-way. Additionally, no work or limited work zones adjacent to these rights-of-way may be established according to applicable railroad permits. Construction activities in the vicinity of the TID Water Conveyance System shall include straw waddles, silt fences, and other measures (as identified in Section 4.4) to prevent debris from entering the canal system. Although construction would occur adjacent to the lining of the canal in some locations, these measures would ensure preservation of the integrity of the canal system consistent with the continuing maintenance and upgrades that currently occur. The crossing or construction of transmission lines parallel to the segments of these four resources within the Project area would

have no effect on the integrity of, or the NRHP or CRHR eligibility status of, these resources that extend for miles outside the Project area. Any effect of the Project to these resources would therefore be less than significant.

MITIGATION MEASURE 4.8-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.8-2

Cause an adverse change in the significance of an archaeological resource. *Although no previously unrecorded, non-linear prehistoric or historic-era archaeological resources were identified during the survey, ground disturbance could affect undocumented cultural resources. Therefore, the impact would be* ***potentially significant.***

Although the area has been disturbed by agricultural practices and construction of development infrastructure (e.g., roadways, waterways, railroads), cultural materials may exist at greater depth, or beneath the orchards and crops, in this area. The potential for the existence of buried archaeological materials within the disturbed Project area may be greater along the drainages and within the agricultural lands. Prehistoric materials might include flaked stone tools, tool-making debris, stone milling tools, fire-affected rock, or soil darkened by cultural activities (midden). Historic materials might include building remains, metal, glass, or ceramic artifacts or debris. Encountering these materials during Project construction would result in a potentially significant impact.

MITIGATION MEASURE 4.8-2

Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the Project area. Measures shall include: (1) a worker education course for all construction personnel; and (2) procedures for discovery of cultural and paleontological resources, including human remains, during construction or ground-disturbing activities.

A worker training session for all construction personnel shall be conducted immediately prior to initiation of ground-disturbing activities for each Project phase. The course will explain the

importance of, and legal basis for, the protection of significant archaeological and paleontological resources. Each worker will also learn the proper procedures to follow in the event cultural resources or human remains/burials are uncovered during construction activities, including work curtailment or redirection and to immediately contact their supervisor. The worker education session will include visuals of artifacts (prehistoric and historic) that might be found in the Project vicinity, and may include handouts.

If cultural resources, such as structure features, unusual amounts of bone or shell, artifacts, or architectural remains are encountered during construction grading, trenching, augering, and/or excavation for the transmission lines and proposed substation, work within 100 feet of the find shall be halted and a qualified archaeologist shall be notified immediately to evaluate the resource(s) encountered and recommend the development of mitigation measures for potentially significant resources consistent with Public Resources Code (PRC) Section 21083.2(i).

When Native American archaeological, ethnographic, or spiritual resources are discovered, all identification and treatment shall be conducted by qualified archaeologists who meet the federal standards, as stated in the Code of Federal Regulations, and Native American representatives who are approved by the local Native American community as keepers of their cultural traditions. In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.8-3

Directly or indirectly destroy a unique paleontological resource or site. *Although no paleontological resources have been identified in the Project area, ground disturbance could affect undocumented paleontological resources. Therefore, the impact would be* ***potentially significant****.*

Although unlikely, considering the Project area is underlain by alluvial, riverine, and basin deposits, the discovery of paleontological resources or sites is a possibility. Paleontological resources might include the fossilized remains of extinct plants and animals, including bones,

teeth, petrified wood, and plant casts. Encountering these materials during Project construction would result in a potentially significant impact.

MITIGATION MEASURE 4.8-3

A worker education training session for all construction personnel would be conducted immediately prior to initiation of ground-disturbing activities for each Project phase, as detailed in Mitigation Measure 4.8-2. If paleontological resources are discovered during construction grading, trenching, augering, and/or excavation for the transmission lines and substation, TID would halt all activities within 100 feet of the find until a qualified professional paleontologist could perform an evaluation. The paleontologist would examine the findings, assess their significance, and recommend appropriate procedures to either further investigate or mitigate adverse impacts on the resources encountered.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.8-4

Disturb human remains, including those interred outside of formal cemeteries. *Although no previously unrecorded human remains were identified during the survey, ground disturbance could affect undocumented human remains, including those interred outside of formal cemeteries. Therefore the impact would be* ***potentially significant.***

Although unlikely, the discovery of human remains is always a possibility. State of California Health and Safety Code Section 7050.5 covers these findings. This code section states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. Encountering remains during Project construction would result in a potentially significant impact.

MITIGATION MEASURE 4.8-4

Under Mitigation Measure 4.8-2, a worker education training session would be instituted for all construction personnel, during which each worker would learn the proper procedures to follow in the event cultural resources or human remains/burials are uncovered during construction activities, including work curtailment or redirection and to immediately contact their supervisor. If human remains are encountered during Project construction grading, trenching, augering,

and/or excavation for the transmission lines and proposed substation, the County Coroner shall be notified of the find immediately. If the human remains are determined to be Native American, the Coroner will notify the NAHC, which would determine and notify a Most Likely Descendent. The Most Likely Descendent would complete the inspection of the site within 24 hours of notification, and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.9 HAZARDS AND HAZARDOUS MATERIALS

This section describes existing hazardous materials issues within 1 mile of the Project area and the potential hazards associated with the construction and operation of the proposed substation and transmission lines. Potential hazards include the release of hazardous materials during construction or operation, interference with navigable airspace near airports, and the risk of wildfires. The potential for effects from exposure to electromagnetic fields (EMF) is also discussed.

4.9.1 EXISTING CONDITIONS

AIRPORTS AND LANDING STRIPS

The Stanislaus County Airport Land Use Commission Plan establishes the airport land use planning boundary associated with the five airports located within Stanislaus County. All of the airports are at least 4 miles from the Project. A small take-off and landing strip is located approximately 0.5 miles south of the Project, in agricultural property roughly bound by Lateral No. 2½, Washington Road, Redwood Road, and Faith Home Road. This strip is anticipated to support crop dusting aircraft. The Project is not located within any of the airport land use planning boundaries identified by the county (Stanislaus County 2004).

TRANSPORTATION CORRIDORS

State Route 99 and the railways within the Project area serve as major transportation corridors between northern and southern California and surrounding states. Hazardous materials are a subset of the tremendous volume of goods routinely shipped along these corridors. Although most hazardous materials are transported without incident, numerous spills and other accidental releases are known to have occurred along SR 99 and the UPRR rail corridor in the San Joaquin Valley. Hazardous material releases in reportable quantities are tracked by three agencies that maintain searchable databases: the Hazardous Materials Incident Report System, maintained by the United States Environmental Protection Agency, which contains hazardous material spill incidents that are reported to the United States Department of Transportation; the California Hazardous Material Incident Report System, maintained by the California Office of Emergency

Services, which contains information on reported hazardous material accidental releases or spills; and the Spills, Leaks, Investigations and Cleanup (SLIC) program, maintained by the State Water Resources Board, which contains information on reported hazardous material accidental releases or spills.

AREAS OF FLAMMABLE VEGETATION

Transmission lines have the potential to start wildfires if the lines come into contact with nearby tree branches or other dry vegetation. The majority of the transmission line corridors pass by irrigated land with little flammable materials. Most trees along the proposed transmission corridor are agricultural and generally pruned. However, dry crop residues and natural (non-irrigated) grassland areas in the vicinity of the Project have the potential to catch fire where sparks from equipment use could inadvertently ignite dry vegetation.

HAZARDOUS MATERIALS AND EXISTING CONTAMINATION SITES

Hazardous materials are defined in Section 4.9.1 of the 2009 Draft EIR. A discussion of existing contamination sites along the Lateral 2 and Lateral 2½ routes follows. Existing areas of potential contamination near the Grayson Substation North are presented in the 2009 Draft EIR.

The Grayson Substation North and transmission line routes primarily cover land used for commercial agriculture, rural residences with gardens and livestock corrals, and denser suburban residential housing (Refer to Section 4.1 Land Use and Agriculture). Existing and past land use activities are used as potential indicators of hazardous material storage and use. Hazardous materials sources include leaking underground storage tanks and accidental releases and spills of hazardous materials. Contaminated surface runoff may occur from agricultural fields that have been treated with pesticides, herbicides, and fumigants.

A site reconnaissance was performed by Registered Environmental Assessor G. O. Graening on March 30, 2010. No potential environmental concerns were detected other than the following minor (*de minimis*) conditions: household waste dumped illegally in isolated areas; and several above-ground diesel fuel tanks used for powering industrial fans for frost protection of tree fruits.

A review of standard environmental databases maintained by federal, state, and tribal offices was completed through Environmental Data Resources, Inc. (EDR) of Milford, Connecticut on March 19, 2009. The databases were searched for properties with reported environmental conditions located within 1 mile of the Project. The database report is presented in Appendix H of the 2009 Draft EIR.

Many of the sites reviewed in the EDR database search are not hazardous materials release sites (known contaminated sites), but rather facilities that use, store, or dispose of hazardous materials offsite. Sites listed in the environmental databases were reviewed based on distance from the alignments, type of site, and regulatory status of the site.

There are two main types of hazardous sites that are of concern: large releases, leaks, or spills that could migrate from up to 1 mile away, and smaller releases, leaks, or spills that are closer to the Project components, generally within 30 feet of the proposed transmission line alignments (i.e. the largest anticipated right-of-way). Smaller sources of contamination beyond 1/8 of a mile from the transmission line rights-of-way and the Grayson Substation North site are unlikely to migrate to the Project area; however, there is the potential for contamination to occur at nearly any location along the route as a result of unknown or unreported spills or leaks, or from illegal dumping.

LATERAL 2½ ROUTE

The search found one site within 1 mile of the Project facilities on databases that document large sources of contamination, such as the National Priority List, or sites listed as corrective action sites by the United States Environmental Protection Agency: Stanislaus Farm Supply, 624 W Service Road, located about ½ mile north of the Almond Power Plant. This facility is referenced on many databases, including: California Hazardous Materials Incident Report System (CHMIRS); the Federal Insecticide, Fungicide and Rodenticide Act database (SSTS); toxics and criteria pollutant emissions data collected by the California Air Resources Board and local air pollution agencies (EMI); the historical underground storage tank (UST) registered database (HIST UST); the Statewide Environmental Evaluation and Planning System (SWEEPS); and SLIC. This facility has at least one documented fertilizer release. The case is open and in remedial phase. The site also has registered, historic fuel UST use, and registered hazardous

material and pesticide usage and disposal. Because this site is in the remedial phase, is at least 0.5-mile from the proposed substation, and is cross-gradient, not up-gradient, of Grayson Substation North, this facility is not expected to impact the proposed substation or transmission line routes. Table 4-6 potential sources of environmental contamination identified within 1/8 mile of the Lateral 2½ Route.

Table 4-6 Reported Hazardous Sites Within 1/8 Mile of the Lateral 2½ Route

Facility Name	Address	Site Type	Record Date	Status
Unspecified	4149 Pioneer Rd, Hughson	CHMIRS, CDL	9/1/2003	Contained: Drug lab waste was abandoned along road.
Unspecified	4411 Esmar Rd, Ceres	CDL	unspecified	past use as an illegal drug lab
Unspecified	6212 Moffett Rd, Ceres	CHMIRS	10/15/1988	unspecified release
Al Enos Chevron	2901 Geer Rd, Turlock	CA FID UST	unspecified	registered, historical fuel UST use
Almond Power Plant	4500 Crows Landing Rd, Modesto	ICIS, FINDS, EMI	1999	licensed power plant
Alton W. Rexin	2461 Geer Rd, Hughson	HST UST, SWEEPS	7/1/1985	fuel UST use
Brown's Cabinet and Mill Work	4311 Pioneer Road, Hughson	HAZNET	unspecified	registered hazardous material usage, disposal
Cape Hart and Sons Trucking	719 East Grayson Rd, Ceres	SLIC	5/20/1994	Open, inactive clean-up program Site: soil contamination with petroleum hydrocarbons
Cleo Barth	4137 Griffin Rd, Hughson	HST UST, SWEEPS	7/1/1985	fuel UST use
Clifford Crook	4206 Walnut Rd, Hughson	HIST UST, SWEEPS	1973	registered, historical fuel UST use
Ditch Tender Home	4000 Santa Fe Ave, Hughson	HST UST, SWEEPS	unspecified	fuel UST use
Unspecified farm	4385 Lucas Rd, Ceres	HIST UST, SWEEPS	1985	registered, historical fuel UST use
Graser Halling	5607 Moffett Rd, Ceres	HIST UST, SWEEPS	1979, 1982	registered, historical fuel UST use
James C. Sorensen	2900 East Redwood Rd, Ceres	HIST UST, SWEEPS	1985	registered, historical fuel UST use

Table 4-6 Reported Hazardous Sites Within 1/8 Mile of the Lateral 2½ Route

Facility Name	Address	Site Type	Record Date	Status
Joel David	4201 North Geer Rd, Turlock	CA FID UST, SWEEPS	7/1/1985	fuel UST use
John Togliatti	2618 Geer Rd, Hughson	HIST UST, SWEEPS	7/1/1985	fuel UST use
John West's Chopping Service	548 San Joaquin St, Modesto	HIST UST, SWEEPS	unspecified	registered, historical fuel UST use
Mary Giglio	2401 Euclid Rd, Hughson	HIST UST, SWEEPS, HAZ NET	7/1/1985	fuel UST use, waste oil cleanup
Mid Valley Nut Company	2605 Geer Rd, Hughson	Cortese	7/1/1985	registered, historical fuel UST use
Paul J. Fernandes	4342 Esmar Rd, Ceres	HIST UST, SWEEPS	7/1/1985	registered, historical fuel UST use
Paul Koelzer	4118 Griffin Rd, Hughson	HIST UST, SWEEPS	7/1/1985	registered, historical fuel UST use
Ralph Headrick	4542 Walnut Ave, Hughson	HIST UST, SWEEPS	unspecified	historical fuel UST use
Rodney Starm	3819 7th St, Hughson	HIST UST	unspecified	historical fuel UST use
Simplot Soilbuilders	4012 Santa Fe Ave, Hughson	HIST UST, SWEEPS, FINDS, SSTS, Envirostor	1969, 1974, 1981, 1982	registered, historic fuel UST use; registered hazardous material and pesticide usage, disposal
Thomas E. Fraser	3530 Gee Rd, Hughson	HIST UST, SWEEPS	unspecified	historical fuel UST use
Twin Tree Farm	4346 Faith Home Rd, Ceres	HIST UST, SWEEPS	1980	registered, historic fuel UST use
Vivian Shaver	4143 Walnut Ave, Hughson	SWEEPS	1990	registered, historic fuel UST use
W. L. Black	4207 Washington Rd, Hughson	HIST UST, SWEEPS	1968, 1970	registered, historic fuel UST use
W.E. Biasca	3830 7th St, Hughson	HIST UST	unspecified	historical fuel UST use

Source: EDR 2009

Acronyms:

CA FID UST = Facility Inventory Database (contains active and inactive underground storage tank locations)

CDL = Clandestine Drug Lab

Cortese = State Water Resources Control Board (LUST), the Integrated Waste Board (SWF/LS), and DTSC (Cal-Sites)

Envirostor = sites that have known contamination or sites for which there may be reasons to investigate further

FINDS = Facility Index System

HAZNET = DTSC data from hazardous waste manifests

ICIS = Integrated Compliance Information System
LUST = Leaking Underground Storage Tank

LATERAL 2 ROUTE

In addition to the Stanislaus Farm Supply site discussed above, the search found several smaller sources of potential contamination or recorded petroleum product and pesticide use within 1/8 mile of the Lateral 2 Route (Table 4-7).

Table 4-7 Reported Hazardous Sites Within 1/8 Mile of the Lateral 2 Route

Facility Name	Address	Site Type	Record Date	Status
Unspecified	4149 Pioneer Rd, Hughson	CHMIRS, CDL	9/1/2003	Contained: Drug lab waste was abandoned along road.
Unspecified	4411 Esmar Rd, Ceres	CDL	unspecified	past use as an illegal drug lab
Almond Power Plant	4500 Crows Landing Rd, Modesto	ICIS, FINDS, EMI	1999	licensed power plant
Alton W. Rexin	2461 Geer Rd, Hughson	HST UST, SWEEPS	7/1/1985	fuel UST use
Brown's Cabinet and Mill Work	4311 Pioneer Rd, Hughson	HAZNET	unspecified	registered hazardous material usage, disposal
City of Ceres	4417 Blaker Rd, Ceres	HAZNET	unspecified	Asbestos containing waste, disposed in landfill
City of Ceres	4454 Morgan, Ceres	SWEEPS	unspecified	unspecified
Cleo Barth	4137 Griffin Rd, Hughson	HST UST, SWEEPS	7/1/1985	fuel UST use
Clifford Crook	4206 Walnut Rd, Hughson	HIST UST, SWEEPS	1973	registered, historical fuel UST use
Ditch Tender Home	4000 Santa Fe Ave, Hughson	HST UST, SWEEPS	unspecified	fuel UST use
Unspecified farm	4385 Lucas Rd, Ceres	HIST UST, SWEEPS	1985	registered, historical fuel UST use
James C. Sorensen	2900 East Redwood Rd, Ceres	HIST UST, SWEEPS	1985	registered, historical fuel UST use
Joel David	4201 North Geer Rd, Turlock	CA FID UST, SWEEPS	7/1/1985	fuel UST use
Joel J. Hidahl Elementary	2351 East Redwood Road, Ceres	FINDS	unspecified	Other Pertinent Environmental Activity Identified at Site
John Togliatti	2618 Geer Rd, Hughson	HIST UST, SWEEPS	7/1/1985	fuel UST use

Table 4-7 Reported Hazardous Sites Within 1/8 Mile of the Lateral 2 Route

Facility Name	Address	Site Type	Record Date	Status
Mary Giglio	2401 Euclid Rd, Hughson	HIST UST, SWEEPS, HAZ NET	7/1/1985	fuel UST use, waste oil cleanup
Mid Valley Nut Company	2605 Geer Rd, Hughson	Cortese	7/1/1985	registered, historical fuel UST use
Paul J. Fernandes	4342 Esmar Rd, Ceres	HIST UST, SWEEPS	7/1/1985	registered, historical fuel UST use
Paul Koelzer	4118 Griffin Rd, Hughson	HIST UST, SWEEPS	7/1/1985	registered, historical fuel UST use
Ralph Headrick	4542 Walnut Ave, Hughson	HIST UST, SWEEPS	unspecified	historical fuel UST use
Rodney Starm	3819 7th St, Hughson	HIST UST	unspecified	historical fuel UST use
Sam Miceli	2654 Gondring Rd, Ceres	HIST UST, SWEEPS	7/1/1985	historical fuel UST use
Sanders Ranch	2730 Gondring Rd, Ceres	HIST UST, SWEEPS	7/1/1985	historical fuel UST use
Simplot Soilbuilders	4012 Santa Fe Ave, Hughson	HIST UST, SWEEPS, FINDS, SSTS, Envirostor	1969, 1974, 1981, 1982	registered, historic fuel UST use; registered hazardous material and pesticide usage, disposal
Southwest No. 1 Elementary School Site	Redwood Road/Central Ave, Ceres	SCH, Envirostor	4/18/2003	No further action
Thomas E. Fraser	3530 Gee Rd, Hughson	HIST UST, SWEEPS	unspecified	historical fuel UST use
Twin Tree Farm	4346 Faith Home Rd, Ceres	HIST UST, SWEEPS	1980	registered, historical fuel UST use
Vivian Shaver	4143 Walnut Ave, Hughson	SWEEPS	1990	registered, historical fuel UST use
W. L. Black	4207 Washington Rd, Hughson	HIST UST, SWEEPS	1968, 1970	registered, historical fuel UST use
W.E. Biasca	3830 7th St, Hughson	HIST UST	unspecified	historical fuel UST use

Source: EDR 2009

GEER ROAD ALTERNATIVE SEGMENT

Sites located along the Geer Road Alternative Segment are listed in Table 4-8.

Table 4-8 Reported Hazardous Sites Within 1/8 Mile of the Geer Alternative Segment

Facility Name	Address	Site Type	Record Date	Status
Joel David	4201 North Geer Rd, Turlock	CA FID UST, SWEEPS	7/1/1985	fuel UST use
John Togliatta	2618 Geer Rd, Hughson	HIST UST, SWEEPS	1988	historical fuel UST use
Mayfield Ranch	8349 E Service Rd, Hughson	HIST UST, SWEEPS	1988	historical fuel UST use
Mid Valley Nut Company	2605 Geer Rd, Hughson, CA	Cortese	unspecified	unspecified
Mrs. Alfred E. Viera	3901 Geer Rd, Hughson	HIST UST, SWEEPS	1988	historical fuel UST use
Odel Dialo	3101 Geer Rd, Hughson	HIST UST, SWEEPS	1988	historical fuel UST use
Simplot Soilbuilders	4012 Santa Fe Ave, Hughson	HIST UST, SWEEPS, FINDS, SSTS, Envirostor	1969, 1974, 1981, 1982	registered, historic fuel UST use; registered hazardous material and pesticide usage, disposal

Source: EDR 2009

ELECTRIC AND MAGNETIC FIELDS

EMF is discussed in Section 4.9.1 of the 2009 Draft EIR. This section also addresses human health concerns related to EMF.

EXISTING ELECTROMAGNETIC FIELD LEVELS

The pre-construction EMF measurements provided in Appendix I of the 2009 Draft EIR are considered representative of the additional routing alternatives presented in this revision to the 2009 Draft EIR. Pre-construction EMF measurements were taken to document existing conditions and provide a bench measurement whereby comparisons can be made after the transmission line and substation are constructed and energized. Measurement locations and graphic representations of recorded and projected EMF levels are provided in Appendix I of the 2009 Draft EIR. The existing EMF levels were measured in the field on April 13, 2009. Eight representative locations were identified along the 115-kV transmission line route:

1) East Grayson Road near the Grayson Substation site.

2) Faith Home Road south of TID Lateral No. 2.

3) Geer Road adjacent to the Hughson Substation.

4) Euclid Avenue south of East Whitmore Avenue.

5) Washington Road at TID Lateral No. 2.

6) Mountain View Road at TID Lateral No. 2.

7) East Grayson Road at Central Avenue.

8) Esmar Road at TID Lateral No. 2½.

The existing EMF measurements were recorded in a manner consistent with Institute of Electrical and Electron Engineers Standard 644-1994 ("Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines") and included the following components:

- Latitude and longitude (via Garmin hand held unit); and
- EMF readings (via EMDEX II Meter, using three field-detecting coils pointing in the X, Y, and Z directions. The meter has a sensitivity from 0.2 to 100 milligaus (mG) full scale at 60 hertz. Accuracy is +/-20 percent at mid-range). Measurements were taken at one meter above the ground, at a distance of 75 feet in each direction perpendicular to the Project route.

Measurement locations are shown on Figure 4.9.1 of the 2009 Draft EIR. Graphic representations of recorded EMF levels are provided in Appendix I of the 2009 Draft EIR. The recorded background electric field measurements were negligible due to shielding effects of nearby fences, trees, and vegetation. The recorded background magnetic field levels were well within the anticipated range, at or below 0.2 mG in most cases, and are considered low.

4.9.2 REGULATORY SETTING

Federal, state, and local regulations pertaining to hazards associated with hazardous materials, obstructions to air traffic, wildfires, and EMF are discussed in Section 4.9.2 of the 2009 Draft EIR.

4.9.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

Potential hazards and hazardous materials impacts associated with the Project include potential spills of petroleum products or hazardous materials during construction, exposure to existing contamination sites along the proposed routes, and risk of wildfires in areas with flammable vegetation.

The calculation methods used for the analysis of the Lateral 2½ and Lateral 2 routing alternatives presented in this revised Draft EIR are provided in Chapter 8 of the *Transmission Line Reference Book, 345-kV and Above* (Electric Power Research Institute 1985). The software tool program used for the analysis, called "EMF Workstation: ENVIRO (Version 3.52)," is a Windows-based model developed by the Electric Power Research Institute. The results of the ENVIRO Program are provided in Attachment AA-1 through AA-5 for each additional routing alternative.

The Project is not located within the Airport Land Use Planning Boundary for any of the five airports in Stanislaus County. Thus, this issue is not addressed further in the EIR.

THRESHOLDS OF SIGNIFICANCE

Impacts would be considered significant if the Project would:

- Result in the unsafe routine transport of hazardous materials or increase the foreseeable risk of a release of hazardous materials;
- Expose people to significant health hazards; or
- Substantially increase the risk of wildfires.

IMPACT ANALYSIS

IMPACT 4.9-1

Transport of hazardous materials and releases of hazardous substances. *Operation of the Project does not involve the use or transport of hazardous substances, and thus no hazardous materials impacts from project operation were identified. Construction of the Project would have the potential to result in the routine transport of hazardous materials and increase the foreseeable risk of a release of hazardous substances via use of such materials in the construction process. Therefore, the impact would be* ***potentially significant****.*

Polychlorinated Biphenyls (PCBs) may be encountered during Project construction. PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications. PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: transformers, capacitors, and other electrical equipment; oil used in motors and hydraulic systems; and thermal insulation material.

All new transformers would contain mineral oil that is free from PCBs. Various utilities have instituted programs to renovate or replace equipment with a mineral oil that does not contain PCBs and visual inspection of pole-mounted transformers during the site reconnaissances did not detect any leaking transformers or stained soils at the base of poles. However, mishandling of PCBs potentially during construction could result in a hazardous substance release.

Additional hazardous materials and petroleum products that could be released during Project construction include diesel fuel, oil, grease, or other lubricants, solvents, Portland cement products and additives, and adhesives and coatings. Improper use or disposal, or accidental releases, of these materials is considered a potentially significant impact**.**

MITIGATION MEASURE 4.9-1

TID shall prepare and implement an effective SWPPP and an effective Spill Prevention, Control, and Countermeasures Plan that details the methods for working with hazardous materials during construction. The Spill Prevention, Control, and Countermeasures Plan shall describe methods

for avoiding spills, as well as the required response if a spill occurs. Construction best management practices will also be employed.

Prior to initiating Project construction, the construction contractor shall furnish training certification or be trained regarding the identification and handling of hazardous materials (including PCB-containing transformers) and spill containment and agency notification procedures. Should any known or suspected release of PCB-containing oil occur during Project construction or operation, the spills will be immediately contained and the affected soils will be isolated and tested to determine the appropriate disposal options.

TID shall notify agencies and perform the required remediation if there is a release of reportable (or otherwise significant) quantities of hazardous materials. In the event of a fuel spill, Stanislaus County Department of Environmental Resources will be notified and clean-up will be accomplished under the guidance of regulatory oversight, as required.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.9-2

Exposure to health hazards. *The Project has the potential to expose people to significant health hazards from encountering contaminated sites during Project construction. In addition, operation of the Grayson Substation North and transmission lines could expose people to electrical shock hazards and EMF. This impact is* ***potentially significant****.*

CONTAMINATED SITES The site reconnaissance and hazardous material records reviews (see Appendix H of the 2009 Draft EIR) did not indicate the likelihood that known contaminated sites would have a direct impact on Project facilities. However, excavation activities at the Grayson Substation North and along the transmission line routes could encounter buried USTs or contaminated soil from unreported facilities that used hazardous materials or petroleum products within or near the construction corridor. This is a potentially significant impact**.**

Various pesticides and herbicides are commonly used in agricultural operations. While these chemicals do not typically accumulate in soils at concentrations that are a hazard to humans or the environment as a result of crop production, the areas where pesticides are stored or loaded into equipment and equipment wash out areas are often improperly managed and result in

contaminated soils and/or water. Excavation or disturbance of such contamination would be a potentially significant impact. There are no known pesticide loading or storage locations along the proposed project routes or at the Grayson Substation North. While there is recognized potential use of organochlorine, orthophosphorous, or arsenical pesticides within agricultural fields adjacent to the Project routes and at the Grayson Substation North site, it is assumed that farmers generally have an economic incentive to not overspray their crops at levels that would result in significant contamination of soils.

ELECTRICAL HAZARDS The Grayson Substation North and transmission lines would create some risk of electrocution and other hazards associated with the high voltage electrical facilities. Risks of electrical hazards from transmission lines are well-known and are effectively reduced to a level of insignificance by following the standard utility design and operational practices contained in GO 95. This construction order, which is periodically reviewed and updated, provides safety rules that have been followed by California utilities for more than 50 years. Design precautions incorporated into the Project include fencing and locking the substation facilities.

Nevertheless, there is still some risk that severe storms and accidents can result in potentially hazardous downed power lines. In nearly all cases, protective devices would de-energize any faulted lines. TID local maintenance crews are able to respond to the Project area within minutes of notification. No significant electrical hazards would occur from the installation of the proposed lines or substation.

EMF CONCERNS Electrical transmission and distribution lines, electrical wiring, appliances, and other electrical devices produce low frequency, low energy EMF. Carefully structured epidemiological and laboratory studies have been conducted worldwide to determine the potential carcinogenic effects of EMF exposure. In general, the studies have shown that there is no overall increase in cancer rates for populations exposed to EMF (although a number of studies have found a weak statistical association with some rare forms of childhood leukemia and magnetic field strengths).

In June 1999, the National Institute of Environmental Health Sciences (NIEHS) issued, *Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Field*s. The study noted

a fairly consistent pattern of a small increase in risk of chronic and childhood leukemia in human population studies, but no such pattern in the experimental data (animal and mechanistic). The NIEHS study found no evidence tying routine EMF exposure to adult cancer or other potential effects such as Alzheimer's disease, depression, or birth defects. While the NIEHS study concludes that EMF exposure cannot be recognized as entirely safe, it did not recommend aggressive regulatory concern such as setting standards and did not recommend that EMF be listed as an agent reasonably anticipated to be a human carcinogen.

In 2002, the California Department of Health Services (CADHS) reviewed several preceding studies on EMF. In general, the scientists at the CADHS had greater certainty in the overall risk posed by EMFs. CADHS determined that the epidemiological evidence for childhood leukemia warranted the classification of EMF as a "possible" carcinogen, and the CADHS was also willing to state a possible link between EMF and adult lymphoid leukemia, Lou Gehrig's Disease, adult brain cancer, and miscarriages. Despite the increased conviction of CADHS's team of reviewers, there is still considerable disagreement between experts, and inconsistency and contradictions among the studies. With the exception of miscarriages, all of these diseases have long latencies from the time of exposure. For this reason, it is difficult to establish statistical associations between cause and effect in a typical epidemiological study.

EMF Modeling It is important that any discussion of EMF include the assumptions used to calculate these fields. It is also important to remember that EMF in the vicinity of the power lines varies with regard to line design, line loading, distance from the line, and other factors. The electric field depends upon line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to line loading (amperage), which varies as power generation is changed. Maximum magnetic fields are produced at the maximum (peak) conductor currents.

In the 2009 Draft EIR, EMF level calculations were performed for two line designs that are components of the Project (a double circuit 115-kV transmission line with 12-kV underbuild and a double circuit 115-kV transmission line with a 69-kV and a 12-kV underbuild) at the eight locations where the EMF measurements were taken. In this Revised Draft EIR, EMF level calculations are performed for five additional routing alternatives that are components of the Project (see Table 4-9).

Table 4-9 Additional Routing Alternatives Modeled

Additional Routing Alternatives
Double circuit 115-kV transmission line with no underbuild
Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line
Double circuit 230-kV transmission line with double circuit 115-kV underbuild
Double circuit 69-kV transmission line
Single circuit 69-kV transmission line

The estimated average and maximum line loading and conductors for each circuit was provided by TID as follows:[5]

Table 4-10 Average and Maximum Line Loading and Conductor Type

Circuit	Amperes per Phase (Average Load)	Amperes per Phase (Maximum Load)	Conductor Type
230-kV (Circuit 1)	193[a]	385	954AA magnolia aluminum conductor, 2-conductor-bundle with 18-inch horizontal spacing
230-kV (Circuit 2)	210[a]	420	954AA magnolia aluminum conductor, 2-conductor-bundle with 18-inch horizontal spacing
115-kV (Circuit 1)	120	734	954AA magnolia aluminum conductor, no bundling
115-kV (Circuit 2)	50	734	954AA magnolia aluminum conductor, no bundling
69-kV	150	572	636AA orchid aluminum conductor,

5 The average load is based on the average daily current that would be expected on the transmission lines on an average day. The maximum load is an extreme worst case based on a system outage condition where one or more circuits are out of service elsewhere on the TID system, resulting in the Project transmission lines operating at the maximum load that could be accommodated for a short period of time (30 minutes to one hour). The maximum load is greater than loads experienced on a peak summer day.

Table 4-10 Average and Maximum Line Loading and Conductor Type

Circuit	Amperes per Phase (Average Load)	Amperes per Phase (Maximum Load)	Conductor Type
(Circuit 1)			no bundling
69-kV (Circuit 2)	150	572	636AA orchid aluminum conductor, no bundling
12-kV	60	60	636AA orchid aluminum conductor, no bundling

Notes:
[a] Average Load was not provided for 230-kV Circuits 1 and 2, therefore the Average Load was assumed to be 50% of the Maximum Load.

The EMF around transmission lines is produced by the level of current flow, measured in terms of amperes, through the conductors (transmission lines). The EMF strength is directly proportional to the current; that is, increased amperes produce stronger EMF. The EMF is inversely proportional to the distance from the conductors. Thus, the EMF strengths decline as the distance from the conductor increases. The electric field around a transmission line remains steady and is not affected by the common daily and seasonal fluctuations of electricity usage. The magnetic fields around a transmission line fluctuate daily and seasonally as the usage of electricity varies. In this revision to the 2009 Draft EIR, EMF level calculations are performed at mid-span and computed for a height of 1 meter (3.3 feet) above the ground directly underneath the transmission lines to determine the average and maximum EMF strengths for each additional routing alternative. The results are included in Appendix D. The maximum calculated EMFs for each additional routing alternative are summarized in Table 4-11 and Table 4-12 below.

The maximum calculated electric field strengths were very similar for each of the transmission configuration types. The double circuit 230-kV transmission line with double circuit 115-kV underbuild was slightly higher due to the combined effect of the 230-kV transmission line and 115-kV transmission line. In addition, since the electric field around a transmission line remains steady and is not affected by the common daily and seasonal fluctuations in usage of electricity, the electric field strength is the same for both the average and maximum loads. The maximum electric field modeling results are summarized in Table 4-10 below.

Table 4-11 Maximum Modeled Electric Fields

Transmission Configuration Type	Average and Maximum Loading Electric Field Maximum on Route (kV/M)
Double circuit 115-kV transmission line with no underbuild	0.81
Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line	0.77
Double circuit 230-kV transmission line with double circuit 115-kV underbuild	1.30
Double circuit 69-kV transmission line	0.47
Single circuit 69-kV transmission line	0.91

The maximum magnetic field modeling results are summarized in Table 4-11. The measurements included in the table are the estimated field strengths at mid-span and computed for a height of 1 meter (3.3 feet) above the ground directly underneath the transmission lines. Given this, they represent the worst case magnetic field strength under both average and maximum conditions. The magnetic field strength diminishes with distance from the transmission lines. Background levels would be achieved at roughly 75 feet from the centerline of the transmission route.

Table 4-12 Modeled Magnetic Fields

Transmission Configuration Type	Average Loading Magnetic Field 75' to Left of Route (mG)	Average Loading Magnetic Field Maximum on Route (mG)	Average Loading Magnetic Field 75' to Right of Route (mG)	Maximum Loading Magnetic Field 75' to Left of Route (mG)	Maximum Loading Magnetic Field Maximum on Route (mG)	Maximum Loading Magnetic Field 75' to Right of Route (mG)
Double circuit 115-kV transmission line with no underbuild	1.04	12.66	1.51	2.87	56.59	2.67

Table 4-12 Modeled Magnetic Fields

Transmission Configuration Type	Average Loading Magnetic Field 75' to Left of Route (mG)	Average Loading Magnetic Field Maximum on Route (mG)	Average Loading Magnetic Field 75' to Right of Route (mG)	Maximum Loading Magnetic Field 75' to Left of Route (mG)	Maximum Loading Magnetic Field Maximum on Route (mG)	Maximum Loading Magnetic Field 75' to Right of Route (mG)
Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line	2.51	7.97	1.21	5.20	17.99	2.23
Double double, double circuit 230-kV transmission line on top portion of single pole structure and double circuit 115-kV transmission line on bottom portion of same pole structure	2.88	18.17	2.75	8.61	98.67	6.91
Double circuit 69-kV transmission line	0.58	11.56	0.53	2.23	44.10	2.04
Single circuit 69-kV transmission line	2.59	23.17	3.00	9.89	88.34	11.44

Considerable research has been conducted over the last 30 years regarding the possible biological effects and human health effects from EMF. This research has produced many studies

that offer no uniform conclusions about whether the long-term exposure to EMF is harmful or not. The State of California has not established health-based standards for EMF exposure based on the available body of research. The modeling results are well within the anticipated range for transmission lines of this voltage. These magnetic fields would be at levels that are commonly found near electrical appliances common in homes. At an approximate 10-inch distance, the magnetic fields around household appliances vary from 3 to 210 mG (NIEHS 1999).

Although TID is not regulated by the California Public Utilities Commission (CPUC), the Project would employ "EMF reduction as a practicable design criterion" as mandated by the CPUC for new and upgraded electrical facilities. This includes:

- Increasing the distance between the conductors and the ground;
- Reducing the spacing between the conductors;
- Minimizing the current in the line; and
- Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

With implementation of these design requirements, no further mitigation is required.

MITIGATION MEASURE 4.9-2

Ground disturbance or excavation during construction of the proposed Project could pose a risk to the health of construction personnel if buried tanks or contaminated soil or groundwater are encountered. Hazards include ignition of flammable liquids or vapors, inhalation of toxic vapors in confined spaces such as trenches, skin contact with contaminated soil or water, or the excavation of undocumented obstructions such as USTs, piping, or solid waste.

TID shall survey the selected substation site and transmission line route to ascertain if there is any observable evidence of a chemical release (such as staining of surface soils or areas of stressed or dead vegetation). Where Project facilities would traverse previously developed properties, the potential for chemical releases or other recognized environmental hazards may be ascertained through Phase I environmental assessment activities. Limited soil sampling and analysis will be conducted only if site assessment activities indicated the potential presence of

herbicide and/or pesticide residues in areas proposed for disturbance. A Sampling and Analysis Plan may accompany the Health and Safety Plan (HASP), discussed below, to determine if constituents of concern are present, and at what concentrations.

A HASP will be prepared for the construction process, consistent with general industry standards and the Occupational Safety and Health Administration, which will address any risks to construction personnel and public safety such that these health and safety risks will be mitigated to an acceptable level. This site-specific HASP for each construction phase (especially for excavations) will describe in detail the health and safety guidelines, procedures, and work practices that must be adhered to, and will also include special details governing certain work, such as working in confined spaces. The contaminants of concern are most likely petroleum hydrocarbons (and associated chemicals such as oxygenates and lead scavengers) and pesticides/herbicides.

At a minimum, the HASP will address appropriate personal protective equipment, monitoring to protect on-site workers, and the appropriate level of worker training (e.g., Hazardous Waste Operations and Emergency Response training). Monitoring may include visual and olfactory observation (e.g., soil staining or unusual odors), or air monitoring with hand-held devices (e.g., photo-ionization detector) to detect volatile hydrocarbons. Health-risk based action levels should be identified for various contaminants that may trigger modifications to work practices. Work practice modifications may include the cessation of construction activities until soil or groundwater sampling is performed, or an increase in the level of PPE or worker training.

If evidence of potential hazardous materials or contamination of soils or groundwater is encountered during transmission line or substation construction, TID shall cease digging, notify the right-of-way owner, and follow applicable requirements of Comprehensive Environmental Response, Compensation, and Liability Act and the California Code of Regulations Title 22 regarding the disposal of wastes. TID shall relocate transmission line poles, wherever feasible, to avoid digging in areas of known soil contamination. The HASP should also address procedures to follow if unknown objects (e.g., USTs and associated piping) are encountered, and the use of specialized contractors to decommission and remove such USTs, and perform confirmation sampling. The implementation of an adequate HASP will reduce the health risk to construction personnel by these recognized environmental conditions to a less-than-significant level.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.9-3

Increase the risk of wildfires. *There is a **potentially significant** risk that the transmission line would increase the likelihood of wildfires.*

WILDFIRE HAZARD The majority of the transmission line corridors pass by irrigated land with little flammable materials. Most trees along the utility corridor are fruit trees and are generally well-pruned. However, construction equipment and activities, including welding and operation of saws, have the potential to generate enough heat or sparks to cause a wildfire. During project operation, the transmission lines would have the potential to start fires if the lines come into contact with nearby tree branches or other dry vegetation. Sparks, hot objects resulting from line faults, or other causes, may also ignite dry vegetation during windy conditions. This is a potentially significant impact.

MITIGATION MEASURE 4.9-3

Best management practices shall be implemented during construction, including the use of spark arrestors on heavy equipment, the proper storage and labeling of flammable materials, and the isolation of welding and cutting activities.

Fires caused by transmission lines can be largely avoided by ensuring sufficient separation between branches and the electrical lines, and by properly maintaining the protective devices in the system. TID facility designs shall conform to applicable regulations with respect to required safety features and setbacks between energized facilities and vegetation or other flammable materials. TID shall institute a program of regular inspection along the transmission line route to assure that plant growth subsequent to installation does not prevent conformance with applicable regulations as they apply to required setbacks from vegetation or other flammable materials. PRC sections 4292 and 4293 allow fire officials to require a minimum 10 foot separation between 115-kV lines and flammable vegetation in forest covered, brush-covered, or grass-covered land. Most of the Project would be located in agricultural land not subject to these requirements, but some vegetation would be encountered along the proposed Project route.

TID only performs weed abatement along transmission lines in fire zones. The Project is not located in a fire zone. Therefore, there would be no herbicide or weed cutting along the Project route. Within the graveled substation area, TID would use herbicides to control weeds.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.10 NOISE

This section describes the regulatory and environmental settings for noise in the Project area. The impact analysis evaluates the effects of construction noise and traffic, and the operational effects of the Project on ambient noise levels in the Project vicinity. Mitigation measures are identified to reduce significant impacts. The terminology used throughout this section is defined as described in Section 4.10 of the 2009 Draft EIR.

4.10.1 EXISTING CONDITIONS

The noise environment within the Project vicinity is that of a quiet rural or suburban area. At various locations within the Project area, and depending on atmospheric conditions, traffic noise is audible from local and major roadways, such as SR 99. Typical noise levels and the general descriptions of the vicinity of the project are described in Section 4.10.1 of the 2009 Draft EIR and continue to apply. Specifics regarding the noise levels along the Project route are presented below.

PROJECT AREA NOISE LEVELS

In order to characterize the noise conditions in the Project vicinity, 15 short-term measurements were made in the Project area, with concurrent observations recorded. The noise monitoring locations are shown on Figure 4.10-1. Typical background noise levels (L90) ranged from 41 to 67 decibel (dB) during quiet times. Primary noise sources identified during the measurements included vehicle traffic and occasional birds, dogs, train horns, and aircraft-related noise.

Three 24-hour noise measurements were also taken. Figures 4.10-2 through 4.10-4 include one-hour noise sampling for the equivalent sound level over a given time period (Leq), the maximum sound level observed (Lmax), the noise level exceeded 50 percent of the time (L50), and L90, over a 24-hour period. The average day-night 24-hour average sound level (Ldn) values for the

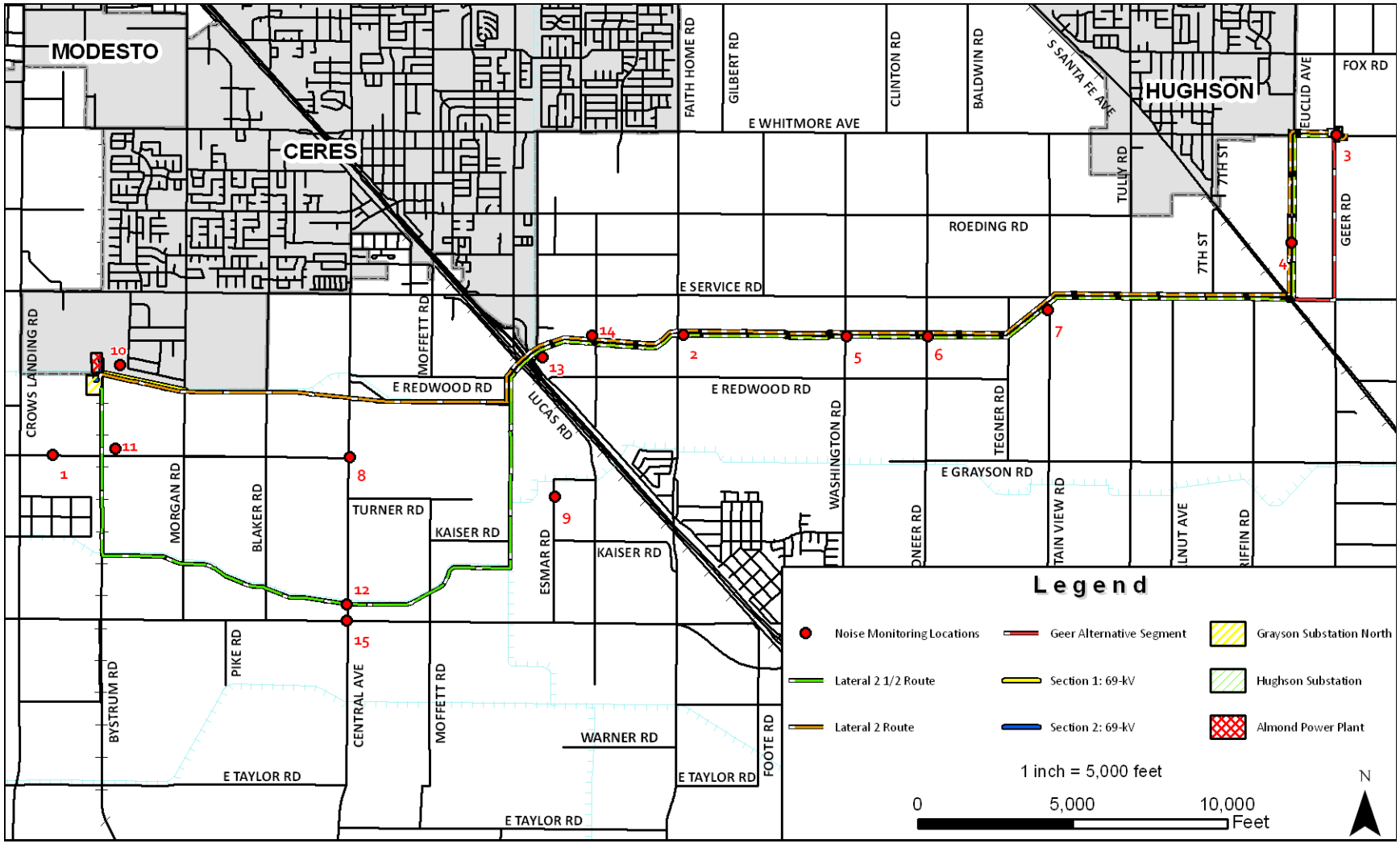


Figure 4.10-1
Noise Monitoring Locations

24-hour measurements were between 61- to 73-A-weighted decibels (dBA)[6]. Noise levels throughout the Project area are estimated to be similar. It should be noted that at Location 1 the meter was located 15 feet from the center of Grayson Road.

As a general rule of thumb, line source noise generally attenuates at a rate of 4.5 dBA per doubling of distance at a soft site (a soft site refers to a site covered with vegetation or soil versus a hard site that is covered by cement or asphalt). At a more typical reference distance of 50 feet from the centerline of Grayson Road, noise levels would be reduced by 8 dBA. Thus, the following noise levels would be expected to occur 50 feet from the centerline of Grayson Road, based on the 1-hour samples: Leq's of 47-65 dBA; L90's of 32-46 dBA; and Ldn of 65 dBA.

The noise measurements and observations indicate that most areas of the Project are expected to be in compliance with the County's General Plan noise standards (shown in Table 4.10-1 of the 2009 Draft EIR) at most times, except during peak use periods in areas immediately adjacent to transportation sources such as roads. Existing noise levels in the project area are detailed in Table 4-13, 24-hour sampling results are presented in Figure 4.10-2 through Figure 4.10-4.

Table 4-13 Existing Noise Levels in the Project Area

Monitoring Location *Duration*	**Location Description**	**Time Period**	**Noise Levels (dBA)**	**Noise Sources and Observations – Noise Levels (dBA)**
Location 1 *24 Hour*	Approximately 1,110 feet east of Crows Landing Road, 15 feet north of the center of Grayson Road	Tues. March 24, 2009	24-hour Ldn = 73 Hourly Average Leq's: 55–73 Hourly L90's: 40–54	Long-term measurements do not identify specific noise sources. L90 background levels are relatively quiet (40-54).
Location 1 *10 Minutes*		Wed., March 25, 2009: 7:06 p.m.–7:16 p.m.	U5- minute sampling Leq's: 63–70 L90's: 49–56	Vehicle traffic along Grayson Rd (Lmax): 76, 80, 78, 74, 82, 77, 86. Birds.

6dBA is a decibel corrected for the variation in frequency response to the typical human ear at commonly encountered noise levels.

Table 4-13 Existing Noise Levels in the Project Area

Monitoring Location *Duration*	**Location Description**	**Time Period**	**Noise Levels (dBA)**	**Noise Sources and Observations – Noise Levels (dBA)**
Location 2 *24 Hour*	Along Lateral No. 2, 225 feet east of Faith Home Road	Tues., March 24, 2009	24-hour Ldn = 61 Hourly Average Leq's: 49–60 Hourly L90's: 45–55	Long-term measurements do not identify specific noise sources. L90 background levels are relatively quiet (45-55).
Location 2 *10 Minutes*	Along Lateral No. 2, 225 feet east of Faith Home Road	Wed., March 25, 2009: 4:06 p.m.–4:16 p.m.	U5- minute sampling Leq's: 55–60 L90's: 52–54	Vehicle traffic along Faith Home Rd (Lmax): 61, 58, 55, 57, 60, 65, 61, 60, 64, 66, 64, 63, 60, 56. Wind.
Location 3 *24 Hour*	Northwest corner of Hughson Substation, 55 feet east of the center of Geer Road	Tues., March 24, 2009	24-hour Ldn = 71 Hourly Average Leq's: 58–71 Hourly L90's: 44-60	Long-term measurements do not identify specific noise sources. L90 background levels are relatively quiet (44-60).
Location 3 *10 Minutes*		Wed., March 25, 2009: 2:36 p.m.–2:46 p.m.	U5-minute sampling Leq's: 60–72 L90's: 56–59	Vehicle traffic along Geer Road (Lmax): 65-80, 88.
Location 4 *10 Minutes*	Across from 3230 Euclid Avenue, 25 feet west of centerline	Wed., March 25, 2009: 3:16 p.m.–3:26 p.m.	U5- minute sampling Leq's: 56–64 L90's: 46–49	Vehicle traffic along Euclid Avenue (Lmax): 74, 80. Wind and wind chimes (Leq): 46-48, 53.
Location 5 *10 Minutes*	Along Lateral No. 2, 50 feet east of Washington Road	Wed., March 25, 2009:4:26 p.m.–4:36 p.m.	U5- minute sampling Leq's: 58–60 L90's: 48–51	Vehicle traffic along Washington Road (Lmax): 72, 69, 74, 67, 69, 64.
Location 6 *10 Minutes*	Along Lateral No. 2, 50 feet east of Pioneer Road	Wed., March 25, 2009:4:51 p.m.–5:01 p.m.	U5- minute sampling Leq's: 52–57 L90's: 44–48	Vehicle traffic along Washington Road (Lmax): 72, 69, 64. Birds and airplane flyover.

Table 4-13 Existing Noise Levels in the Project Area

Monitoring Location *Duration*	Location Description	Time Period	Noise Levels (dBA)	Noise Sources and Observations – Noise Levels (dBA)
Location 7 *10 Minutes*	South of Lateral No. 2, 50 feet west of Mountain View Road	Wed., March 25, 2009: 5:16 p.m.–5:26 p.m.	U5- minute sampling Leq's: 49–59 L90's: 46–47	Vehicle traffic along Mountain View Road (Lmax): 65, 66, 75, 62. Birds, train horn, yard trimming, and traffic along East Service Road.
Location 8 *10 Minutes*	50 feet east of Central Avenue, near Grayson Road	Wed., March 25, 2009: 6:07 p.m.–6:17 p.m.	U5- minute sampling Leq's: 61–63 L90's: 50–53	Vehicle traffic along Central Avenue (dB): 65, 68, 74, 72, 60, 67, 64, 76, 70. Dog barking, birds, and airplane flyover.
Location 9 *10 Minutes*	West of Prairie Flower Road at 90 degree angle of Esmar Road, 660 feet south of Esmar Road and 50 feet east of Esmar Road	Wed., March 25, 2009: 6:35 p.m.–6:45 p.m.	U5- minute sampling Leq's: 52–53 L90's: 50–51	Birds and traffic along SR 99. No local traffic during sampling.
Location 10 *10 Minutes*	900 feet east of Almond Power Plant at Farm Supply Drive and Marchy Lane	Thurs., April 8, 2010: 3:36 p.m. – 3:46 p.m.	5-minute sampling Leq's: 44, 46 L90's: 41, 41	Local road traffic (Lmax): 54, 58. Wind, birds, airplane (Lmax): 48, 48. Industrial businesses, proposed development to the northeast.
Location 11 *10 Minutes*	50 feet north from center of Grayson Road east of RR Tracks	Thurs., April 8, 2010: 4:05 p.m. – 4:15 p.m.	5-minute sampling Leq's: 56, 57 L90's: 41, 42	Grayson road traffic (Lmax): 71, 74. Wind, birds, airplane (Lmax): 54, 54. Chickens, gunshots.
Location 12 *10 Minutes*	50 feet west from center of Central Avenue south of canal	Thurs., April 8, 2010: 5:48 p.m. – 5:58 p.m.	5-minute sampling Leq's: 57, 60 L90's: 47, 47	Central road traffic (Lmax): 71, 72. Airplane (Lmax): 62. Birds, water bubbling from canal.
Location 13 *10 Minutes*	250 feet east from center of SR 99 at Moore Road/Frontage Road	Thurs., April 8, 2010: 5:25 p.m. – 5:35 p.m.	5-minute sampling Leq's: 69, 68 L90's: 67, 65	Hwy 99 traffic (Lmax): 71. Frontage Road traffic (Lmax): 72. Luxury car business/residence on Moore Road.

Table 4-13 Existing Noise Levels in the Project Area

Monitoring Location *Duration*	**Location Description**	**Time Period**	**Noise Levels (dBA)**	**Noise Sources and Observations – Noise Levels (dBA)**
Location 14 *10 Minutes*	Residence north of canal, West of Esmar Road, north of Redwood Road	Thurs., April 8, 2010: 5:06 p.m. – 5:16 p.m.	5-minute sampling Leq's: 55, 57 L90's: 49, 50	Esmar road traffic (Lmax): 63, 64. Kids riding bikes (Lmax): 65. Palm tree in wind (Lmax): 55. Dog barking, birds, airplanes, view to traffic on SR 99.
Location 15 *10 Minutes*	60 feet northeast from intersection at Keyes Road and Central Avenue	Thurs., April 8, 2010: 4:31 p.m. – 4:41 p.m.	5-minute sampling Leq's: 68, 68 L90's: 57, 58	Trucks on Keyes Road (Lmax): 75, 80. Busy intersection, produce stand to NE, birds, wind.

Source: Miller Environmental Consultants, 2009 and 2010.

Figure 4.10-2
Noise Monitoring Results: Location 1

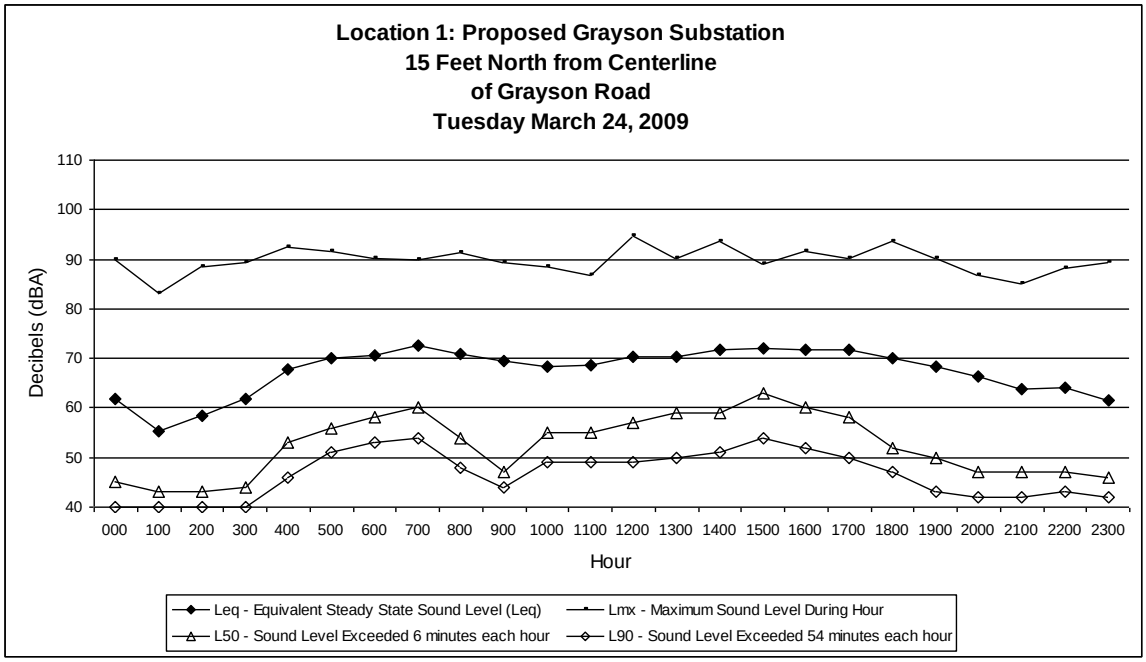


Figure 4.10-3
Noise Monitoring Results: Location 2

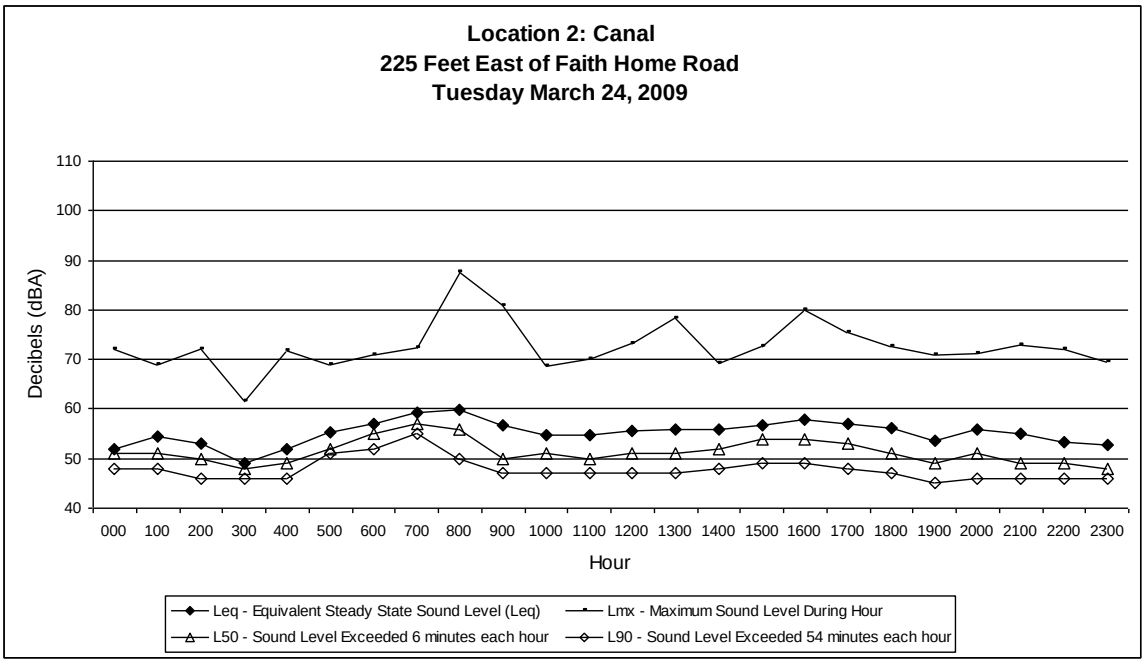
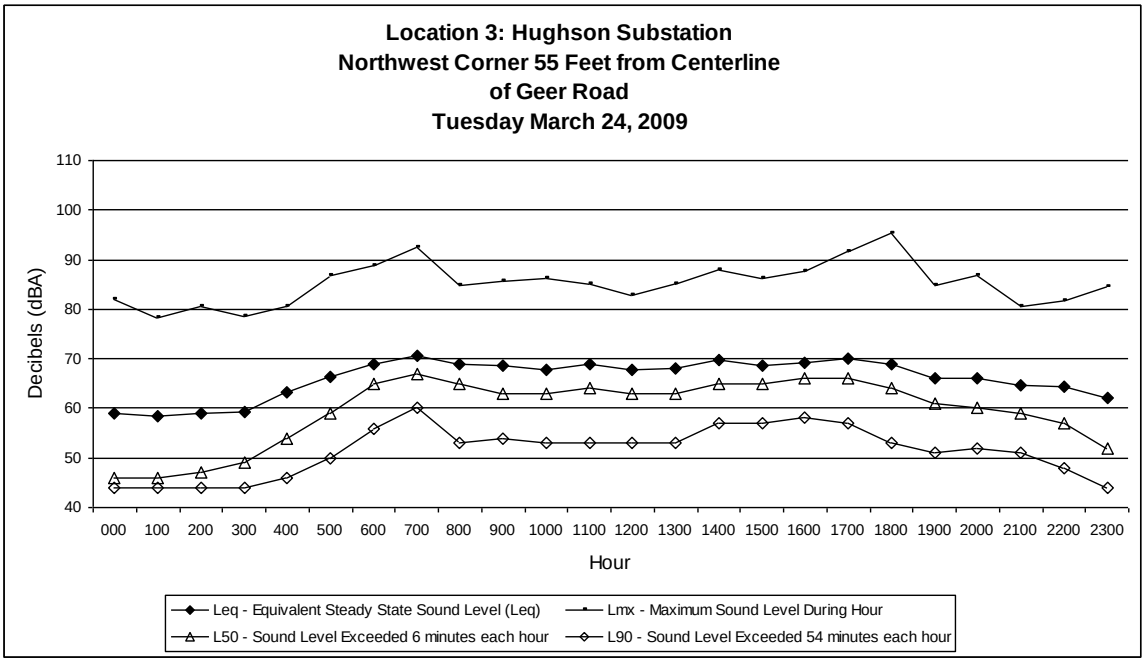


Figure 4.10-4
Noise Monitoring Results: Location 3



SENSITIVE RECEPTORS

Sensitive receptors in the Project vicinity include residences, schools, and churches located along the transmission line routes and near the substation. Many residences are located along the proposed transmission line route. A residence near Esmar Road and Lateral No. 2 is within 20 feet of the alignment for both the Lateral 2½ and Lateral 2 routes. At the site of the Grayson Substation North, the nearest existing residence is located approximately 2,000 feet to the south. The nearest church to the potential 115-kV transmission line routes, Grace Community Christian Church, is located on East Service Road, east of Esmar Road, approximately 1,100 feet north of the transmission line routes. The nearest school to the Lateral 2 Route is located on East Redwood Road in Ceres, approximately 780 north of the proposed alignment. The nearest school to the Lateral 2½ Route is located on the northeast corner of East Whitmore and 7th Street, approximately 0.25 miles northwest of the transmission line route. Implementation of the Geer Road Alternative Segment with either route would not influence the distance to the nearest residence or church, but would increase the distance to the between the project routes and Hughson High School by approximately 0.25 miles. A summary of the nearest sensitive receptors to the proposed elements of the Project is provided below in Table 4-14.

Table 4-14 Proximity of Sensitive Receptors to Project Elements

Sensitive Receptor	Lateral 2 Route: 115-kV	Lateral 2½ Route: 115-kV	Section One: 69-kV	Section Two: 69-kV	Grayson Substation North
Residence	<20 feet	<20 feet	0.5 miles	0.5 miles	0.5 miles
School	0.15 miles (Hidahl Elementary)	0.25 miles (Hughson High School)	0.6 miles (Kiddie Kingdom Daycare Center)	0.7 miles (Kiddie Kingdom Daycare Center)	0.8 miles (Kiddie Kingdom Daycare Center)
Church	0.2 miles (Grace Community Christian Church)	0.2 miles (Grace Community Christian Church)	1.2 miles (Gospel Tabernacle)	1.6 miles (Gospel Tabernacle)	1.6 miles (Gospel Tabernacle)

As a general rule, noise levels inside a standard constructed building tend to be 20 dB less than the noise levels outside. It would be safe to assume that buildings in the Project area are built accordingly and that noise levels inside would be 20 dB less than the noise levels outside.

4.10.2 REGULATORY SETTING

The regulatory setting was previously summarized in the 2009 Draft EIR. Refer to Section 4.10.2 of that document for a discussion of regulations pertinent to the proposed Project.

4.10.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

Impacts were evaluated by measuring the existing noise levels in the area and determining the noise compatibility of the Project. This analysis considers the suitability of the Project area for the proposed transmission lines and Grayson Substation North and the effect of Project noise upon other sensitive receptors in the area.

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions, noise barriers, vegetative or manufactured, etc.). Widely distributed noise, such as from a large industrial facility spread over many acres or a street with moving vehicles (known as a "line" source), would typically attenuate at a lower rate, approximately 3 to 4.5 dBA each time the distance doubles from the source, which also depends on environmental conditions (Caltrans 1998). Noise from large construction sites will exhibit characteristics of both point and line sources, and attenuation will therefore generally range between 4.5 and 7.5 dBA each time the distance doubles.

For transportation noise, an increase in noise levels of 5 dBA is considered significant where existing noise levels are less than 60 dBA Ldn (FICON 1992). In addition, an increase in noise of 3 dBA or more is considered significant for existing noise levels between 60 and 65 dBA Ldn, and an increase in noise by 1.5 dBA or more is considered significant for existing noise levels greater than 65 dBA Ldn. These criteria apply to existing noise-sensitive areas, such as residences (FICON 1992).

With temporary noise impacts (e.g., construction activities), identification of "substantial increases" depends upon the duration of the impact, the temporal daily nature of the impact, and

the absolute change in decibel levels. For operational impacts, operational noise that would exceed the "normally acceptable" land use compatibility noise range of the Stanislaus County and City of Ceres general plans would be considered a significant noise impact. Therefore, exposure of existing residents to noise levels exceeding 60 dBA Ldn would be considered a significant impact per the general plans.

The Project is not located within an airport land use plan area, within 2 miles of a public airport or within the vicinity of a private airstrip. As a result, this issue is not addressed further.

THRESHOLDS OF SIGNIFICANCE

Adverse impacts from Project-related noise would be considered significant if the Project would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance;
- Expose persons to or generate excessive groundborne vibration or noise levels;
- Create a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project; or
- Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Project.

IMPACT ANALYSIS

IMPACT 4.10-1

Result in a substantial temporary noise impact that could affect adjacent residences. *Noise levels generated during construction activities could exceed the standards established in the local general plans or noise ordinances. Therefore the impact would be* ***potentially significant****.*

Construction of the substation and transmission lines would occur concurrently. Construction of the Grayson Substation North is estimated to last 12 months. Construction of either the Lateral 2½ Route or the Lateral 2 Route is anticipated to occur over 11 months. Implementation of the Geer Road Alternative Segment would not have an impact on construction duration. Noise generated by these activities could adversely affect nearby residents to the south of the proposed substation, as well as the residences located along the transmission line routes.

Construction activity noise levels at and near the Project area would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. The Project would include off-site haul import for aggregate material and off-site haul export for soil using existing roads and highways. Table 4-15 shows typical noise levels during different construction stages and Table 4-16 shows typical noise levels produced by various types of construction equipment.

Table 4-15 Typical Construction Activity Noise Levels

Construction Phase	Noise Level (dBA Leq)
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Stringing/Clipping	78

Source: EPA 1971

Notes: Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

Table 4-16 Typical Noise Levels from Construction Equipment

Construction Equipment	Noise Level (dBA Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Pile Driver	101
Backhoe	85

Source: Cunniff 1977

Construction of the Project would generate noise according to the phase of construction and the noise generating equipment used during the 12 months of construction. The nearest existing residence is located approximately 2,000 feet south of the proposed Grayson Substation North.

Construction activities for the transmission lines would occur only where structures are required, not along the entire transmission route, and would only occur for a few days at any one location. The closest sensitive receptor to the proposed 115-kV transmission line is within 20 feet of the Lateral 2½ and Lateral 2 routes. Additional residential areas along the transmission line would be exposed to construction noise at incrementally lower levels.

Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance. Assuming an attenuation rate of 6 dBA per doubling of distance, the outside areas of the closest residences would temporarily experience maximum noise levels of up to 113 dB during the excavation stage[7.] This estimated worst-case noise level is based upon the noise generated from excavation, the loudest transmission line construction activity in Table 4-15, and the distance to the closest residence. It conservatively assumes that the transmission structure would be located at the point along the route closest to the residence, which is not TID's practice. It is also important to note that excavation typically lasts only a few hours. At a distance of 500 feet, maximum noise levels would be up to 70 dBA at all excavation areas and during the finishing stages at the substation. Construction noise at these levels would be substantially greater than current noise levels at existing residences. Residences located further from construction activities would be exposed to lower noise levels, but would still be subjected to noise levels considerably above the existing noise levels.

Construction activities would substantially increase ambient noise levels at noise-sensitive locations adjacent to the Project area, albeit temporarily. It takes approximately three days to install an angle transmission pole, approximately three days to install a 115-230kV double-double pole, and approximately two days to install a tangent pole. Nevertheless, construction noise would be considered disruptive to nearby residences and would be a significant impact. Since transmission line structures are placed into the ground by first excavating the soil with diggers and drills, not by driving the poles directly into the ground, ground vibrations in the vicinity of the Project would be less than significant.

7 Residents or non-work observers would not experience these high noise levels (referenced at five feet) because the immediate work area would be cleared of non-workers prior to construction activity at all locations.

MITIGATION MEASURE 4.10-1

The following mitigation measures would ensure compliance with the Stanislaus County and the City of Ceres noise ordinances, as well as further reduce construction-related noise impacts.

- Construction shall be limited to the hours between 7 a.m. and 8 p.m. Monday through Friday, and 8 a.m. and 8 p.m. Saturday, Sunday, and legal holidays.
- Signs shall be posted at the construction site that include permitted construction days and hours, expected timeframe for construction, a day and evening contact number for the job site, and a TID contact number for complaints about construction noise. The signs would help to facilitate rapid communication of any problems related to noise. Posting of the hours and duration would allow the adjacent residences to understand the length of the proposed construction phase and also the limits on activity each day and week.
- Construction equipment shall be properly maintained and operated, and equipped with mufflers. Haul trucks shall be operated in accordance with posted speed limits.
- Construction staging and parking areas shall be located away from existing residences. Maximizing the distance between construction-related activities and residences would minimize construction-related noise impacts on these sensitive receptors.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.10-2

Increase ambient noise levels in the Project area above existing levels. *The Project would increase traffic noise levels, operation of the substation would generate humming sounds, and operation of the transmission lines would create sizzling, crackling, or hissing sounds associated with corona discharge. This would be a* ***less-than-significant*** *impact.*

The Project would generate approximately two truck trips per month for substation-related maintenance needs and two truck trips per year for transmission line-related maintenance. This could add up to four truck trips one day during the year. This is a relatively small increase in traffic and would not noticeably increase traffic noise levels in the Project area. A doubling of traffic volume (i.e., 100 percent increase) results in a just noticeable increase in noise level of

approximately a 3 dBA. Noise-related impacts from Project traffic would be less than significant.

Transformers generally are the major sources of audible noise within a substation. Transformers are used to convert electricity at high voltage and low current to electricity at low voltage and high current or vice versa. Small transformers located in utility boxes along the distribution system are not a significant source of noise, but larger transformers, reactors, circuit breakers, and other equipment located at substations can produce audible humming sounds. Fans and ventilation equipment used to cool transformers produce broadband noise, and occasionally louder impulse noises occur during switching of a breaker. As noted earlier, long term noise measurements at the existing Hughson Substation showed one-hour Leq's ranging from 58-71 dB and an Ldn of 71 dB. Noise sources at the Hughson Substation include some noise from the substation, but primarily noise from vehicle traffic along Geer Road and Whitmore Avenue. Based on the noise levels at the existing Hughson Substation, noise levels at the residence approximately 2,000 feet south of the proposed substation are estimated to be within the 50-60 dB Ldn range considered normal and acceptable for residential areas in Stanislaus County (please refer to the 2009 Draft EIR for a discussion of acceptable noise ranges). Noise-related impacts from Project operations at the Grayson Substation North would be less than significant.

The electric field in high voltage transmission lines creates an electrical discharge in the air immediately surrounding the conductors. This phenomenon is called corona and is more pronounced in wet or foggy weather when the atmosphere is more conductive. Sounds described as sizzling, crackling, or hissing can be associated with corona discharge, which is typically associated with transmission lines 220-kV or higher. Utilities try to minimize corona because it represents lost energy. San Diego Gas & Electric estimates this noise to be about 50 dBA for a 500-kV line during wet weather near the right-of-way edge and under 40 dBA near the right-of-way edge for overhead 230-kV transmission lines (CPUC 2008). This would be equivalent to 53 dBA and 43 dBA respectively, directly under the transmission line, 5 feet above ground level. Noise levels from 115-kV and distribution lines would be less than those produced by 500 and 230-kV lines. These noise levels are well below the level considered normal and acceptable by Stanislaus County for residential use. Project related noise impacts from operation of the transmission line would be less than significant.

MITIGATION MEASURE 4.10-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.11 TRANSPORTATION

This section identifies impacts of the Project to transportation facilities and circulation, including potential increases in traffic and potential safety hazards. The analysis documents the physical condition and capacity of the area circulation system. This information is based on field surveys, as well as a review of published materials by such sources as the California Department of Transportation (Caltrans), Stanislaus County, the City of Ceres, and the City of Hughson.

4.11.1 EXISTING CONDITIONS

General attributes of local roadways are included in Section 4.11.1 of the 2009 Draft EIR. The Project would primarily follow established canals and railway lines. Major transportation routes in the Project area, including roadways and rail lines, are depicted in Figure 3.2-1.

ROADWAYS

The area road system generally consists of rural two lane roadways, the capacity of which is governed by such varying factors as alignment, shoulder and travelway width, passing sight distance, and the percentage of trucks, agricultural equipment, and/or recreational vehicles using the routes. Because area roads carry a significant amount of agricultural traffic during summer months, traffic volumes and operating levels of service vary throughout the year (DCE 2005).

The Project would parallel several local roadways, including Geer Road, East Whitmore Avenue, Euclid Avenue, and East Service Road. These local arterials have a general level of service of C (Fehr and Peers 2007a). That is, there is stable traffic flow with minimal delays. Stanislaus County strives to maintain at least a C level of service on all roadways (Stanislaus County 2007a). Roadways in the project vicinity are presented in Table 4-17 below.

Table 4-17 Characteristics of Area Roadways

Roadway	Relationship to Project Routes			Classification
	Lateral 2 Route	Lateral 2½ Route	Geer Road Alternative Segment	
Geer Road	Crosses	Crosses	Parallels	Arterial

Table 4-17 Characteristics of Area Roadways

Roadway	Relationship to Project Routes			Classification
	Lateral 2 Route	Lateral 2½ Route	Geer Road Alternative Segment	
East Whitmore Avenue	Parallels	Parallels	Crosses	Arterial
Euclid Avenue	Parallels	Parallels		Collector
Santa Fe Avenue	Crosses	Crosses		Arterial
East Service Road	Parallels	Parallels		Arterial
Tully Road	Crosses	Crosses		Local
Mountain View Road	Crosses	Crosses		Major Collector
Tegner Road	Crosses	Crosses		Local
Pioneer Road	Crosses	Crosses		Local
Washington Road	Crosses	Crosses		Collector
Faith Home Road	Crosses	Crosses		Expressway (Class B; 4 lane)
Esmar Road	Crosses	Crosses		Local
Frontage Road	Crosses	Crosses		Collector
SR 99	Crosses	Crosses		Freeway
Lucas Road	Crosses	Parallels		Primary Collector
Gondring Road	Parallels			Local
Moffet Road		Crosses		Local
Central Avenue	Crosses	Crosses		Arterial/Collector
Blaker Road	Crosses	Crosses		Primary Collector
Morgan Road	Crosses	Crosses		Arterial
Grayson Road		Crosses		Arterial

RAILWAYS

The Project (Lateral 2½ and Lateral 2 routes) would cross a total of three railroad tracks, owned by the Burlington Northern Santa Fe (BNSF) railroad and UPRR. These railways transport coal,

agricultural products, consumer products, and industrial goods. The BNSF line runs northwest to southeast near Hughson's western boundary. The Lateral 2½ and Lateral 2 routes would cross this line once east of SR 99. The 115-kV transmission line would also cross perpendicular to the UPRR tracks that parallel SR 99. The third set of tracks runs north to south between Crows Landing and Morgan roads. South of Ceres, the Lateral 2 Route would cross these UPRR tracks just before entering the proposed Grayson Substation North. The Lateral 2½ Route would parallel UPRR tracks for approximately 1 mile, crossing the tracks once. The Section Two 69-kV line connecting the Grayson Substation North to the Almond Power Plant would also cross these UPRR tracks once.

BIKEWAYS

Bikeways are divided into three classes, defined by Caltrans in the *Highway Design Manual*, as follows:

- Class I: Path physically divided from, and independent of, a roadway with its own right-of-way (generally 8 feet for two-way travel).
- Class II: Areas marked by a striped lane on a roadway designated primarily for bicycle use, although vehicle parking and vehicle and pedestrian cross flow are permitted.
- Class III: Bike routes marked only with signs, where bicycles share the road with pedestrians and vehicles.

Planning documents indicate that there is one bikeway along the Project route. *The City of Ceres' General Plan* identifies East Grayson Road as a Class II/III bikeway. The City of Hughson, in conjunction with the Stanislaus Council of Governments, is currently producing a Non-Motorized Transportation Plan (Fehr and Peers 2007b; Alta 2008). This plan proposes the addition of bikeways to several roadways in the vicinity of the proposed 115-kV transmission line routes.

4.11.2 REGULATORY SETTING

The regulatory setting for the Project is defined in Section 4.11.2 of the 2009 Draft EIR.

4.11.3 IMPACTS AND MITIGATION MEASURES

The potential transportation impacts of the Project include increased traffic volumes, disruption of traffic flow during construction, potential traffic hazards from placing poles along public roads, and possible interference with future plans to widen or otherwise alter public roads.

METHODS OF ANALYSIS

The Project has been analyzed for potential impacts to existing roadways. This section presents a description of the analysis of Project-related impacts, including an evaluation of the Project's consistency with Caltrans, CPUC, BNSF, UPRR, and applicable city and county standards.

THRESHOLDS OF SIGNIFICANCE

Impacts are considered significant if:

- Routing the lines adjacent to the existing roadway right-of-ways would significantly impair the ability to adapt transit systems to future growth in the region (including increased right-of-ways and intersection improvements);
- The Project would cause a substantial increase in traffic relative to the existing traffic load and capacity, or would cause the level of service to fall below the established standard;
- Proposed design features would substantially increase hazards (e.g., sharp curves or dangerous intersections) or incompatible uses;
- Implementation of the Project would result in inadequate emergency access;
- Implementation of the Project would result in inadequate parking capacity;
- The Project would conflict with the operation of transportation-related infrastructure including railways and major thoroughfares; or
- The Project would conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts or bicycle racks).

IMPACTS AND MITIGATION MEASURES

The following is a description of traffic impacts that would be anticipated with Project implementation and recommended mitigation measures, as applicable.

IMPACT 4.11-1

> **Impair ability to adapt transit systems**. *Care has been taken to identify potentially necessary and planned infrastructure upgrades along the Project alignment. However, placement of transmission structures along roadways would result in some restriction to future roadway and intersection expansion. This impact is* ***potentially significant****.*

To the extent feasible, the new transmission line facilities would be placed on the side of the road where aboveground utilities currently exist to minimize potential impacts to future road expansion projects. In addition, the transmission line facilities would be located outside of the established public right-of-way to enable expansion of the roads. This would not eliminate the potential that proposed roadway widening projects would be inhibited by the Project. Future widening of roadways that parallel the transmission route alignment, especially those that require right-of-way expansion, may decrease the ultimate available clear zone[8] between roadways and the proposed transmission line poles. While the American Association of State Highway and Transportation Officials criteria for clear zones have not been adopted by the State of California and are not applicable to the Project, clear zones are generally considered to beneficial public safety.

Published planning documents indicate that future expansion projects are proposed along the 115-kV transmission line route. These intended upgrades and proposed future classifications are presented below in Table 4-18.

8 Defined by the Federal Highway Administration (2007) as the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. It is an unobstructed, relatively flat area (such as a shoulder) that allows a driver to stop safely or regain control of a vehicle. The desired minimum width is dependent upon traffic volumes and speeds and on the roadside geometry.

Table 4-18 Proposed Roadway Upgrades along the Proposed Project Routes

Roadway	Project Route Potentially Impacted	Proposed Upgrades
Geer Road	Lateral 2 Route Lateral 2 ½ Route Geer Road Alternative Segment	proposed expansion to 4 lanes with eventual expansion to 6 lanes
East Whitmore Avenue	Lateral 2 Route Lateral 2 ½ Route Geer Road Alternative Segment	proposed expansion to 4 or 5 lanes
Euclid Avenue	Lateral 2 Route Lateral 2 ½ Route	proposed re-routing of Euclid Avenue to intersect with Santa Fe Avenue north of the current location. Eventual upgrade to major collector
Service Road	Lateral 2 Route Lateral 2 ½ Route Geer Road Alternative Segment	proposed expansion to 4 lane, class C expressway
Santa Fe Avenue	Lateral 2 Route Lateral 2 ½ Route	proposed expansion to a four-lane, class C expressway
Faith Home Road	Lateral 2 Route Lateral 2 ½ Route	proposed expansion to a four-lane, class C expressway
Central Avenue	Lateral 2 Route Lateral 2 ½ Route	proposed expansion to 4 lanes
Morgan Road	Lateral 2 Route Lateral 2 ½ Route	proposed expansion to 4 lanes
East Grayson Road	Lateral 2 Route Lateral 2 ½ Route	proposed expansion to 4 lanes and extension to Mitchell Road at Service Road

Source: Stanislaus Council of Governments *2011 Regional Transportation Plan, Appendix A*; City of Hughson *Street Master Plan*

In general, the Project would have only a minor potential impact to roadways proposed for expansion where a crossing would occur. In these locations, it is possible that the established ruling span would permit road expansion without modification of Project infrastructure. Alternately, no more than two poles are likely to require relocation. There is greater potential for conflict where the routes would parallel roads proposed for expansion.

Additionally, the Project would cross SR 99 north of East Redwood Road. Caltrans has prepared the *Route 99 Corridor Enhancement Master Plan*, which outlines a plan to bring SR 99 to Interstate Highway standards by 2030. This will require upgrade of several stretches of freeway and elimination of at-grade intersections. The point of the proposed overcrossing is within a reach of freeway that generally meets the 2030 Facility Concept, and no major upgrades are planned for this area.

GEER ROAD The level of service on Geer Road is anticipated to degrade an E level, or worse, under future conditions. To improve service, the *Hughson Street Master Plan* proposes the widening of Geer Road between Hatch Road and Santa Fe Avenue to four lanes by 2013 and the eventual widening to six lanes (Fehr and Peers 2007a). The *2011 Regional Transportation Plan* identifies the widening of Geer Road to four lanes in this area as a Tier Ia Non-fiscally Constrained project; indicating that, while not fully funded, the project is a priority for the City of Hughson and is in some stage of development (StanCOG 2007). Future expansion of Geer Road would likely necessitate the relocation of Project transmission poles (estimated at 21 poles) if the Geer Road Alternative Segment is implemented.

EAST WHITMORE AVENUE East Whitmore Avenue, which is currently an arterial, is proposed for expansion to a four-lane arterial by the City of Hughson (Fehr and Peers 2007a). The *2011 Regional Transportation Plan* indicates that East Whitmore Avenue is under consideration for expansion to a four or five lane expressway between Geer Road and the City of Ceres boundary. This roadwork is listed in the transportation plan as a Tier II project, with no forecasted funding (StanCOG 2007).

The Lateral 2 and Lateral 2½ routes would parallel east Whitmore Road for approximately 0.25-mile. Within the City of Hughson, four-lane arterials, the classification to which East Whitmore Avenue is proposed for upgrade, require 100 feet of right-of-way. The *Street Master Plan* (2007) indicates that the expansion of East Whitmore Avenue will require the acquisition of additional right-of-way.

The widening of East Whitmore Road may be complicated by the placement of Project poles parallel to the roadway. Assuming a 120 foot ruling span, there is the potential that approximately five transmission poles would have to be relocated to accommodate eventual

expansion of East Whitmore Avenue. Due to the absence of funding, this project is not considered reasonably foreseeable.

EUCLID AVENUE The re-alignment of the southern terminus of Euclid Avenue is planned for construction in 2015. Euclid Avenue would be realigned to intersect with Santa Fe Avenue approximately 0.25-mile north of the current intersection, reducing the number of roadways intersecting at the five-way Santa Fe Avenue/Euclid Avenue/Service Road intersection. The roadway is also planned for eventual upgrade from a collector to a major collector (Fehr and Peers 2007a). Within the City of Hughson, streets identified for upgrade to major collectors will require an 80 foot right-of-way. This requirement has been developed to accommodate projected traffic demand, to facilitate the movement of large trucks, and/or to improve safety due to limited visibility or other safety hazards.

The re-alignment of Euclid Avenue would have no impact on the Project. Project poles would not require relocation and would be maintained along the established corridor. Further, upgrade to a major collector may not impact Project transmission poles because expansion may be possible only on the opposite side of the roadway from this infrastructure.

SERVICE ROAD The *Hughson Street Master Plan* proposes expansion of Service Road from two lanes to a four lane, class C expressway (Fehr and Peers 2007a). This expansion could affect transmission poles associated with either the Lateral 2½ or the Lateral 2 115-kV route, or the Geer Road Alternative Segment. However, since the poles would be located between the roadway and Lateral No. 2, and the relocation of Lateral No. 2 is unlikely, it is anticipated that any expansion of Service Road would occur on the north side and would not have an affect on, or be impacted by, the Project.

SANTA FE AVENUE Santa Fe Avenue is expected to have a level of service at or below an E designation under future conditions. Expansion to a four-lane, class C expressway is planned for construction in 2016 (Fehr and Peers 2007a). At most, this expansion is anticipated to require modification of the two poles that would span the roadway.

FAITH HOME ROAD The *Public Facility Fees Nexus Study for the City of Ceres* (PMC 2008) identifies the portion of Faith Home Road between Service and Redwood roads as an area that should undergo improvements. These improvements would be funded entirely through developer

impact fees. The regional transportation plan indicates that the portion of Faith Home Road between Hatch Road and SR 99 is proposed for expansion to a six lane expressway, however no funding is currently identified for the project (StanCOG 2007). At most, this expansion is anticipated to require modification of the two poles that would span the roadway.

CENTRAL AVENUE Improvements to Central Avenue, between Service and Grayson roads, are identified in the *Public Facility Fees Nexus Study for the City of Ceres* (PMC 2008). According to the nexus study, these improvements are proposed to be funded entirely by developer impact fees. The regional transportation plan proposes widening Central Avenue from two to four lanes between Industrial and Grayson Avenue, but identified no funding for the project (StanCOG 2007).

The expansion would occur in the portion of Central Avenue crossed by the Lateral 2 Route. At most, this expansion is anticipated to require modification of the two poles that would span the roadway.

MORGAN ROAD The *Public Facility Fees Nexus Study for the City of Ceres* (PMC 2008) indicates that road improvements are planned on Morgan Road, between Service and Grayson roads. These improvements would be funded to 10.15 percent by the City of Ceres, with the remainder paid by developer impact fees. This expansion may require the relocation of poles associated with the Section One 69-kV line and the Lateral 2 Route.

EAST GRAYSON ROAD Improvements are proposed on Grayson Road between Crows Landing Road and Central Avenue. These upgrades would be funded entirely by impact fees, according to the *Public Facility Fees Nexus Study for the City of Ceres* (PMC 2008). Widening East Grayson Road from two to four lanes is also listed in the *2011 Regional Transportation Plan* as a project potentially warranted in the future, but for which no funds are currently identified (StanCOG 2007).

INTERSECTIONS The Geer Road/Whitmore Avenue intersection is anticipated to degrade to a level of service of F under future conditions. Stanislaus County has proposed to signalize and widen the intersection (Fehr and Peers 2007a). As discussed above, Euclid Avenue is proposed for partial realignment to curtail the use of the Santa Fe Avenue/Service Road/Euclid Road

intersection, which is otherwise predicted to be at a level of service of F under future conditions (Fehr and Peers 2007a).

CONCLUSIONS Only projects that are currently funded, or that are in some stage of development, are considered reasonably foreseeable under CEQA. A potential inconsistency with these projects alone is not a significant effect. Improvements to Faith Home Road, East Grayson Road, and Central Avenue would likely require the acquisition of right-of-way; however, plans for these improvements have not yet been developed.

MITIGATION MEASURE 4.11-1

The location of proposed utility infrastructure shall be made available to the Stanislaus County Department of Public Works for review and comment prior to construction. In addition, TID will review the City of Hughson's Street Master Plan prior to design and utility pole placement, in an effort to minimize impacts to the proposed upgrades identified in Table 4-18.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-2

Increase local traffic volumes. *Project-related construction traffic would result in a moderate increase in usage of local roads and potential disruptions. This impact would be* ***potentially significant****.*

INCREASED TRAFFIC During construction of the proposed transmission line, approximately 24 workers would be present along the entire transmission line alignments, working in six-person crews at different locations. These workers would travel daily to the marshalling yard, where the crew members would park their personal vehicles and proceed to jobsite with diggers, bucket trucks, pickups, etc. Poles and other construction equipment would also be delivered to the sites.

A 10- to 15-person crew would be used for substation construction. Access to the site would be via local and agricultural roads. Increased traffic volume would be noticeable on some little used roads; however, given the small size of the construction crews and the brevity of the construction activities at any one location, these temporary increases in traffic would not be significant. Impacts to traffic volumes would be comparatively much less than those typically associated with seasonal harvesting operations.

TRAFFIC DISRUPTIONS With the exception of public roadway crossings, the transmission lines would be sited within private easements or irrigation district rights-of-way. Consequently, potential impacts to traffic disruption would be largely avoided. However, during construction, where the temporary construction zone would cross public roadways, or locations where the temporary construction zone could potentially encroach along the length of a roadway right-of-way, there could be potential temporary impacts to traffic flow and local access. Any transmission line construction zone that would extend within or across the local public road rights-of-way may require temporary and localized lane closures while raising the poles and stringing the conductors. These temporary closures would be more significant on major and collector roads with higher traffic volumes. Lane closures could be anticipated to last several hours, closing one lane for approximately 1 mile at a time. Temporary traffic interruptions on local roads may result in short-term impacts to traffic conditions.

MITIGATION MEASURE 4.11-2

Temporary traffic controls shall be implemented to minimize the potential for construction activities to result in traffic disruptions. Signs and/or flagmen shall be in place to alert drivers of approaching lane closures and construction activities, and to safely maintain potential alternate one-way traffic flow, as needed. Controls would follow Caltrans' most recent *Manual of Traffic Controls for Construction and Maintenance in Work Zones*, and road closures would be coordinated with the Stanislaus County inspector. As required by the County's *Standards and Specifications* (2007b), all traffic lanes would be opened during peak traffic hours: Monday through Friday 7:30 to 8:30 a.m. and 4:30 to 5:30 p.m. Any traffic control plan to be implemented within Stanislaus County's right-of-way shall be submitted to Stanislaus County Public Works for approval.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-3

Substantially increase traffic hazards. *Poles and other infrastructure associated with the Hughson-Grayson Transmission Line and Substation Project would be placed a safe distance from travelways and intersections. This impact would be considered* ***less than significant****.*

The Stanislaus County *Standards and Specifications* stipulate that all above-ground permitted utilities/facilities must be placed in Public Utilities Easement. If no such easement exists, then the edge of utilities/facilities must be located within 2 feet of the roadway right-of-way line. TID plans to locate the poles for the proposed transmission line in private easements outside the road right-of-ways. Thus, the Department of Public Works' *Standards and Specifications* do not apply to the Project.

At intersections, site-specific factors can affect visibility. Stanislaus County requires that poles at intersections be placed to avoid interfering with the view of oncoming traffic, generally a minimum of 70 feet from the centerline of the intersection (Stanislaus County 2007b).

MITIGATION MEASURE 4.11-3

TID will consult with county officials in the field regarding the proper placement of poles at intersections on a case-by-case basis. Visibility strips will be placed on the poles to reduce potential hazards to motorists.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-4

Result in inadequate emergency access. *The Project would not impair existing emergency access, and adequate access would be provided to proposed facilities, including transmission infrastructure and the Grayson Substation North. The Project would have a* ***less-than-significant*** *impact on emergency access.*

The proposed transmission infrastructure would not inhibit emergency access to any established resources or improvements, including homes, businesses, canals, or agricultural land. Emergency access to the proposed transmission line would be via local roadways, TID canal access roads, and easement clearings where no roads exist. The Grayson Substation North would be accessible from the paved access road to the Almond Power Plant off of Crows Landing Road, along the north side of Lateral No. 2. A box culvert bridge would be installed across Lateral No. 2 to provide vehicular access to the substation site. The bridge would be engineered to support the weight of vehicles and substation equipment while providing unimpeded flow of irrigation water.

MITIGATION MEASURE 4.11-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-5

Result in inadequate parking. *The Grayson Substation North would provide adequate parking. Project implementation would result in a* ***less-than-significant*** *impact.*

The Project would not remove any parking currently available to the public. Therefore, there would be no long term loss in parking opportunities. During construction, roadway closures and the need to locate construction vehicles may reduce parking availability. This is not expected to impact parking in the Project area, as the need for parking in the rural residential area is low.

Following completion, the Project would require parking facilities at the Grayson Substation North. The facility would be designed to accommodate this requirement. Parking along the transmission line routes for inspection activities would occur within an established easement and would not impact parking conditions.

MITIGATION MEASURE 4.11-5

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-6

Conflict with the operation of local railways or SR 99. *The Project would cross SR 99 and established rail lines in several locations. Impacts would be considered* ***potentially significant****.*

The Project route would cross the BNSF line as the transmission line passes over Lateral No. 2. Further west, the 115-kV line would cross over the UPRR tracks that parallel SR 99. The UPRR tracks that run north to south east of Crows Landing Road would be paralleled by the Lateral 2½ Route, and crossed by the Lateral 2½ Route, the Lateral 2 Route, and the Section Two 69-kV line (see Figure 3.2-1).

Railroad crossings would be designed at an angle approximately 90 degrees to the centerline of the tracks. The transmission lines would completely span railroad property, with supportive structures located outside the property bounds. For each crossing, an overhead wireline crossing permit will be obtained from the appropriate railroad company.

The 115-kV transmission lines would cross roughly perpendicular to SR 99, south of Ceres and north of the Faith Home Road crossing. Transmission poles would be placed outside Caltrans' right-of-way; however, an overhead aerial encroachment permit would be required. This permit would include procedures for traffic control to minimize potential impacts.

MITIGATION MEASURE 4.11-6

Appropriate BNSF, UPRR, and Caltrans procedures shall be followed at all crossings. All work near the BNSF line shall be conducted in conformance with the procedures contained in the railway's *Utility Accommodation Policy* (2007). UPRR crossings shall follow the railway's *Procedures for Wireline Crossings*, and TID shall complete and submit to UPRR the required online application for work.

For construction of lines that would cross the SR 99, an encroachment permit (TR-0100) would be required from Caltrans. In conjunction with this permit, traffic control will be implemented by the California Highway Patrol. These measures will include rolling breaks of durations sufficient for construction personnel to install pull rope and string conductors across the freeway. Temporary support poles may be placed at protected locations outside shoulders and in medians to prevent pull ropes or conductors from accidentally falling during installation.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.11-7

Conflict with adopted programs supporting alternative transportation. *The Project would be constructed adjacent to the right-of-way of several roadways, potentially limiting opportunities to expand the existing right-of-ways to accommodate bike lanes or walking paths in the future. This impact would be considered* ***potentially significant****.*

The Project would be located in a rural, agriculturally based region of Stanislaus County, outside major city centers. It is not anticipated that these areas will experience a change in current usage

in the near future. Planning documents indicate that there is one bikeway along the Lateral 2½ Route. *The City of Ceres' General Plan* identifies East Grayson Road as a Class II/III bikeway. Such bikeways are located in the roadway and would not be impacted by the placement of utility poles outside of East Grayson Road's right-of-way.

Additional bikeways are currently proposed in the region. The City of Hughson, in conjunction with the Stanislaus Council of Governments, is currently producing a Non-Motorized Transportation Plan (Fehr and Peers 2007b; Alta 2008). The bikeways proposed in this plan that would be parallel to, or would cross, the Project are identified in Table 4-19 below.

Table 4-19 Proposed Bikeways along the Project Routes

Existing Infrastructure	Class
Geer Road	Class I and Class III
East Whitmore Avenue	Class II
Euclid Avenue	Class II
East Service Road	Class II
Lateral No. 2	Class I
Ceres Main Canal	Class I

Source: *Stanislaus County Non-Motorized Transportation Plan* (Alta 2008)

The proposed bikeways along Geer Road may require additional right-of-way, further increasing the likelihood of conflict with the Project. The proposed Class II bikeways would be located on the roadway and would not be impacted by the Project. The Class I bikeways proposed along the TID canals are consistent with use of this area as a utility corridor and would not conflict with the project.

The Project would have no impact on current or future use or operations of public transportation means. Further, it would in no way impact the walk-ability of the route.

MITIGATION MEASURE 4.11-7

TID shall make construction plans and alignment details available to local agencies (including the City of Ceres, City of Hughson, and StanCOG) for identification of potential right-of-way issues related to future roadway and bikeway path upgrades.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.12 PUBLIC SERVICES AND UTILITIES

This section provides an overview of the existing public services and utilities in the Project area and an analysis of the Project's potential to impact these services. Mitigation measures are provided, as necessary, to reduce potential impacts.

4.12.1 EXISTING CONDITIONS

PUBLIC SERVICES

Section 4.12.1 of the 2009 Draft EIR provides a description of existing public service (including schools, recreational facilities, fire protection, and law enforcement) and public utilities (including water, solid waste, and electrical services) in the Project area.

4.12.2 REGULATORY SETTING

Public services and utilities regulations applicable the proposed project are described in Section 4.12.2 of the 2009 Draft EIR.

4.12.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

Impacts on Public Services and Utilities were identified by comparing existing services and facilities against future demand associated with Project implementation.

THRESHOLDS OF SIGNIFICANCE

Impacts would be considered significant if the Project would:

- Result in substantial adverse physical impacts associated with the provisions of new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for public services including fire protection, police protection, schools, and other public facilities;
- Impact existing or proposed schools;

- Adversely effect existing utility infrastructure;
- Conflict with any applicable policies regarding the construction of public services;
- Be served by a landfill with insufficient permitted capacity to accommodate the Project's solid waste disposal needs or be unable to comply with federal, state, and local statutes and regulations related to solid waste;
- Exceed the wastewater treatment requirements of the Central Valley Regional Water Quality Control Board or require, or result in, the construction of new facilities for wastewater treatment or stormwater drainage that could cause a significant effect on the environment; or
- Have insufficient water supplies available to serve the Project from existing entitlements.

IMPACT ANALYSIS

IMPACT 4.12-1

Result in substantial adverse physical impacts associated with the provisions of new or physically altered government facilities. *The Project does not require the construction of new facilities to achieve current performance objectives for the maintenance of public services. The Project would have* ***no impact.***

The Project would not overburden the existing public services, or necessitate new or altered government facilities. No change in the type or amount of community police protection, fire services, or other emergency services is anticipated as a result of the Project. Under the Project, the Grayson Substation North would be enclosed with chain link fencing, topped with barbed wire to discourage unauthorized access, and would also have perimeter motion sensors.

Transmission and distribution lines have the potential to start fires in rare situations when the lines come into contact with nearby tree branches or other dry vegetation during windy conditions. Fires caused by transmission lines can be largely avoided by ensuring sufficient separation between the branches and the electrical lines, and by properly maintaining the protective devices in the system. The lands that the Project would traverse are primarily cultivated agricultural lands and orchards. Within these areas, the risk of wildland fire is generally low because agricultural properties are typically well maintained, with little undergrowth and minimal dead wood.

All substation and transmission line facilities would be designed and constructed in compliance with applicable fire codes and standards. Following Project implementation, TID would periodically inspect the substation and transmission line segments, and trim vegetation around the transmission line poles and conductors to maintain adequate distances between electrical hardware and vegetation to avoid fire hazards. Inspections would be performed in accordance with GO 95 and GO 165.

During Project construction, it may be necessary to implement lane closures and detour traffic, which may result in short-term impacts to the response times of fire or police personnel responding to emergencies. Such impacts, however, would not require the addition of government facilities.

Further, there may be temporary and localized disruptions in electrical service as a result of Project construction. These interruptions (less than eight hours each and affecting only a few homes at a time) are needed to transfer the existing lines to new poles. Project implementation plans include provisions for temporary distribution facilities, which would consist of 12-kV lines on 45 foot distribution poles, located on the north side of East Service Road, from Santa Fe Avenue to Mountain View Road (approximately 1.4 miles). In addition, if the Geer Road Design Option is selected, a temporary 12-kV distribution line on 45 foot poles would be constructed on the east side of Geer Road for approximately 1 mile. These temporary facilities would be constructed along existing road rights of way to provide electrical service during construction of the new transmission line and would be removed once construction of this portion of the route is completed.

MITIGATION MEASURE 4.12-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.12-2

Impact existing or proposed schools. The Project would not be located within 100 feet of an established school. *The Project would be in compliance with the 100-foot safety distance for 115-kV transmission lines specified in the California Department of Education regulations. Therefore, the Project is expected to have **no impact** on existing schools.*

The California Department of Education recommends a 100-foot setback between schools and 115-kV transmission lines. The Project routes would meet these requirements.

The Project itself would not contribute to a need for new schools, and there are no known plans for the construction of new schools along the Lateral 2 or Lateral 2½ routes. In the future, if a need arises for new schools in the vicinity, the proposed transmission line would constitute a constraint on the siting of the new school. This constraint would not be a significant impact because there are sufficient siting choices to ensure that appropriate setback distances can be observed. The Project is not expected to result in a significant impact to existing or future schools.

MITIGATION MEASURE 4.12-2

No mitigation necessary

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.12-3

Adversely effect existing utilities. *The Project would cross, run parallel to, and share poles with, existing utility lines. Construction would result in a **potentially significant** impact.*

The Project would cross several existing utility lines. There may be temporary disruptions in service as a result of Project construction. These interruptions (less than eight hours each) are needed to transfer the existing lines to new poles or to provide safety for construction crews.

Co-location of Project 115-kV transmission with 230-kV lines would require an outage of the Westley/Walnut/Parker 230-kV transmission line during construction. Construction requiring the outage of power lines would be conducted in the winter, under low demand conditions. Power would be generated internally or delivered via other sources to accommodate for this reduction in transmission, and there would be no impact on power customers.

MITIGATION MEASURE 4.12-3

During transmission line design, TID will coordinate with other local utilities to avoid alignment conflicts. TID will locate existing underground natural gas, petroleum, water, irrigation, and communication lines at, or adjacent to, the planned pole locations, and shall adjust proposed pole placement, if necessary, to avoid interference with these utilities. Underground Service Alert shall be notified at least two working days prior to any digging. TID will provide 48 hours advance notice to customers along the transmission line of any temporary disruptions in service that may result from Project construction.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.12-4

Conflict with utility construction policies. *The proposed infrastructure would be constructed in compliance with applicable policies regarding the construction of public services. Therefore, the impacts associated with the Project would be* ***less than significant****.*

The Project would be constructed in conformance with applicable codes and industry guidance documents. The Project is considered consistent with applicable local policies.

The Section Two 69-kV line that would extend from the Grayson Substation North to the existing Almond Power Plant would be partially within the City of Ceres. The city's general plan states that, in areas of new development or redevelopment, the city requires that utilities are undergrounded, if feasible. The Project would not be completed in conjunction with any new development or redevelopment and TID does not underground transmission lines of this voltage. Further, the proposed line would not be suitable for undergrounding due to engineering constraints. Several other lines connect to the Almond Power Plant. These existing utilities are also above ground.

MITIGATION MEASURE 4.12-4

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.12-5

Be served by a landfill with sufficient capacity to accommodate the Project's solid waste needs. *The disposal of used poles and other discarded Project materials would not significantly affect landfill operations or available capacity. Therefore, the impacts associated with the Project would be* ***less than significant****.*

Approximately 150 existing distribution and transmission poles would be replaced through implementation of the Project. Wooden poles may have been treated with, and could contain, quantities of pentachlorophenol, copper napthenate, or other materials on the State Toxic Characteristic List. Poles treated along their entire length with these chemicals cannot be disposed of in the county landfill. Poles that cannot be sent to the landfill would either be re-used or made available to the public for construction and landscape-related uses.

Poles that have not been treated, or have been only partially treated along the length buried below ground would be sent to the Stanislaus County landfill on Fink Road. Disposal of the used poles would not significantly affect the capacity or operation of the Fink Road Landfill. No significant amount of electrical equipment, other than poles, would be disposed of as a result of this Project. TID plans to comply with all federal, state, and local statutes and regulations regarding solid waste.

MITIGATION MEASURE 4.12-5

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT 4.12-6

Exceed wastewater treatment requirements or require construction of new facilities. *The Project would not require the construction of new facilities for wastewater treatment or storm water drainage and would not exceed the wastewater treatment requirements of the Central Valley Regional Water Quality Control Board. The impact to water treatment facilities would be* ***less than significant****.*

The Grayson Substation North would require the installation of a septic tank for disposal of wastewater associated with lavatory facilities. No other wastewater would be generated through facility operations, and no further infrastructure would be required.

Potential impacts to stormwater quality as a result of Project construction are addressed in Section 4.4-1 of this document under Impact 4.4-1.

MITIGATION MEASURE 4.12-6

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

IMPACT4.12-7

Have insufficient water supplies. *Existing groundwater supply would be sufficient to serve the operational requirements of the Project. Impact to water supply would be* ***less than significant****.*

One of the control buildings for the Grayson Substation North would have a restroom for maintenance workers who would be on-site approximately once a month. A 1 hp, single phase groundwater well would be constructed to provide water for domestic purposes. Groundwater supply is sufficient to support this limited use.

MITIGATION MEASURE 4.12-7

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

4.13 SOCIOECONOMICS

This section describes the existing social and economic conditions in Stanislaus County and the cities of Ceres and Hughson[9]. Socioeconomic factors include population, housing, employment, income, and community infrastructure.

4.13.1 EXISTING CONDITIONS

The population, housing, and employment characteristics presented in Section 4.13.1 of the 2009 Draft EIR represent socioeconomic conditions in the vicinity of the project.

4.13.2 REGULATORY SETTING

The regulatory setting is described in Section 4.13.2 of the 2009 Draft EIR.

4.13.3 IMPACTS AND MITIGATION MEASURES

METHODS OF ANALYSIS

The anticipated effects of the Project have been analyzed for their potential to promote population growth or displace the existing population. Additional analysis is provided regarding the potential for the Project to impact the value of adjacent homes and associated improvements.

THRESHOLDS OF SIGNIFICANCE

The following thresholds have been developed as significance criteria for evaluation of the Project's potential impacts. Impacts would be considered significant if the Project would:

- Induce substantial growth or concentration of population;
- Displace substantial numbers of existing people or houses, necessitating construction of replacement housing elsewhere; or
- Cause a substantial permanent decrease in housing values.

9 Although the Project would not be located within the City of Hughson's jurisdiction, socioeconomic information regarding the city is included in this Section due to the city's proximity to the Project.

IMPACT ANALYSIS

IMPACT 4.13-1

Induce population growth or concentration. *The proposed transmission and substation facilities are expected to have **no impact** to population and housing in the vicinity of the Project.*

CONSTRUCTION Construction of the Hughson-Grayson 115-kV Transmission Line and Substation Project would require a peak workforce of approximately 60 people. Project construction would be performed by local workers that are either TID employees, contractors to TID, or a combination of both. In 2008, the Natural Resources, Mining and Construction sector workforce was estimated to be 9,300 workers (EDD 2009). The 60 workers required for construction of the Hughson-Grayson 115-kV Transmission Line and Substation Project represents less than one percent of the estimated workforce in the Natural Resources, Mining, and Construction sector. Therefore, there is assumed to be sufficient construction labor available in Stanislaus County for the Project.

In the event that the Project workers commute from outside the area, it is unlikely they would relocate given the duration of the construction activities, which is estimated to be approximately one year for the transmission lines and substation. Adequate numbers of temporary residences are available in the communities neighboring the proposed line to accommodate these workers. For example, there are 47 hotels/motels in Stanislaus County with a total of 3,332 rooms. Hotel occupancy rates for the period November 2007 through October 2008 averaged approximately 42 percent (CH2M Hill 2009). Potential workers from outside the general Project area are not expected to purchase homes during their brief local employment. If workers desire to purchase homes, however, a sufficient supply of vacant houses is available. As of July 2010, there were 2,368 single-family homes available for sale in Stanislaus County (Metro List). Thus, relocation of Project construction workers would not induce pressure on the local housing supply. Consequently, construction of the Project would not create a significant increased demand for housing or public services, nor would it cause a substantial increase in population. Therefore, the construction phase would have a less than significant impact and would not induce population growth or concentration.

OPERATION During operation of the proposed transmission line and substation, a peak workforce of two people would be required, and work would be intermittent. The operations workforce

would consist of existing TID employees, and would therefore, not have any impact on growth or population. Assuming two additional workers were hired to perform these maintenance responsibilities, the increase in population would not constitute a substantial growth in population. Therefore, the Project would result in a less than significant impact and would not induce population growth or concentration once the Project is operating.

The proposed transmission line would provide power to areas currently receiving services, along with increased capacity for planned future development. Economic electricity prices are expected to result from the Project. However, these changes alone are not expected to induce population growth in the area. Chapter 6 of this document addresses the growth-related effects of the Project.

MITIGATION MEASURE 4.13-1

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.13-2

Displace substantial numbers of existing people or residences. *The Project is consistent with Stanislaus County and the City of Ceres' major goals and objectives for development. Implementation would have* ***no impact*** *on populations.*

Implementation of the Project is not anticipated to displace large numbers of people. The Project does not call for either the removal or relocation of any existing housing. No transmission lines would impede residents' ability to access or maintain their buildings. Residents along the Project route would not need to relocate during construction activities. No significant downsizing of either employment opportunities or public services is expected.

MITIGATION MEASURE 4.13-2

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impact

IMPACT 4.13-3

Decrease property values. *The Project would have a* ***less-than-significant*** *impact on property values.*

Property owners along transmission line routes expressed concern during the public scoping of the 2009 Draft EIR that the installation of overhead transmission lines and poles may decrease property values. Although CEQA does not require a discussion of economic impacts, studies on the impact of transmission lines on property values have been reviewed to determine potential impacts. Although these studies were conducted in other areas of the country and evaluated transmission line facilities that were different from the Project, they provide some guidance for assessing impacts on real estate.

When buying a property, several factors are considered (such as school districts, community services, scenic beauty, recreational opportunities, and commute distances). The relative importance of each of these factors varies among individuals. Likewise, the importance of nearby power lines will vary among prospective buyers and is largely subjective.

In her 1992 synopsis of previously conducted summaries compiled for the Edison Electric Institute, Cynthia Kroll determined that overhead transmission lines have the potential to reduce the sales price of agricultural and residential properties. This reduction was generally observed on the magnitude of zero to 10 percent. The paper concluded that other factors (such as neighborhood, size of lot, and irrigation potential) are more likely to be major factors in determining the sales price of a property. Additionally, a transmission line's negative effects are most likely to occur to properties crossed by, or immediately adjacent to, the line and may be greater for smaller properties. These impacts are greatest following construction and may diminish over time.

SINGLE FAMILY HOMES A recent study undertaken by Des Rosiers (2003; as cited in CH2M Hill 2006) in a suburb of Montréal found that, in general, homes adjacent to the transmission line right-of-way and facing a transmission tower experience a drop in property value of 10 percent. Conversely, a number of studies provide evidence that, in some cases, overhead transmission lines and their rights-of-way may have positive effects on the value of some properties. The degree to which this occurs depends very much on the circumstances of the line itself, the

neighborhood, and the improvements made to the right-of-way. The Des Rosiers study found that, for properties located next to the transmission line right-of-way, but not right next to a transmission tower, there is a positive price impact that ranges from seven to 22 percent. Des Rosiers also found that for properties that were not immediately adjacent to the right-of-way, but for which the transmission corridor affords views of an open character, the presence of the corridor can be an asset. In fact, these properties with improved access to views as a result of utility easements experienced value increases in the range of three to four percent.

AGRICULTURAL LAND Impacts ranging from no effect to up to a 20 percent decrease in value have been found in cases where there were disruptions to irrigation and farm operations resulting from transmission line location (Jensen Management Services 1983; as cited in CH2M Hill 2006). Often, negative effects are felt by those properties where there is potential for residential development.

DISTANCE EFFECTS As in most real estate transactions, the impact of the Project would depend on location; in this case, the location of the property and the location of the proposed facilities. Several studies that have found transmission lines to affect property values include findings that the effects are highest in the areas closest to the transmission line and taper off quickly with distance. A study conducted by Colwell and Foley (1979; as cited in CH2M Hill 2006), for example, found the effects to be highest within 50 feet of the right-of-way and then to drop off very quickly with increasing distance, disappearing almost entirely after 200 feet.

The aesthetic appearance of the poles can influence the impact on property values. Elements of the Project design, including pole color and pole heights, reduce the aesthetic impacts of the proposed transmission and distribution lines. Where views of lines and towers are unobstructed, negative impacts can extend up to 0.25-mile. However, if at least partially screened by trees, landscaping, and topography, negative effects are reduced considerably (Pitts 2007).

Where the transmission facilities are located in rural areas, the impact on property values is expected to be less than significant. Utility poles are common in these areas, and property values are dominated by the value of the land rather than the aesthetic appearance. Nevertheless, there is the possibility that some less-than-significant reduction in property values may occur, particularly in relation to adjacent residential uses.

The proposed transmission line design has oriented the line so as to follow canals, roads, and railroad tracks, reducing the potential impact to irrigation and farming operations. In addition, the existing transmission or distribution lines would be co-located with the new transmission lines, where possible. Locating transmission lines near residences has been avoided to the extent possible. Where not possible, priority will be given to placement of poles in locations other than directly across from residences.

MITIGATION MEASURE 4.13-3

No mitigation required

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant

5.0 ALTERNATIVES ANALYSIS

5.1 INTRODUCTION

5.1.1 CEQA AUTHORITY FOR CONSIDERATION OF ALTERNATIVES

Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines requires Environmental Impact Reports (EIRs) to describe "...a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives."

5.1.2 BASIC PROJECT OBJECTIVES

The basic objectives of the Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project) include the delivery of additional energy supplies and improvement to system reliability. There are currently no east-west trending power lines connecting Turlock Irrigation District's (TID) distribution system in the east to its transmission system in the west north of the City of Turlock. As such, bridging the towns of Hughson and Ceres was deemed essential to this Project. TID utilizes its 69 and 115 kilovolt (kV) transmission systems to distribute power to substations throughout its service territory. Currently, the Ceres area is only served by the 69-kV system, and that system is near capacity. There is a need to provide voltage support to the west Ceres area to serve forecasted load growth.

A transmission system operating at or near capacity is more likely to experience local outages. To remedy this issue, TID currently has to institute operating limitations to prevent overloading the 69-kV transmission system in Ceres. These operating limitations include, for example,

operating the existing Almond Power Plant when it may be uneconomical to do so in order to reduce the amount of electricity traveling through the 69-kV transmission lines to the Ceres area. In addition, when a transmission system operates at or near capacity, the conductors sag due to increased heat resulting from high amperage in the lines. The thermal sagging impedes the ability to maintain electrical safety clearances (i.e. the required safe distance from the line to ground or other conductors) which can result in reliability and safety concerns.

TID requires a project that eliminates these constraints. First, the project should enable the Ceres area to be served by TID's 115-kV transmission system, increasing system reliability and reducing strain on the existing 69-kV transmission system. Second, the project should provide additional reliability to the TID system by providing another means of bringing electricity in and out of the area. This would provide voltage support to the west Ceres area, accommodating forecasted load growth. Third, the project must provide another way of transmitting electricity generated by the existing TID Almond Power Plant to the Ceres Area and the TID transmission system. A final project objective is to provide additional reliability through a dedicated crossing over State Route (SR) 99, allowing TID to move electricity east-to-west and west-to-east as system conditions dictate.

TID Objectives for Transmission Lines

TID has also developed guidelines, which are the basic objectives for routing transmission lines. The guidelines for transmission line routing require the following:

- Use of existing overhead circuit routes and other utility corridors that could include canals, drainage corridors, parkways, open space, freeways, and railroad alignments;
- Following arterial streets;
- When the alignment is not along a street, following property lines to minimize bisecting parcels of land;
- Affecting the smallest percentage of a parcel of land;
- Preference for an alignment that is the shortest length with the fewest angles;

- Minimizing impacts to wetlands, special-status vegetation and wildlife species, and cultural and paleontological resources along the alignment;
- Preference for compatible adjacent land uses and zoning;
- Consideration of compatibility with potential future expansion;
- Avoidance of freeway access areas and airport approach/departure flight zones;
- Minimizing the land use impact by affecting the smallest percentage of a parcel of land;
- Minimizing the need to relocate existing facilities, infrastructure, or utilities;
- Minimizing residential communities' visual impacts and electrical and magnetic field exposure;
- Siting in areas that are least susceptible to flooding, fire, and other natural or human-made disasters; and
- Community and agency input.

DISTRIBUTION SUBSTATION OBJECTIVES

TID has developed guidelines for distribution substation site selection. The guidelines serve as the foundation for the objectives of the substation, which are as follows:

- Locate the substation in proximity to load centers;
- Locate the substation in proximity to arterial streets;
- Parcels must be of sufficient size for the substation and potential future expansion;
- The substation should minimize impacts to onsite wetlands, special-status plant and animal species, and cultural and paleontological resources;
- Provide available (or developable) power line capacity;
- Preference for compatible adjacent land uses and zoning;
- Minimizing development on parcels of land that have a Williamson Act contract;

- Minimizing the land use impact by affecting the smallest percentage of a parcel of land;
- Minimizing the need to relocate existing facilities, infrastructure, or utilities;
- Siting in areas that are least susceptible to flooding, fire, and other natural or human-made disasters; and
- Community and agency input.

Distribution substations are sited as centrally as practicable to the loads they serve in an effort to maintain system performance standards of low electric losses and high reliability.

5.2 ALTERNATIVES CONSIDERED

Alternatives to the Hughson-Grayson 115-kV Transmission Line and Substation Project, including alternative voltage levels, use of lattice steal towers, undergrounding the transmission lines, and constructing a new power plant, are discussed in the 2009 Draft EIR. The 2009 Draft EIR also contains a full discussion of the No Project Alternative and alternative substation locations. Further, the document details the implications of six alternative segment alignments. Refer to Section 5.3.3 of the 2009 Draft EIR for a discussion of these alternatives.

The 2009 Draft EIR found that there are no significant unmitigated impacts associated with the Grayson Road Route, the Grayson Substation South, and the Section One and Two alternative 69-kV transmission line routes. Similarly, this Revised Draft EIR finds no significant unmitigated impacts associated with the two alternative 115-kV transmission line routes (Lateral 2½ and Lateral 2), the Geer Road Alternative Segment, Grayson Substation North, and the Section One and Two alternative 69-kV transmission line routes. In general, there would be minor differences in the magnitude of impacts between the alternatives, but all would result in the same impact significance levels within each environmental resource area and would meet the Project objectives. A summary of the three complete alternative routes collectively analyzed in the 2009 Daft EIR and this Revised Draft EIR is provided below in Table 5-1.

Table 5-1 Project Alternative Summary

Attribute	Route Characteristic		
	Grayson Road Route	Lateral 2 Route	Lateral 2½ Route
Route Length (miles)	10	9	11
Duration of 230-kV Outage for Construction (months)	0	3	1
Result in Significant Environmental Impacts?	No	No	No

5.2.1 ENVIRONMENTAL AND LAND USE IMPLICATIONS OF ALTERNATIVE ROUTES

To provide a comparative analysis of the three alternatives under consideration, direct and indirect effects to property along the routes was quantified. Analysis was focused on the land use implications of the alternatives under consideration because: 1) the impacts to all resource areas expected to result from the proposed alternatives were determined to be substantially similar; and 2) land use is closely tied to many resource areas because it often determines the sensitive receptors exposed to potential disturbances, such as those to the auditory and visual environment.

For this analysis, a 150 foot-wide study area was added to each side of the route centerlines (for a 300 foot wide corridor). As discussed in the 2009 Draft EIR, impacts from a linear facility that could reasonably be expected to extend beyond the Project footprint, such as noise, hazards, visual resources, and land use compatibility, are generally attenuated beyond this buffer. Therefore, this was considered a reasonable footprint for study.

Parcels were considered directly affected when the transmission line would touch or traverse the parcel, and indirectly affect where a parcel would be located within the 150 foot buffer of the Project, but the transmission line would not be located on the parcel itself. The linear distance of direct and indirect effects on individual parcels was measured, and the results tabulated according to current use of the property.

This analysis was performed to give a more accurate representation of the types of actual land uses and potential effects associated with each route. The analysis of adjacent land use was developed beyond zoning designations because current zoning in the majority of the project area allows residential, agricultural, and other uses to occur under the agricultural-residential zoning designation. Directly and indirectly affected parcels were classified into three land use categories: Agricultural, Residential, and Other. Parcels with active agriculture and no residential structures within 150 feet of the line were designated as agricultural. Residential use was determined by the presence of residential structures on the parcel within 150 feet of the line. Finally, the Other classification was applied to parcels that did not fit the agricultural and residential criteria (e.g., commercial, industrial, and miscellaneous land uses). The results of this analysis are presented in Table 5-2 and Table 5-3. Figures 5.1-1 through 5.1-3 indicate the land use classifications along the Lateral 2½ Route, the Lateral 2 Route, and the Geer Road Alternative Segment.

Table 5-2 Land Use Characteristics of the Alternative Project Routes

Route	Total Residences within 150 feet	Bisect Parcels?	Direct Effects[A] (linear feet)			Indirect Effects (linear feet)			Total Parcels Under Williamson Act
			Ag[B]	Res[C]	Other[D]	Ag	Res	Other	
Lateral 2½	37	Yes[E]	26,729	29,590	6,127	12,756	34,736	4,134	54
Lateral 2	38	Yes[F]	11,263	27,328	5,437	10,602	30,221	6,537	47
Grayson Road	113	Yes	30,684	22,208	2,985	26,261	16,728	1,937	61

A: Effects were determined based on aerial photograph interpretation and field reconnaissance.

B: Ag = agricultural land uses.

C: Res = residential land uses. Determination derived if homestead was evident within 150 feet of the alternative route.

D: Other land uses are those uses that do not clearly conform with typical agricultural or residential uses.

E: Parcels bisected are currently bisected by Lateral No. 2½

F: Parcels bisected are currently bisected by existing 230-kV transmission

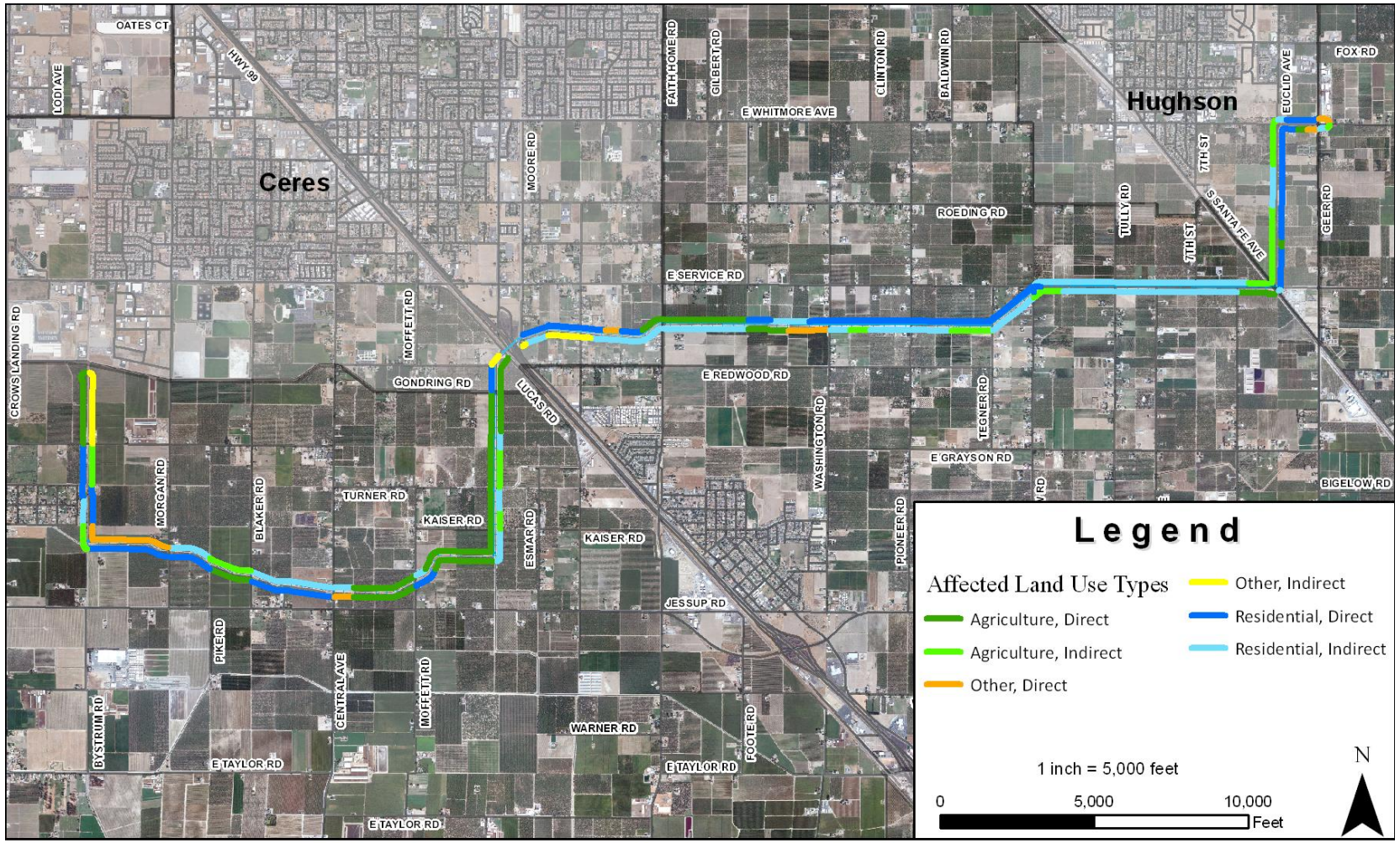


Figure 5.2-1
Lateral 2½ Route Land Use Impacts

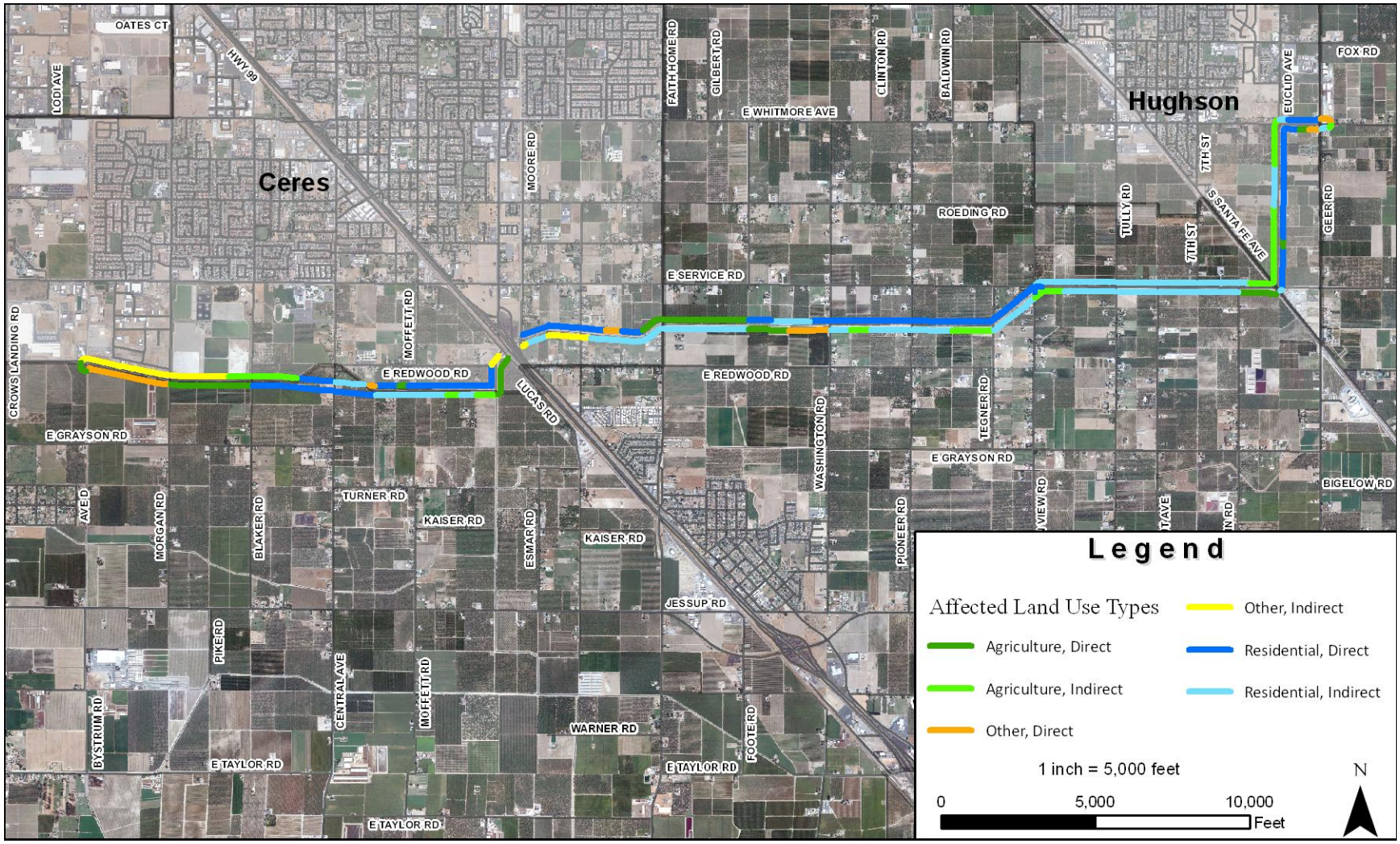


Figure 5.2-2
Lateral 2 Route Land Use Impacts

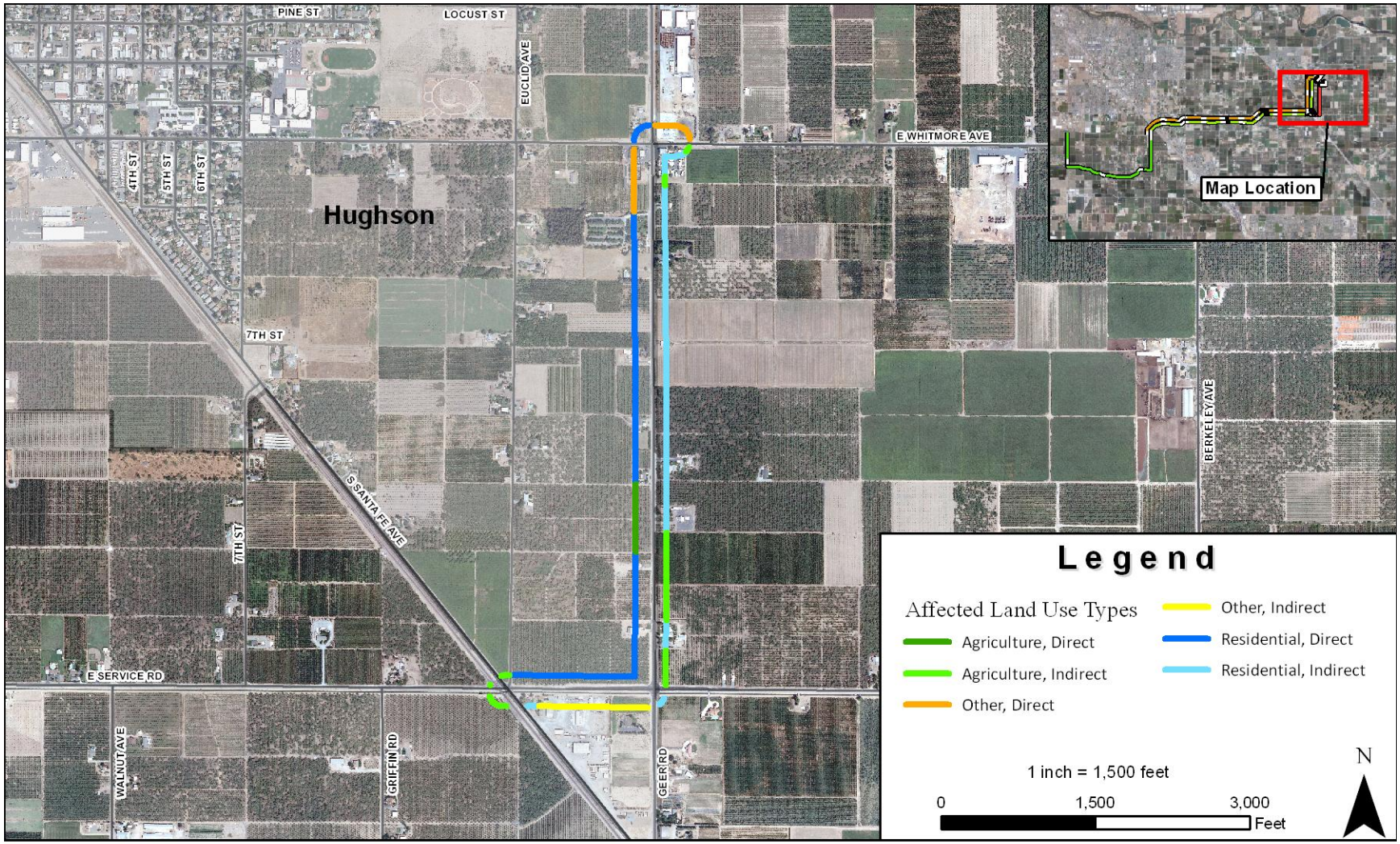


Figure 5.2-3
Geer Road Alternative Segment Land Use Impacts

As presented above, the Grayson Road Route would locate Project transmission in proximity to a greater number of residences than either the Lateral 2½ or Lateral 2 routes, although it would be adjacent to the least linear distance of land developed for residential use. The Grayson Road Route would directly affect the greatest amount of agricultural land, while the Lateral 2½ Route would affect more linear distance designated as residential and other land uses in this study. The Grayson Road Route has the potential to impact the greatest number of parcels under Williamson Act contract.

Table 5-3 Land Use Characteristics of the Geer Alternative Segment Compared to the Project Routes

Route	Total Residences within 150 feet	Bisect Parcels?	Direct Effects[A] (linear feet)			Indirect Effects (linear feet)			Total Parcels Under Williamson Act
			Ag[B]	Res[C]	Other[D]	Ag	Res	Other	
Geer Road	19	No	661	5,236	1,007	1,623	4,248	1,057	8
Euclid Ave	16	No	619	6,273	719	4,043	2,037	-	10

A: Effects were determined based on aerial photograph interpretation and field reconnaissance.

B: Ag = agricultural land uses.

C: Res = residential land uses. Determination derived if homestead was evident within 150 feet of the alternative route.

D: Other land uses are those uses that do not clearly conform with typical agricultural or residential uses.

The Geer Road Alternative Segment would be located within 150 feet of more homes than the Project routes, and would affect fewer parcels under Williamson Act Contract. The Geer Road Alternative Segment would directly effect less land supporting residences than the Euclid Avenue portion of the Project routes; but would indirectly effect nearly twice the linear distance of land in residential use. The Geer Road Alternative Segment would, generally, impact more parcels classified as “Other” than the portion of the Project routes along Euclid Avenue.

5.2.1 Environmental and Land Use Implications of Alternative Substation Sites

The Grayson Substation North and the Grayson Substation South would both meet the objectives of the Project without resulting in any significant impacts. Impacts under all environmental resource areas would be fundamentally the same. For example, neither of the sites support evidence of sensitive biological, cultural, or other resources, nor are located on a site with a

known hazardous condition. Both parcels are currently in agricultural use, but not under Williamson Act contract, and are under zoning that permits substation development.

5.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The CEQA Guidelines require the selection of an environmentally superior alternative. The environmentally superior alternative best meets the Project objectives, while minimizing or eliminating adverse environmental impacts. The CEQA Guidelines state: "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines §15126.6(e)(2)). CEQA does not require an agency to select the environmentally superior alternative (CEQA Guidelines §§ 15042-15043).

Under the No Project Alternative, transmission lines and substation infrastructure would not be constructed. The No Project Alternative would not meet the Project objectives of increasing supply and promoting the safety and reliability of TID's system. Specifically, the No Project Alternative would not enable the Ceres area to be served by TID's 115-kV transmission system, increasing system reliability and reducing strain on the existing 69-kV transmission system. The No Project Alternative would not provide additional reliability to the TID system by providing another means of bringing electricity in and out of the area and would not provide voltage support to the west Ceres area to accommodate forecasted load growth. Further, the No Project alternative would not provide additional reliability through a dedicated crossing over State Route (SR) 99, allowing TID to move electricity east-to-west and west-to-east as system conditions dictate. Therefore, while the No Project Alternative would not result in any of the impacts associated with Project implementation and is the environmentally superior alternative, it would not meet the objectives of the Project.

Among the alternative Project routes, the determination of an environmentally superior alternative requires the evaluation and balancing of many factors. The Grayson Road Route would provide the best overall electrical reliability (due to being located apart from existing 230-kV lines) and would be the easiest to access for construction and maintenance. This route, however, is anticipated to have the greatest effect on residents because it is located along

roadways. The Grayson Road Route impacts 36 percent more parcels than the Lateral 2½ Route and 68 more parcels than the Lateral 2 Route.

The Lateral 2 Route would impact roughly the same number of residences as the Lateral 2½ Route, and much fewer residences than the Grayson Road Route. The linear distance of agricultural land directly impacted by the Lateral 2 Route would be less than the other two routes, while the linear distance of residential land directly impacted would be intermediary to the Grayson Road Route and the Lateral 2½ Route. The Lateral 2 Route would also impact the fewest parcels under Williamson Act contract.

The environmental implications of the Geer Road Alternative Segment are roughly equivalent to those associated with the segment of the Project routes that would be located along Euclid Avenue. The Geer Road Alternative Segment would be located within 150 feet of more residences than the Project routes along Euclid Road, exposing more receptors to the Project. In addition, the expansion of Geer Road is reasonably foreseeable. This expansion would require the relocation of project poles and would result in the expenditure of additional resources. For these reasons, implementation of the Geer Road Alternative Segment is not considered environmentally superior to the Euclid Road portion of the Grayson Road, Lateral 2½, and Lateral 2 routes.

Implementation of either the Grayson Substation North or the Grayson Substation South would result in no significant environmental impacts after the implementation of proposed mitigation. However, the Grayson Substation North would be setback from public roadways and would be more completely shielded from view. In addition, the Grayson Substation North would be located nearer to the Almond Power Plant. This clustering of TID's infrastructure may promote a better land use pattern and reduce aesthetic changes to the environment.

Given the body of evidence presented, the Lateral 2 Route is determined to be the environmentally superior alternative 115-kV route for the Project. Implementation of the Geer Road Alternative Segment is not environmentally superior to the Euclid Avenue portion of this route; therefore, the Lateral 2 Route, as presented in Chapter 3 of this document, is considered the environmentally superior alternative. Furthermore, on the basis of potential benefits in the

areas of visual resources and land use, the Grayson Substation North has been determined to be the environmentally superior alternative substation site.

However, since none of the three routes analyzed present potentially significant environmental impacts after implementation of mitigation, the Grayson Road Route, Lateral 2½ Route, or Lateral 2 Route could be implemented under CEQA. Similarly, the Geer Road Alternative Segment does not present potentially significant environmental impacts after implementation of mitigation and could also be implemented under CEQA. For the substation at the western terminus of the Project, neither the Grayson Substation North nor the Grayson Substation South present potentially significant environmental impacts after implementation of mitigation, and either could be implemented under CEQA.

6.0 CUMULATIVE AND GROWTH INDUCING IMPACTS

This chapter presents an analysis of the cumulative impacts that would be anticipated with implementation of the Project, and other identified projects that are proposed in the Project vicinity. The chapter also discusses the Project's growth-inducing impacts and the Project's significant and irreversible commitment of resources.

6.1 CUMULATIVE IMPACTS

The California Environmental Quality Act (CEQA) Guidelines, Section 15130, require that an EIR discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." According to Section 15065(c), "'Cumulatively considerable' means that the incremental effects of an individual 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 as defined in Section 15130." Pursuant to Section 15130 of the CEQA Guidelines, "(t)he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impacts to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact." The Project is considered to have a significant cumulative effect if:

- The cumulative effects of development without the project are not significant and the project's additional impact is substantial enough, when added to the cumulative effects, to result in a significant impact; or
- The cumulative effects of development without the project are already significant and the project contributes measurably to the effect. The term "measurably" is subject to interpretation. It is understood herein to refer to impacts noticeable to a reasonable person, or in excess of an established threshold of significance.

Mitigation measures are to be developed that reduce the Project's contribution to cumulative effects to a less-than-significant level. The CEQA Guidelines acknowledge that sometimes the only feasible method for mitigating or avoiding significant cumulative effects is to adopt ordinances or regulations that apply to all projects that contribute to the cumulative effect.

6.1.1 SETTING

The setting for analysis of cumulative Project impacts is based on development and infrastructure projects that are related geographically to the Project. There are currently eight projects within the vicinity of (i.e. less than 1 mile from) the Project that are undergoing review by Stanislaus County and the City of Ceres. The City of Hughson has no projects within 1 mile of the Project (personal communication: Thom Clark, City of Hughson, July 2009; unreferenced). Projects identified within the Project's vicinity are summarized below.

- Martella Farms submitted a Use Permit application on July 8, 2009 for the purpose of constructing four agricultural storage facilities and two canopy roof structures. The property is located at the northeast quadrant of the Geer Road/East Service Road intersection, less than one mile east of the proposed 115-kV transmission line route.

- Stanislaus County has prepared a Mitigated Negative Declaration to construct a new animal shelter on vacant land located at 3312 Crows Landing Road in Ceres. This project would be constructed less than a mile north of the Grayson Substation site and the western terminus of the proposed 115-kV and two 69-kV transmission line routes.

- There are two projects within the City of Ceres which include the addition of a ground water well at each location. At the Crows Landing Flea Market a 650-725 gallon per minute well will be added. A 650 gallon per minute well is currently being added at the Ceres Lion Park Wells.

- The City of Ceres' long-range planning efforts include: the West Ceres Specific Plan, the Copper Trails Master Plan and Annexation, and the Maple Glen Master Plan and Annexation. All of these projects are within 1 mile of the transmission lines and the Grayson Substation.

- The Draft West Ceres Specific Plan encompasses approximately 960 acres of developed, undeveloped, and agricultural land to the west of the current city limits. Its study area is bound by Whitmore Avenue to the north, Service Road to the south, Ustick Road to the west, and the Union Pacific Railroad line to the east (Ceres 2008). The Plan, which is currently undergoing CEQA environmental review, proposes a mix of residential, office, commercial, and industrial uses to be developed in the area (personal communication: Tom Westbrook, City of Ceres, July 2009; unreferenced). The interconnection of the Section Two 69-kV transmission line at the existing Almond Power Plant and part of its route is located approximately 0.25 mile to the south of the Plan's southeast study area corner.

- The Copper Trails Master Plan and Annexation study area encompasses 175 acres and is bound by the TID Lower Lateral No. 2 to the south, Blaker Road to the west, East Service Road to the north, and Central Avenue to the east, and would be adjacent to the Lateral 2 Route. The Master Plan will include low, medium, and high density residential uses with parks and open space, and the existing Central Valley High School. As part of the project, the wastewater treatment plant will be expanded. The Maple Glen Master Plan and Annexation is located directly east of the Copper Trails Master plan area, and consists of 188 acres and 910 homes in low, medium, and high density residential ranges (Ceres 2008).

- In addition, the California Energy Commission (CEC) is currently reviewing the *Almond 2 Power Plant Application for Certification*, which was submitted May 11, 2009 (09-AFC-2). TID proposes to construct, own, and operate this electrical generating plant in Ceres, California. The Almond 2 Power Plant would be a natural gas-fired, simple-cycle peaking facility rated at a gross generating capacity of 174 megawatts (MW). The Almond 2 Power Plant is proposed to be located on an approximately 4.6-acre parcel adjacent to, and north of, the existing 48-MW TID Almond Power Plant and would be connected to the proposed Grayson Substation via dual 115-kV transmission lines (TID 2009).

Assuming the project receives certification from the CEC by the third quarter of 2010, construction of the Almond 2 Power Plant would begin immediately following CEC approval and would last approximately 12 months. Pre-operational testing of the power plant would begin in the fourth quarter of 2011, and full-scale commercial operation would be expected to commence by the fourth quarter of 2011. With implementation of the proposed mitigation measures and the anticipated CEC Conditions of Certification, there will be no significant unmitigated environmental impacts associated with the construction and operation of the Almond 2 Power Plant (TID 2009).

6.1.2 POSSIBILITY OF CUMULATIVE IMPACTS WITH THE PROJECT

In light of the project setting described above, no significant cumulative impacts are anticipated. All of the proposed projects identified are consistent with surrounding land uses and would not introduce any sensitive receptors to the vicinity nor substantially alter the visual character along the proposed 115-kV and 69-kV transmission line routes. In addition, the projects would not eliminate any identified sensitive habitats or impact any protected species.

The Almond 2 Power Plant would have two 115-kV power lines that would connect to the Project. This area is currently in agricultural production and is located within Stanislaus County and the City of Ceres' Planning Area and Reserve Area. The city has designated this area as Industrial Reserve. This designation is given to lands that will eventually be developed with industrial uses as part of the City of Ceres. The substation and accompanying transmission lines would be consistent with the city's anticipated future use for this area (personal communication: Tom Westbrook, City of Ceres, July 2009; unreferenced).

The visual impact of the Grayson Substation North and transmission lines would be increased when considered in conjunction with the Almond 2 Power Plant. The two projects would have the effect of further transforming the viewshed from one dominated by industrial features with rural elements to an industrial landscape. Because industrial uses are the planned land use in the area, this would not be considered an adverse impact.

Furthermore, no cumulative impacts to hydrology and water quality are expected. Potential impacts to drainage would be localized and mitigated, and would therefore not contribute to any

overall effects. The single onsite well at the Grayson Substation North and the geographic dispersal of impervious surfaces would limit any potential impact to aquifer volume or groundwater quality. In addition, because the Project would use limited amounts of groundwater, the Project and the Crows Landing (Flea Market) and Ceres Lions Park wells would not, in combination, result in any significant cumulative impacts.

The Hughson-Grayson 115-kV Transmission Line and Substation Project would be located in a non-attainment area for State and Federal air quality standards. No unmitigated construction-related impacts to air quality are anticipated on an individual Project or cumulative level. The Project would not result in a significant impact to air quality during operation; however, there is potential that the Almond 2 Power Plant would contribute to air pollution. TID has sufficient emissions reductions credits to cover any potential increase and to mitigate for any impact associated with the Almond 2 Power Plant project.

There is potential for a cumulative impact to hazards related to electromagnetic fields in the area between the Grayson Substation North and the Almond 2 Power Plant, where both projects have proposed transmission structures. There are no sensitive receptors in this area, and the potential for this impact to be significant is low.

If construction of the identified projects occurs concurrently, there is potential for amplified impacts to the auditory environment along the transmission line routes and at the Grayson Substation North site. Exact construction schedules are not known at this time. Therefore, analysis of potential noise-related impacts cannot be fully performed. Noise impacts as a result of construction of the Grayson Substation North, which is located in close proximity to the Almond 2 Power Plant, may be slightly amplified if work on that project is occurring concurrently. However, both projects would be required to implement noise mitigation, including equipment noise controls and limits on hours of construction. Given the short construction period required at each of the pole locations along the routes and that there are few sensitive receptors near the Grayson Substation site, cumulative impacts to noise are not anticipated.

Impacts to traffic and transportation, similarly, would only occur if several projects are constructed at the same time and 1) the same haul routes are used for several projects or 2)

detours and road closures required for different projects overlap or conflict. Based on the locations and development schedules of the projects under discussion, these impacts are considered unlikely.

Additionally, cumulative socioeconomic impacts could occur if the construction schedules for other large projects overlap with the schedule for the proposed project. This may create a demand for construction workers that exceeds the capacity of the local labor force; thus creating an influx of construction workers that would result in impacts to local housing, schools, and/or public services. Given the present economic setting, this is not considered a significant cumulative impact.

6.2 GROWTH-INDUCING IMPACTS

According to Section 15126.2(d) of the State CEQA Guidelines, an EIR must discuss the growth-inducing impacts of the proposed project. A growth-inducing impact is defined by the CEQA Guidelines as an impact that fosters economic or population growth, or the construction of additional housing, either directly or indirectly. Growth inducement can occur, for example, if a project would remove obstacles to population growth, such as an expansion of a wastewater treatment plant that could allow additional development in the service area.

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises); or a construction effort with substantial short-term employment opportunities that indirectly stimulates the need for additional housing and services to support the new employment demand; and/or removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

Growth inducement itself is not an environmental effect but may lead to environmental impacts. These environmental effects may include increased demand on other community and public services and infrastructure, increased traffic and noise, degradation of air or water quality,

degradation or loss of plant or animal habitats, or conversion of agricultural and open space land to urban uses. Growth inducement may constitute an adverse impact if the growth is not consistent with, or accommodated by, the land use plans and growth management plans and policies for the area affected. A project that would induce disorderly growth (i.e., conflict with local land use plans) could directly or indirectly cause additional adverse environmental impacts and other public service impacts. An example of this would be the extension of urban services to a non-urban site, thus encouraging conversion of non-urban lands to urban uses.

6.2.1 POSSIBLE PROJECT-RELATED GROWTH INDUCEMENT

TID serves new development as approved by the local agencies that have jurisdiction over lands within TID's electrical service area. TID does not designate where and what new development may occur. The presence of the proposed substation and transmission line segments would not induce population growth or urban growth; it would accommodate growth and increased electrical demand that is planned to occur in the local area. As a result, the project is not considered to be growth-inducing, and no growth-inducing impacts are expected.

6.3 SIGNIFICANT AND IRREVERSIBLE COMMITMENT OF RESOURCES

Uses of nonrenewable resources during the initial and continued phases of the project may be practically irreversible, since the removal or nonuse of committed resources is unlikely. The Project would use both renewable and nonrenewable natural resources for project construction and operation. The Project would use nonrenewable fossil fuels in the form of oil and gasoline during construction and operation. Other nonrenewable and slowly-renewable resources consumed as a result of Project development would include, but not necessarily be limited to, lumber and other forest products, sand and gravel, asphalt, petrochemical construction materials, steel, copper, aluminum, and water. The Project would require a commitment of materials, energy, and economic resources but this commitment would not seriously deplete existing sources, and many of the materials are salvageable.

Although it is physically possible to remove the proposed electrical facilities should they prove unnecessary, in practice the construction of an overhead electrical transmission line commits the

corridor to the proposed use for the duration of the planning horizon. As individual poles and items of equipment weather, they would be replaced, but the entire project is not likely to become obsolete. Other linear features would be inclined to use all or a portion of this corridor for their needs, just as the Project has followed existing canal and public road rights-of-way to avoid impacting residential and agricultural uses. During the lifetime of the Project, the surrounding uses would adjust to the aesthetic and physical environment associated with the Project, and would produce a corridor that is more compatible with these uses. This accommodation would strengthen the permanent nature of the Project, producing effects that are, in practice, irreversible.

6.4 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

CEQA Guidelines Section 15126.2(b) requires that any significant and unavoidable impact to the environment be identified, including impacts that cannot be mitigated to less-than-significant levels. With application of the mitigation measures in Chapter 4 of this EIR, all project impacts will be mitigated below a level of significance. Therefore, the Project would not result in any significant unavoidable adverse impacts.

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WETLAND DELINEATION / JURISDICTIONAL WATERS REPORT

FOR THE HUGHSON-GRAYSON 115-KV TRANSMISSION LINE

AND SUBSTATION PROJECT, CERES, CALIFORNIA:

PART 2—THE LATERAL 2 ½ ALIGNMENT

16 April 2010

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1.0 INTRODUCTION

Parus Consulting, Inc., conducted a formal wetland delineation of a second alignment of the Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project) area in the city of Ceres, Stanislaus County, California. This report presents the results of the field survey conducted in accordance with the United States Army Corps of Engineers' (USACE) *Wetlands Delineation Manual* to determine which portions of the study area may qualify as potentially jurisdictional waters of the United States (US), including wetlands. USACE is ultimately responsible for determining the limit of their jurisdiction, and this report has been prepared to assist the USACE with their determination. This report also identifies which portions of this property may qualify as potentially jurisdictional waters of the State of California (including isolated wetlands). The State of California is ultimately responsible for determining the limit of their jurisdiction, and this report has also been prepared to assist State agencies with their determination.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project would consist of a new 115 kilovolt (kV) transmission line, two 69-kV transmission line sections, the Grayson Substation, and related facilities. The 115-kV transmission line feature of the Project would be approximately 11 miles in length and span the distance between the cities of Hughson and Ceres in Stanislaus County, California (Figure 1). The eastern endpoint of the 115-kV transmission line route would be located at the existing Hughson Substation near the corner of East Whitmore Avenue and Geer Road, east of the City of Hughson. The western terminus of the 115-kV line would be at the proposed Grayson Substation, which would be located south of Lateral No.2 and north of East Grayson Road, near the existing Almond Power Plant, south of the City of Ceres. Where there are existing 230-kV transmission lines along the proposed route, poles would be larger and accommodate "co-location" of both line types on a single structure. Similarly, existing distribution lines would be underbuilt on the 115-kV towers in many locations.

In addition to the new 115-kV transmission line, the Project would also include the construction of two 69-kV transmission line sections that would both terminate at the Grayson Substation. Section One of the 69-kV transmission line would be located along Lateral No. 2 between the substation and Morgan Road, and the second 69-kV transmission line section (Section Two) would connect the Grayson Substation to Turlock Irrigation District's existing Almond Power Plant. A new bus expansion and circuit breaker would be installed at the power plant to accommodate the transmission line.

1.2 REGULATORY SETTING

Real property in California that contains water resources is subject to various federal and state regulations, and activities occurring in these water resources may require permits, licenses, variances, or similar authorization from federal, state, and local agencies. The following is a brief, but not exhaustive, summary of such regulations as they apply particularly to field delineations of jurisdictional waterbodies.

1.2.1 Federal Regulations

Waters of the US are defined as: all waters used in interstate or foreign commerce; all interstate waters, including interstate wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent and ephemeral streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, where the use, degradation, or destruction could affect interstate commerce; impoundments of these waters; as well as tributaries of these waters, or wetlands adjacent to these waters (Section 404 of the Clean Water Act; 33 CFR Part 328). With non-tidal waters, in the absence of adjacent wetlands, the extent of federal jurisdiction is defined by the ordinary high water mark - the line on the shore established by the fluctuations of water and indicated by a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, or the presence of litter and debris. Wetlands are defined as:

"…those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Federal Register 1980, 1982).

Any person, firm, or agency planning to alter or work in navigable waterbodies, including the discharge of dredged or fill material, must first obtain authorization from USACE. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) prohibits the obstruction or alteration of navigable waters of the US without a permit from USACE. Section 301 of the Federal Water Pollution Control Act and Amendments of 1972 (the "Clean Water Act") prohibits the discharge of pollutants, including dredged or fill material, into waters of the US without a Section 404 permit from USACE (33 USC 1344). If the proposed project involves species (or their habitat) listed under the federal Endangered Species Act of 1973, USACE must initiate consultation with the US Fish and Wildlife Service or National Marine Fisheries Service pursuant to Section 7 (16 USC 1536; 40 CFR Part 402). The applicable Regional Water Quality Control Board must certify that a USACE Section 404 Permit action meets state water quality objectives by issuing a Water Quality Certification (Section 401, Clean Water Act). The California Department of Fish and Game provides comment on USACE permit actions under the Fish and Wildlife Coordination Act.

The US Environmental Protection Agency (USEPA) and USACE (2008) issued joint guidance regarding Clean Water Act jurisdiction following the decision in the consolidated cases of Rapanos v. United States and Carabell v. United States. USACE and the USEPA assert jurisdiction over traditional navigable waters, non-navigable tributaries that have relatively permanent flow, and adjacent wetlands. The agencies decide jurisdiction on a case-by-case basis for non-navigable tributaries that do not have relatively permanent flow, and adjacent wetlands. The agencies generally will not assert jurisdiction over ditches, swales or other erosional features, or isolated wetlands.

1.2.2 State Regulations

Waters of the State are regulated primarily under the California Water Code and the California Code of Regulations Title 23 (Water) and Title 27 (Environmental Protection). All water features in California, including isolated wetland features and impermanent drainages that are not claimed as waters of the US, are considered waters of the State. Waters of the State are protected under the Porter-Cologne Water Quality Control Act (California Water Code, Division 7: Water Quality) and are regulated by the State Water Resources Control Board (SWRCB). For fill, dredge, or construction activities that may impact waters of the State that are not subject to federal regulation, the SWRCB may impose Waste Discharge Requirements (and compensatory mitigation) before any construction activity begins. The California Department of Fish and Game is authorized under California Fish and Game Code (§1600-1607, 5650F) to develop mitigation measures and enter into Streambed Alteration Agreements with applicants who propose projects that would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. Note that regulatory precedent defines the boundary of these water channels to be the limit of riparian vegetation, not the ordinary high water mark.

1.2.3 Local Regulations

No County or municipal regulations pertaining to delineation of jurisdictional water features were identified. Turlock Irrigation District owns, or has authority over, many of the agricultural canals in the region.

1.3 ENVIRONMENTAL SETTING

The study area is located within the San Joaquin Valley geographic subregion, which is contained within the Great Central Valley geographic subdivision of the larger California Floristic Province (Hickman 1993). This region has a Mediterranean-type climate, characterized by distinct seasons of hot, dry summers and wet, moderately-cold winters. The Project is located in climate Zone 14, with marine layers moderating high and

low temperatures but lacking the thermal belts that protect completely from frosts (Hickman 1993). The topography of the study area is extremely flat with a gentle slope to the west (Figure 2). The elevation ranges from approximately 76 feet to 130 feet above mean sea level. The study area is located within the Tuolumne River watershed. Three terrestrial vegetation communities are present within the study area: annual grassland/cereal rowcrop, stonefruit orchard, and ruderal/developed. All existing natural habitats are extremely modified or disturbed, with extensive evidence of grading, tilling, and/or paving.

2.0 METHODOLOGY

Methodology followed USACE guidelines, and consisted of preliminary data gathering and research, field surveys, digital mapping, and documentation of final boundary determinations.

2.1 PRELIMINARY DATA GATHERING AND SYNTHESIS

Prior to conducting the field delineation the following information sources were reviewed:

- Client's engineering drawings;
- US Geological Survey 7.5 minute topographic quadrangle maps and aerial photography;
- US Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey maps;
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate (Flood Hazard Boundary) Maps;
- US Fish and Wildlife Service National Wetland Inventory Maps; and
- Any previous studies.

2.2 DETERMINATION PROCEDURES

The purpose of the field determination was to: 1) identify any and all water features that are subject to federal jurisdiction (*i.e.*, waters of the US) within the study area; and 2) if present, determine the boundary of each water feature. The entire study area was assessed in such a manner as to view all areas to the degree necessary to determine the vegetation community types and the presence or absence of jurisdictional water features. Wetland field determination procedures followed the USACE *Wetlands Delineation Manual* technical guidelines for a Level 2 Routine Field Determination (Environmental Laboratory 1987). Additionally, the USACE (2001) *Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest* was also consulted.

The diagnostic environmental characteristics of hydrophytic vegetation, hydric soils, and wetland hydrology (i.e., three-parameter approach) were used as the standard for determining if specific areas qualified as wetlands (Environmental Laboratory 1987). A subject area was determined to be a wetland if all three requisite characteristics were present; as a general rule, evidence of a minimum of one positive indicator for each parameter must be found in order to make a positive wetland determination.

Hydrophytic vegetation is defined as "...the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils sufficient in duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Hydrophytic vegetation indicators included: prevalence of vegetation; majority of dominant plant species are obligate or facultative wetland plants (hydrophytes); morphological or physiological adaptations to saturated soil conditions; species listed on the *National List of Plant Species that Occur in Wetlands* (USFWS 2006a) and the Regional List (Region 10) (USFWS 2006b). This National List divides plant species into categories based upon their frequency of occurrence in wetlands. These categories are: OBL – obligate wetland plants that occur almost always in wetlands under natural conditions (estimated probability greater than 99%); FACW – facultative wetland plants that usually occur in wetlands, but occasionally occur in non-

wetlands (estimated probability 67 – 99%); FAC – facultative wetland plants that are equally likely to occur in wetlands or non-wetlands (estimated probability 34 – 66%); FACU – facultative upland plants that usually occur in non-wetlands, but occasionally are found in wetlands (estimated probability 1 – 33%); UPL – obligate upland plants that almost always occur in non-wetlands (estimated probability greater than 99%); NI and UNK – insufficient information to determine status; NL – not listed; NA – no agreement by Regional Panel on status; and NO – species does not occur in specified region. During field investigations, the percentage of hydrophytic species was determined based on the ratio of wetland indicator species present to the total number of species present. More than 50 percent of the dominant plant species must be FAC, FACW, or OBL to meet the hydrophytic vegetation criterion.

Hydric soils are defined as soils that are "...formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (Environmental Laboratory 1987). A minimum one week of inundation or 14 consecutive days of saturation during the growing season is a typical requirement. The criteria for establishing the presence of hydric soils vary among different soil types and drainage classes. Hydric soil indicators include evidence of reducing or redoximorphic conditions (including sulfidic odor, organic streaking), gleyed, mottled, or low-chroma soils, iron and manganese concretions, and low dissolved oxygen concentration (aquic moisture regime); organic soils (histosols); or mineral soils saturated and rich in organics (histic epipedon) (NRCS 2006a). In the absence of visible field indicators, hydric soil conditions may be determined according to two criteria: 1) all dominant plant species have an indicator status of OBL and/or FACW (at least one dominant plant species must be OBL); and 2) areas below the level of ordinary high water are frequently flooded for long duration or very long duration during the growing season and posses and aquic (reducing) moisture regime. Soils are classified as hydric on non-hydric by NRCS (2006b).

Wetland hydrology "...encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season" (Environmental Laboratory 1987). Many factors influence site-specific hydrology, including the precipitation, stratigraphy, topography, soil permeability, and plant cover of the site. In general, inundation or saturation must occur for at least five percent of the growing season to qualify as wetland hydrology. The degree of inundation or saturation at the subject site can vary widely from year to year depending on rainfall patterns within the watershed. Primary wetland hydrology indicators include visual observations of inundation or soil saturation, water marks and water-stained leaves, sediment deposits, drift lines, and drainage patterns in wetlands.

Taxonomic determinations were aided by referencing museum specimens or texts, including the following: Hickman (1993); Brenzel (2001); Calflora (2010); University of California at Berkeley (2010a,b); CDFG (2010); and NatureServe (2010). For identification of water features other than wetlands that are subject to federal jurisdiction, two principal field characteristics were evaluated: 1) the presence of a channel; and 2) the presence of an ordinary high water mark. Other characteristics were noted, where possible: description of hydrologic feature type, length, approximate discharge volume, gradient, range between low and high water mark, etc. For determination of whether these water bodies constituted waters of the US, USACE regulations (33 CRF 328) were consulted.

3.0 RESULTS

Dr. G. O. Graening conducted the field assessment on 3 March 2010. The results of the analyses of vegetation, soils, and hydrology are presented in the following sections, followed by the Waters of the US suggested determination.

3.1 VEGETATION

Three terrestrial vegetation communities are present within the study area: annual grassland/cereal rowcrop, stonefruit orchard, and ruderal/developed. All flora sighted within the study area during the field survey on 3 March 2010 are listed in Table 1. No obligate wetland plants (hydrophytes) were detected within the study area other than duckweed (*Lemna* sp.) within the canals.

Table 1. List of Plants Identified During Field Survey

Scientific Name	Common Name	Wetland Status
Avena fatua	Wild oat	NL
Brassica nigra	Black mustard	NL
Bromus spp.	Brome grasses	NL
Centaurea solstitialis	Yellow star thistle	NL
Chenopodium murale	Goosefoot	FACU
Citrus sp.	Citrus trees	NL
Conyza canadensis	Telegraphweed	NL
Datura stramonium	Moonflower	NL
Echinochloa sp.	Barnyardgrass	FACW
Erodium botrys	Long-beak filaree	FACU*
Geranium dissectum	Cutleaf geranium	NL
Hordeum marinum	Mediterranean barley	FAC+
Lemna sp.	Duckweed	OBL
Lolium multiflorum	Italian ryegrass	NL
Malva neglecta	Common mallow	NL
Matricaria matricariodes	Pineappleweed	NL
Plantago lanceolata	Narrowleaf plantain	FAC-
Prunus dulcis	Almond	NL
Raphanus sativus	Radish	NL
Rumex crispus	Curly dock	FACW-
Salsola iberica	Russian thistle	NL
Solanum nigrum	Nightshade	FACU
Stellaria media	Chickweed	FACU
Tragopogon dubius	Salsify	NL
Triticum aestivum	Wheat	NL
Verbascum thapsus	Mullein	NL
Vicia villosa	Hairy vetch	NL
Xanthium strumarium	Cocklebur	FAC+

3.2 SOIL TYPES

Digital soil survey maps from NRCS' SSURGO 2.2 Database were consulted for this study (NRCS 2010), and mapped soil units occurring within the study area are listed and described in Table 2 and displayed in Figure 3. Two mapped soil units occurring within the study area were designated "hydric" by NRCS: HddA and DuA. These soil units occur in the vicinity of the proposed alignment, but do not occur at all with the proposed substation site.

Table 2. Mapped Soil Units in the Study Area Vicinity (from NRCS SSURGO 2.2 Database)

Unit Code	Unit Name	Drainage Class	Hydric?
HddA	Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes	poorly drained	yes
HdpA	Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes	well drained	no
HdA	Hanford sandy loam, 0 to 3 percent slopes	well drained	no
DuA	Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes	poorly drained	yes
DrA	Dinuba sandy loam, 0 to 1 percent slopes	moderately well drained	no
TuA	Tujunga loamy sand, 0 to 3 percent slopes	somewhat excessively drained	no
HdsA	Hanford sandy loam, deep over silt, 0 to 1 percent slopes	well drained	no

3.3 HYDROLOGY

The elevation of the proposed transmission alignment ranges from a high of about 130 feet at the Hughson Substation to a low of about 75 feet near the proposed Grayson Substation. The topography of the region is an alluvial plain that dips gently to the west from the Sierra Nevada mountain range toward the San Joaquin River channel (Figure 2). The Tuolumne River incises this plain, and has been extensively diverted for agricultural uses. One of these diversions is the Ceres Main canal and its laterals (Figure 4).

The study area and vicinity consists of an agricultural plain with soils of varying permeability that is prone to local flooding. The study area has been graded flat, and typically berms have been created to facilitate basin flood irrigation of cereal crops and stonefruit orchards. Roadside ditches are present, but they do not form a continuous and organized drainage system. Frequent disturbance, such as that performed by County road maintenance, prohibits the development of functional wetlands. County stormwater/sewer system improvements are absent except for occasional drop inlets along major roads such as Crows Landing Road, Service Road, etc.

Similar to the laterals of the Ceres Main canal, stormwater in the vicinity of the study area gravity flows westward to the San Joaquin River basin. Annual precipitation averages approximately 12 inches (Western Regional Climate Center 2010). According to the FEMA Flood Insurance Rate Map of the area, the property is not in a flood zone (FEMA 2006). The FEMA designations in the Project area are shown in Figure 5. The zone codes are as follows; Zone A – inside the 100-year floodplain; Zone X - outside the 500-year floodplain; Zone X500 - outside the 100-year floodplain but within the 500-year floodplain; Zone ANI – area not included in the mapping program. Because wetlands often occur within floodplains, these FEMA Flood Hazard Boundary Maps may assist the delineator in determining if wetland hydrology exists within the study area.

3.4 NATIONAL WETLANDS INVENTORY / PREVIOUS DELINEATIONS

No previously published wetland delineation reports were identified other than that of our previous delineation of the alternative alignment for the Project (Natural Investigations 2009). The USFWS (2010) National Wetland Inventory (NWI) digital maps of the study area were also consulted. No NWI wetlands were mapped within the study area. Mapped wetland features in the vicinity of the study area are shown in Figure 6, and consist primarily of ponds and other man-made depressions associated with flood irrigation agriculture.

3.5 DELINEATION RESULTS

All hydrologic features were identified and mapped within the study area, and subjected to the three-parameter test. Based upon these analyses, no water features were identified within the proposed Grayson Substation site and three water features were identified within the Project alignment: the Ceres Main Canal and 2 of its laterals (Lateral No. 2 and Lateral No. 2½) (Table 3; Figure 7). No streams, and no wetlands, vernal pools, or other isolated waterbodies were detected within the study area. No hydrophytes were detected, and no evidence of hydric soils was found (although there are hydric soils mapped in the vicinity by NRCS). Normal wetland hydrology is also lacking in this highly regulated agricultural setting. It was not necessary to establish sampling points with test pits to conduct analysis for the presence or absence of wetland (or ordinary high water mark) indicators.

Table 3. Inventory of Water Features Identified within the Study Area

Water Feature	**Acreage**	**Length** ($^{+}$/- 25 feet)
Wetlands and Other Isolated Waterbodies		
Wetlands	none	n/a
Vernal pools	none	n/a
Drainages and Channels		
Natural drainages	none	0
*Ceres Main Canal	$^{+}$2.48	7,212
* Lateral No. 2½	$^{+}$4.83	14,026
* Lateral No. 2	$^{+}$8.73	25,339
Total	$^{+}$16.04	46,577

Notes
**Water Features Not Recommended for Jurisdictional Determination*
$^{+}$ Acreage based upon an assumed canal width of 15 feet.

These agricultural canals that occur within the study area are about 15 feet wide, cement lined, and regularly cleared of vegetation and sediment; within the study area, no leaks were detected that could support adjacent wetlands. According to the USGS hydrography dataset, these canals are reduced to intermittent (impermanent) flows by the time they terminate in canal drains that flow to the San Joaquin River; note that these canals are symbolized on 7.5 degree minute quadrangles by dashed blue lines, indicating that they are not permanent flowing channels. It also must be noted that irrigation district water resources such as these canals would fail in their primary objective of wise use of the water resource if canals continuously transported water back to traditional navigable waters. These canals apparently fail the hydrology criterion (Scalia Test): non-navigable tributaries of traditional navigable waters that are relatively permanent waters. These canals may also fail the significant nexus (Kennedy) test, as water quality in these canals appears to be excellent. The water consists of diversions of the Tuolumne River that are not conjoined with any industrial discharges or construction stormwater runoff; thus, discharges from these canals are unlikely to impair the receiving waterbody—the San Joaquin River. The USACE and USEPA (2008) guidance document states that the following water features will not be pursued as jurisdictional: "Ditches (including roadside ditches) excavated wholly in and draining only in uplands and that do not carry a relatively permanent flow of water." Thus, we do not recommend that these canals be determined to be waters of the US.

4.0 SUMMARY

Parus Consulting, Inc., conducted a formal delineation of waters of the US of the Hughson-Grayson 115-kV Transmission Line and Substation Project area, in Stanislaus County, California. Delineation methods followed procedures developed by USACE. All hydrologic features were identified and mapped within the study area, and subjected to the three-parameter test. Based upon these analyses, three water features were identified: the Ceres Main canal and two of its lateral canals. No streams and no wetlands, vernal pools, or other isolated waterbodies were detected within the study area.

These canals are not recommended to be determined to be waters of the US because they appear to lack the permanency and significant nexus requirements for a jurisdictional determination. This delineation of waters of the US is subject to verification by USACE and the SWRCB. This verification is typically considered valid for five years before re-verification is necessary.

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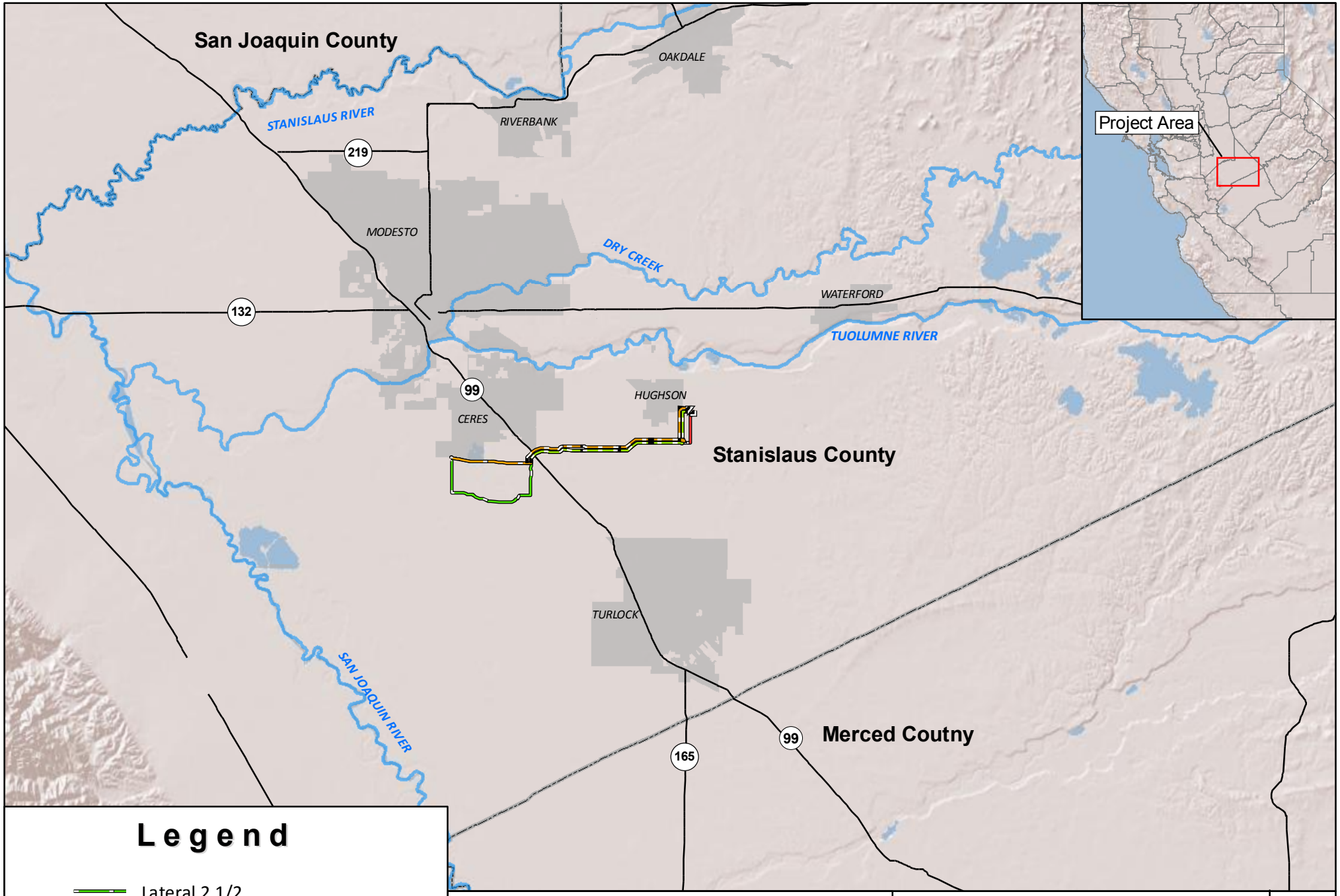
6.0 QUALIFICATIONS OF THE SURVEYOR

G.O. GRAENING, Ph.D.

G. O. Graening holds a Ph.D. in Biological Sciences and a Master of Science in Biological Engineering, and is a certified arborist (International Society of Arboriculture). Dr. Graening has 13 years of experience in environmental assessment and research, including the performance of numerous wetland delineations. Dr. Graening also serves as an adjunct professor of biology at California State University Sacramento and is an active researcher in the area of conservation biology and groundwater ecology.

Dr. Graening holds the following scientific collection permits: CDFG Scientific Collecting Permit Number 6802; and CDFG Plant Voucher Specimen Permit Number 5096.

FIGURES



Legend

- Lateral 2 1/2
- Lateral 2
- Geer Alternative Segment

Hughson-Grayson 115kV Trasmission Line and Substation Project

Project Location

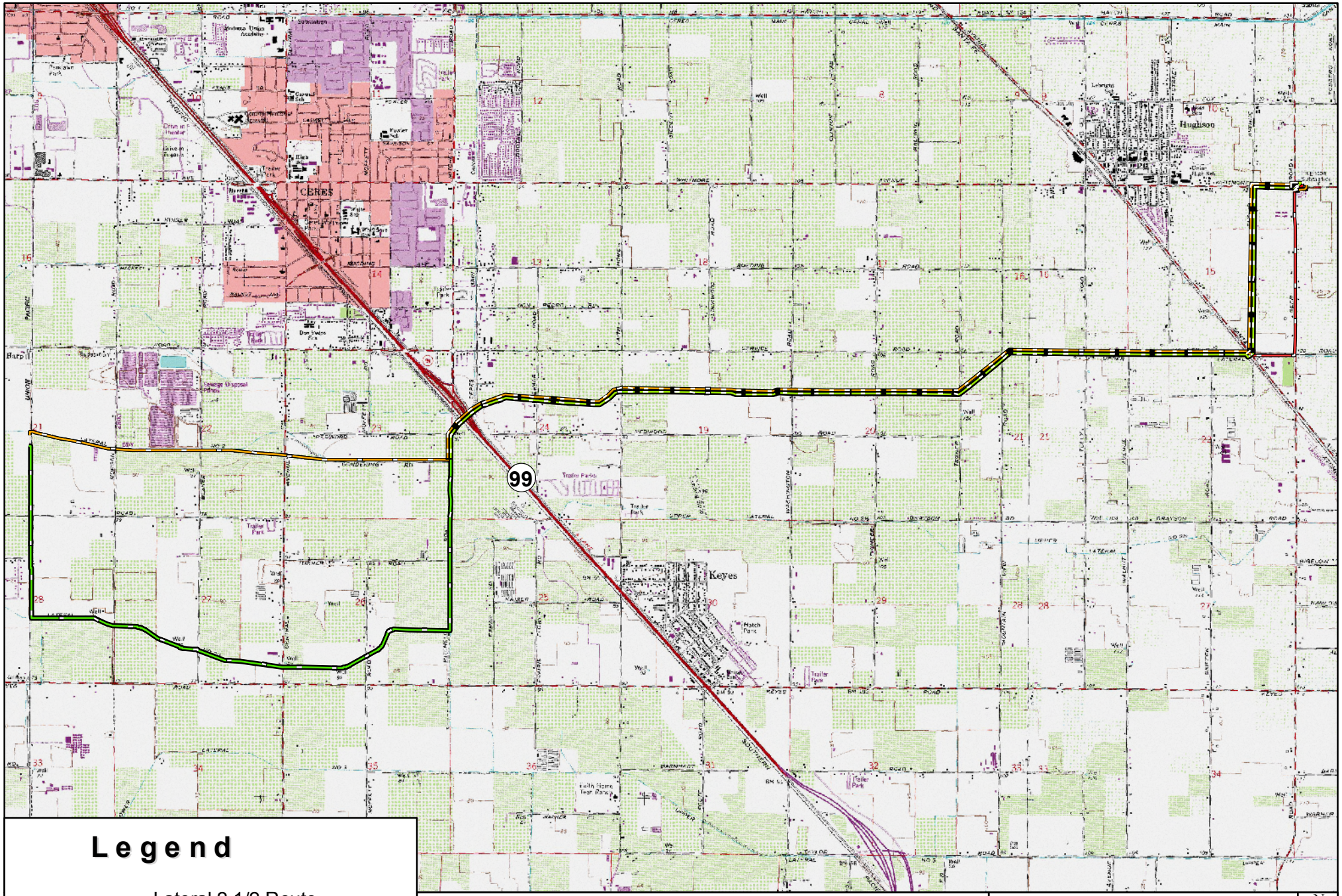
1 inch=4 miles

0 4 8 Miles

Figure 1

Date: April 8, 2010

PARUS CONSULTING, INC.



Legend

- Lateral 2 1/2 Route
- Lateral 2
- Geer Rd Option

Hughson Grayson 115-kV Transmission Line and Substation Project

Topography, USGS 7.5" Quadrangle

1 inch=4,000 feet

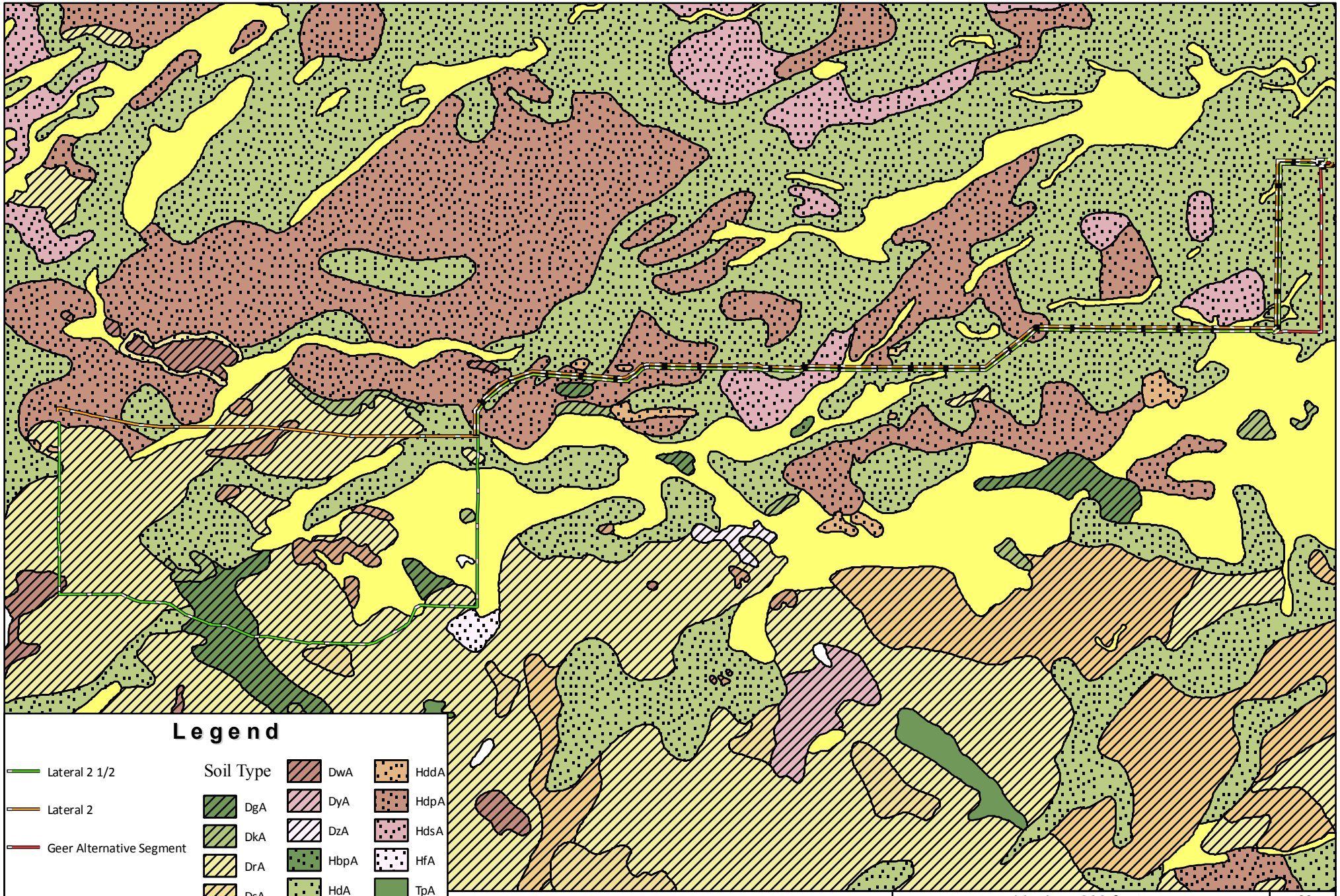
0 4,000 8,000 Feet

N

Figure 2

Date: April 8, 2010

PARUS CONSULTING, INC.



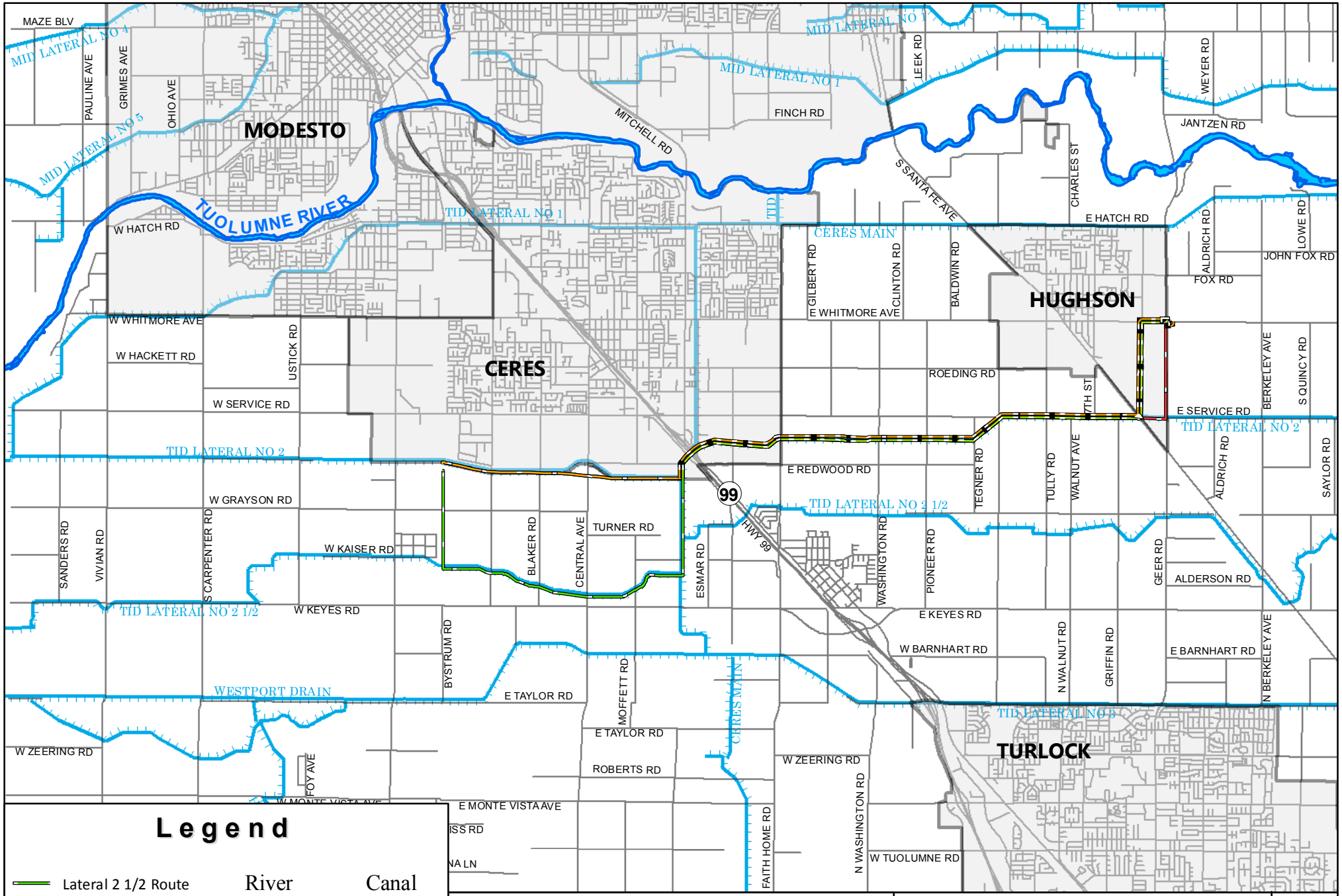
Hughson Grayson 115-kV Transmisssion Line and Substation Project

Soil Classifications

Figure 3

Date: April 8, 2010

PARUS CONSULTING, INC.



Legend

- Lateral 2 1/2 Route
- Lateral 2
- Geer Alternative Segment
- River
- Canal

Hughson-Grayson 115kV Trasmission Line and Substation Project

1 inch=7,000 feet

0 1 2 3 Miles

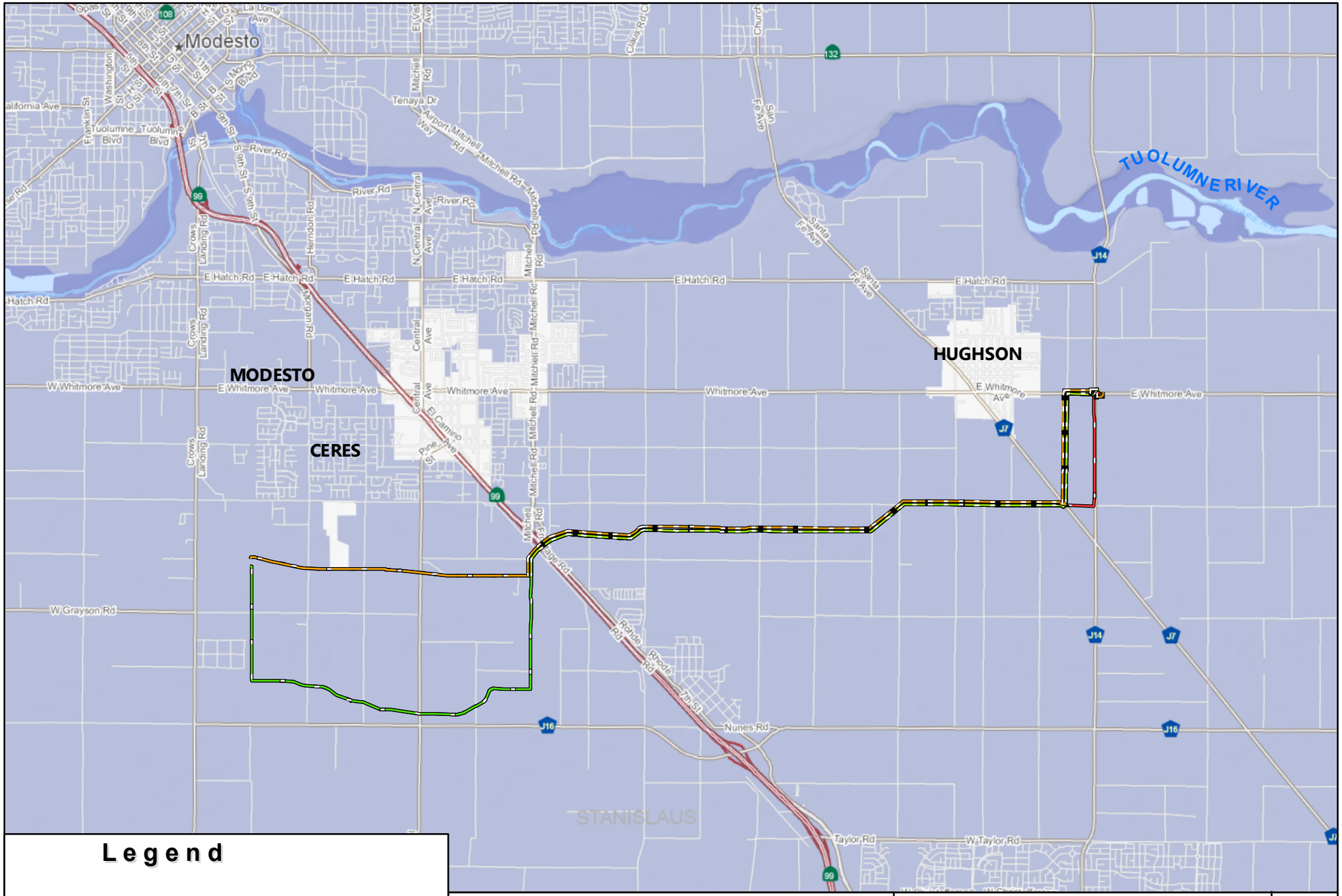
N

Regional Water Features

Figure 4

Date: April 8, 2010

PARUS CONSULTING, INC.



Legend

- Lateral 2 1/2 Route
- Lateral 2
- Geer Alternative Segment
- High Flood Hazard
- Low Flood Hazard
- Not Mapped or Unknown

Hughson-Grayson 115kV Trasmission Line and Substation Project

FEMA Flood Map

1 inch=6,000 feet

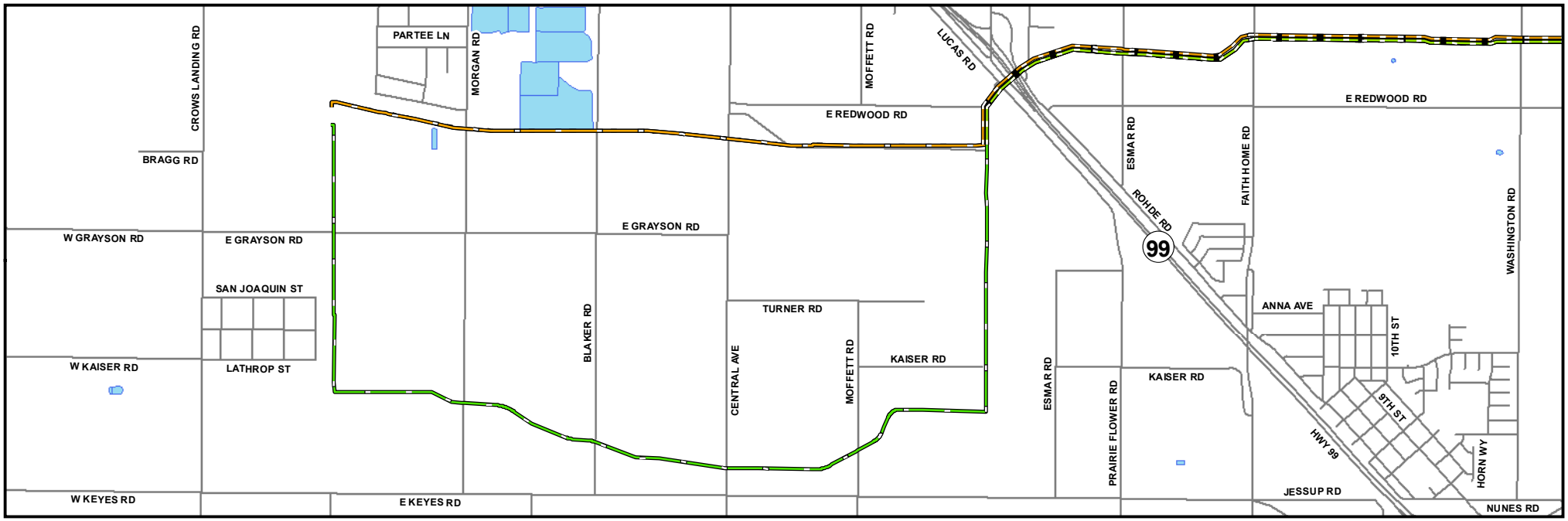
0 6,000 12,000 Feet

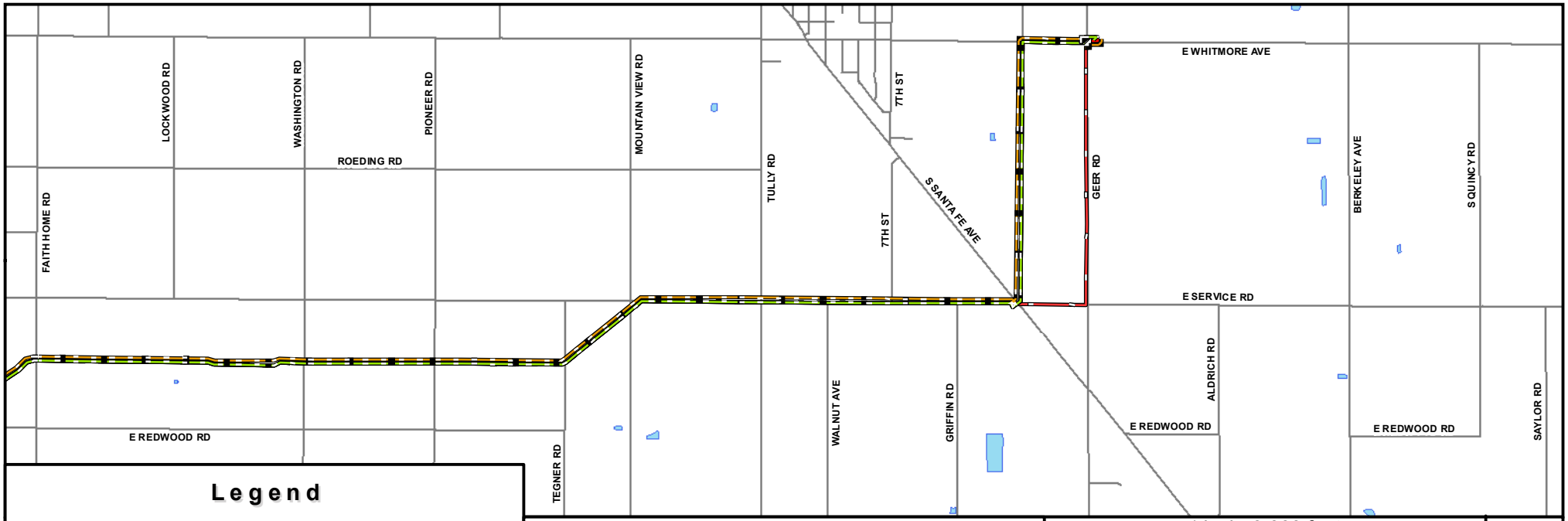
N

Figure 5

Date: April 8, 2010

PARUS CONSULTING, INC.





Legend

- Lateral 2 1/2 Route
- Lateral 2
- Geer Alternative Segment

1:24000 Map BrushLake

1:24000 Map Denair

1:24000 Map Ceres

Hughson-Grayson 115kV Trasmission Line and Substation Project

USFWS National Wetland Inventory

1 inch=3,000 feet

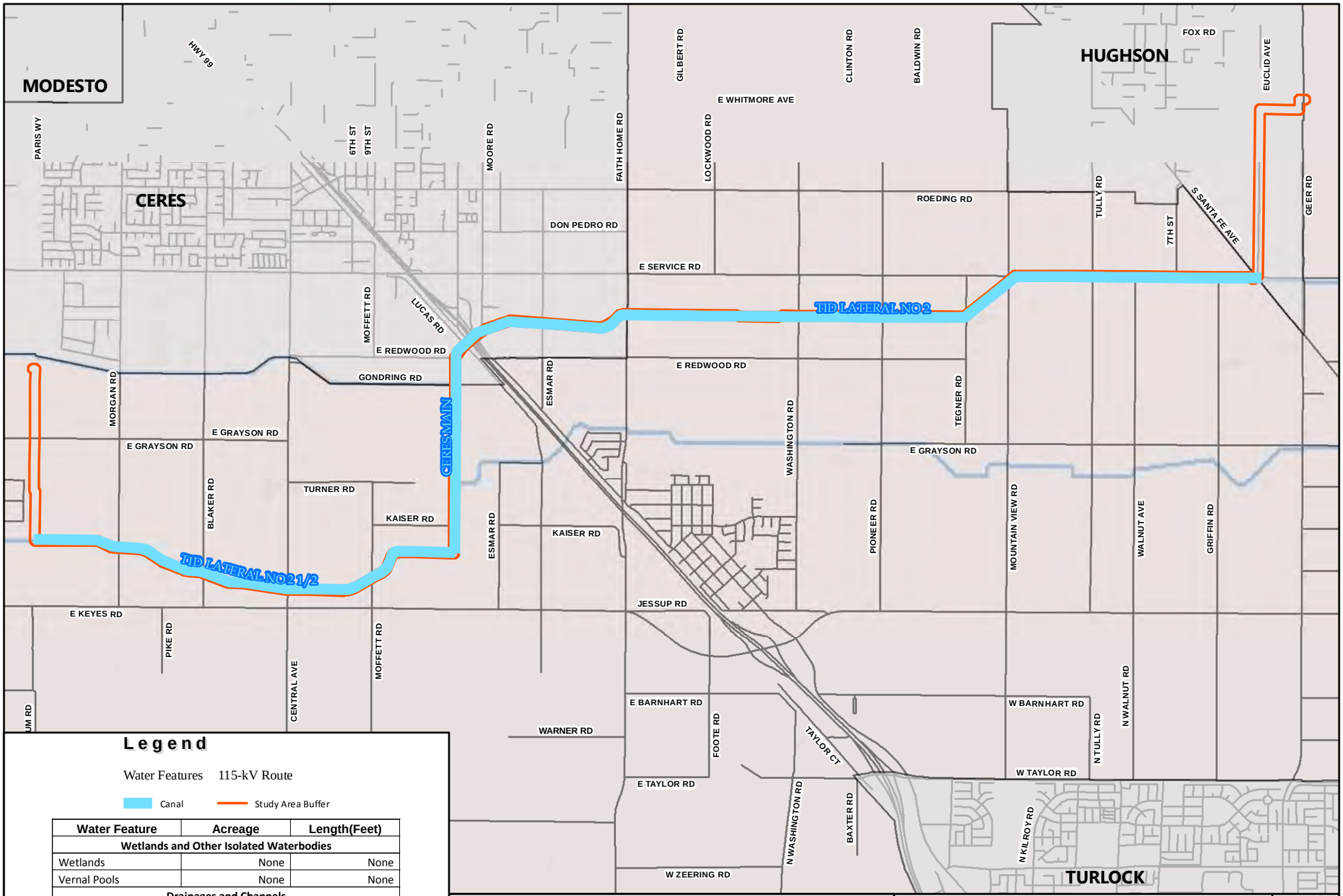
0 3,000 6,000 Feet

N

Figure 6

Date: April 8, 2010

PARUS CONSULTING, INC.



Legend

Water Features 115-kV Route

Canal Study Area Buffer

Water Feature	Acreage	Length(Feet)
Wetlands and Other Isolated Waterbodies		
Wetlands	None	None
Vernal Pools	None	None
Drainages and Channels		
TID Lateral No 2 1/2	*4.83	14026
Ceres Main	*2.48	7212
TID Lateral No 2	*8.73	25339
Natural Drainages	None	None

Notes:
** Water Features Not Recommended for Jurisdictional Determination.
* Acreage based upon assumed canal width of 15 feet.

Hughson-Grayson 115kV Trasmission Line and Substation Project

Delineation Map of Potentially Jurisdictional Waters

1 inch=4,000 feet
0 4,000 8,000 Feet

N

Figure 7

Date: April 8, 2010

PARUS CONSULTING, INC.

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Users\Lois\Documents\Lois\Miller Envt Inc\TID Route\TID Revised\TID T-Line Revised.urb924

Project Name: TID T-Line

Project Location: Stanislaus County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (tons/year unmitigated)	0.75	7.63	2.43	0.00	0.01	0.28	0.29	0.00	0.26	0.26	828.26
2010 TOTALS (tons/year unmitigated)	0.47	4.64	1.39	0.00	0.00	0.16	0.16	0.00	0.15	0.15	492.13

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.02	0.15	0.26	0.00	0.00	0.00	176.63

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.07

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.02	0.15	0.26	0.00	0.00	0.00	176.70

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009	0.75	7.63	2.43	0.00	0.01	0.28	0.29	0.00	0.26	0.26	828.26

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Asphalt 07/13/2009-09/01/2009	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45
Fine Grading 07/13/2009-09/01/2009	0.05	0.53	0.18	0.00	0.00	0.02	0.02	0.00	0.02	0.02	71.86
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.04	0.48	0.14	0.00	0.00	0.02	0.02	0.00	0.02	0.02	62.82
Fine Grading On Road Diesel	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.14
Fine Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90
Mass Grading 07/13/2009-09/01/2009	0.16	1.55	0.54	0.00	0.00	0.06	0.06	0.00	0.05	0.05	184.77
Mass Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Off Road Diesel	0.15	1.55	0.49	0.00	0.00	0.06	0.06	0.00	0.05	0.05	179.70
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.07
Trenching 07/13/2009-09/01/2009	0.03	0.38	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.01
Trenching Off Road Diesel	0.03	0.38	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	52.84
Trenching Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.17
Building 08/24/2009-05/06/2010	0.51	5.15	1.55	0.00	0.00	0.19	0.19	0.00	0.17	0.17	514.00
Building Off Road Diesel	0.51	5.13	1.51	0.00	0.00	0.19	0.19	0.00	0.17	0.17	508.84
Building Vendor Trips	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.02
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.14

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2010	0.47	4.64	1.39	0.00	0.00	0.16	0.16	0.00	0.15	0.15	492.13
Building 08/24/2009-05/06/2010	0.47	4.64	1.39	0.00	0.00	0.16	0.16	0.00	0.15	0.15	492.13
Building Off Road Diesel	0.47	4.62	1.36	0.00	0.00	0.16	0.16	0.00	0.15	0.15	487.19
Building Vendor Trips	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.89
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05

Phase Assumptions

Phase: Fine Grading 7/13/2009 - 9/1/2009 - Default Fine Site Grading Description

Total Acres Disturbed: 0.04

Maximum Daily Acreage Disturbed: 0.01

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 82.46

Off-Road Equipment:

2 Bore/Drill Rigs (240 hp) operating at a 0.75 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 5 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 7/13/2009 - 9/1/2009 - Type Your Description Here

Total Acres Disturbed: 0.04

Maximum Daily Acreage Disturbed: 0.01

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

2 Bore/Drill Rigs (240 hp) operating at a 0.75 load factor for 8 hours per day

3 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 10.8 hours per day

1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 5 hours per day

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1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 7/13/2009 - 9/1/2009 - Type Your Description Here

Off-Road Equipment:

2 Bore/Drill Rigs (240 hp) operating at a 0.75 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 5 hours per day

Phase: Paving 7/13/2009 - 9/1/2009 - Type Your Description Here

Acres to be Paved: 0.01

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

Phase: Building Construction 8/24/2009 - 5/6/2010 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 5.5 hours per day

3 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 10.8 hours per day

5 Other General Industrial Equipment (240 hp) operating at a 0.51 load factor for 8 hours per day

1 Other Material Handling Equipment (250 hp) operating at a 0.59 load factor for 8 hours per day

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.15	0.12	0.00	0.00	0.00	176.38
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (tons/year, unmitigated)	0.02	0.15	0.26	0.00	0.00	0.00	176.63

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
General heavy industry	0.00	0.00	0.00	0.00	0.00	0.00	0.07
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.07

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
General heavy industry		0.01	1000 sq ft	3.46	0.03	0.35
					0.03	0.35

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	1.6	98.2	0.2
Light Truck < 3750 lbs	0.0	3.3	88.5	8.2
Light Truck 3751-5750 lbs	0.0	1.4	98.1	0.5
Med Truck 5751-8500 lbs	0.0	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	100.0	0.0	72.0	28.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.1	14.3	78.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	68.2	31.8	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	0.0	90.9	9.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Rural Trip Length (miles)	16.8	7.1	7.9	10.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
General heavy industry				90.0	5.0	5.0

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\Lois Clarke\My Documents\Lois\Miller Envt Inc\TID Route\Analysis\TID Substation.urb924

Project Name: TID Substation

Project Location: Stanislaus County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (tons/year unmitigated)	0.21	1.74	0.81	0.00	0.88	0.08	0.96	0.18	0.07	0.26	196.77
2010 TOTALS (tons/year unmitigated)	0.19	1.39	0.77	0.00	0.00	0.06	0.06	0.00	0.06	0.06	178.03

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.04	0.15	0.26	0.00	0.00	0.00	176.63

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.42

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.04	0.15	0.26	0.00	0.00	0.00	177.05

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009	0.21	1.74	0.81	0.00	0.88	0.08	0.96	0.18	0.07	0.26	196.77

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Mass Grading 07/13/2009-08/14/2009	0.05	0.39	0.18	0.00	0.46	0.02	0.48	0.10	0.02	0.11	40.87
Mass Grading Dust	0.00	0.00	0.00	0.00	0.46	0.00	0.46	0.10	0.00	0.10	0.00
Mass Grading Off Road Diesel	0.05	0.39	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02	37.94
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94
Fine Grading 08/14/2009-09/15/2009	0.03	0.35	0.13	0.00	0.42	0.01	0.44	0.09	0.01	0.10	39.95
Fine Grading Dust	0.00	0.00	0.00	0.00	0.42	0.00	0.42	0.09	0.00	0.09	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	26.21
Fine Grading On Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.94
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80
Trenching 09/07/2009-10/14/2009	0.04	0.28	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	30.28
Trenching Off Road Diesel	0.03	0.28	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	28.08
Trenching Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19
Asphalt 10/05/2009-11/09/2009	0.02	0.20	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	23.50
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.19	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.48
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53
Building 11/02/2009-06/25/2010	0.07	0.52	0.28	0.00	0.00	0.02	0.02	0.00	0.02	0.02	62.17
Building Off Road Diesel	0.07	0.46	0.19	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.20
Building Vendor Trips	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.17
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.79

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2010	0.19	1.39	0.77	0.00	0.00	0.06	0.06	0.00	0.06	0.06	178.03
Building 11/02/2009-06/25/2010	0.19	1.39	0.77	0.00	0.00	0.06	0.06	0.00	0.06	0.06	178.03
Building Off Road Diesel	0.18	1.25	0.52	0.00	0.00	0.06	0.06	0.00	0.05	0.05	138.03
Building Vendor Trips	0.01	0.13	0.09	0.00	0.00	0.00	0.01	0.00	0.00	0.00	23.41
Building Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.58

Phase Assumptions

Phase: Fine Grading 8/14/2009 - 9/15/2009 - Default Fine Site Grading Description

Total Acres Disturbed: 7.35

Maximum Daily Acreage Disturbed: 1.84

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 257.83

Off-Road Equipment:

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 4 hours per day

1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 7/13/2009 - 8/14/2009 - Type Your Description Here

Total Acres Disturbed: 7.35

Maximum Daily Acreage Disturbed: 1.84

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 4 hours per day

1 Rollers (114 hp) operating at a 0.56 load factor for 6 hours per day

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1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 9/7/2009 - 10/14/2009 - Type Your Description Here

Off-Road Equipment:

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 4 hours per day

1 Tractors/Loaders/Backhoes (79 hp) operating at a 0.55 load factor for 6 hours per day

1 Trenchers (63 hp) operating at a 0.75 load factor for 6 hours per day

Phase: Paving 10/5/2009 - 11/9/2009 - Type Your Description Here

Acres to be Paved: 1.84

Off-Road Equipment:

1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 4 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 4 hours per day

Phase: Building Construction 11/2/2009 - 6/25/2010 - Type Your Description Here

Off-Road Equipment:

1 Cranes (190 hp) operating at a 0.43 load factor for 6 hours per day

1 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 4 hours per day

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.15	0.12	0.00	0.00	0.00	176.38
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.02						
TOTALS (tons/year, unmitigated)	0.04	0.15	0.26	0.00	0.00	0.00	176.63

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
General heavy industry	0.00	0.00	0.00	0.00	0.00	0.00	0.42
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.42

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
General heavy industry		0.01	1000 sq ft	20.00	0.20	2.00
					0.20	2.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	1.6	98.2	0.2
Light Truck < 3750 lbs	0.0	3.3	88.5	8.2
Light Truck 3751-5750 lbs	0.0	1.4	98.1	0.5
Med Truck 5751-8500 lbs	0.0	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	100.0	0.0	72.0	28.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.1	14.3	78.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	68.2	31.8	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	0.0	90.9	9.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Rural Trip Length (miles)	16.8	7.1	7.9	10.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
General heavy industry				90.0	5.0	5.0

Greenhouse Gas (GHG) Emissions Calculations

Project Name: Hughson-Grayson Substation and Transmission Line

Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	706,520	353	320
URBEMIS2007 Vehicle Emissions	980	0	0
Total Emissions (area sources + vehicles)	**707,500**	**354**	**321**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Estimated Project Annual Electrical Use: 696,000 kWh (kilowatt hours)/year
696 mWh (megawatt hours)/year

		Annual		CO2	Annual
Indirect GHG gases	Emission Factor lb/mWh	Project Electricity mWh	GHGs metric tons	Equivalent Factor	CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	524	696	165	1	165
Nitrous Oxide (N2O)	0.0037	696	0.0	296	0
Methane (CH4)	0.0067	696	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**166**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Sources (CO2 equivalent Metric Tons)

Area Sources	**320**	65.8%
Vehicles	**0**	0.1%
Electrical Use	**166**	34.1%
Total=	**487**	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Regiustry Report Protocol 2006

Pg. 32 (CCARRP) gives Equations

Pg. 36 (CCARRP - April 2008 update) gives CO2 output emission rate (lbs/mWh)
878.71 (lbs/mWh)

Pg. 85 (CCARRP) gives CO2 equivalency factors

Pg. 87 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0067 (lbs/mWh)
Nitrous Oxide - 0.0037 (lbs/mWh)

PG&E Carbon Footprint Calculator gives CO2 output emission rate (lbs/kWh)
0.524 lbs/kWh

lbs/metric ton = 2204.62

	Operations	Construction
Percentage of 25,000	1.9%	3.7%
Percentage of 169 Million	0.0003%	0.0006%

	Tons from URBEMIS	Metric Tons
Construction CO2	1025.03	930

Annual kWh Calculations for Project Emissions of Electricty Used by the project

Project Name: Hughson-Grayson Substation and Transmission Line

Total GHG Emissions From Commercial Electricity Use
Average monthly consumption (kWh)

Miscellaneous* (kWh/sq ft/Year)	square footage**	kWhours per year
4.35	160,000	696,000

*Electricity Usage Rates from Table A9-11-A South Coast AQMD CEQA Air Quality Handbook
1993 - Usage Rate is Average for SCE and LADWP
**Substation is 320,000 square feet, assumed 1/2 area due to minimal electricity usage expected but some needed for lighting

SUPPLEMENTAL CULTURAL RESOURCES SURVEY FOR THE HUGHSON-GRAYSON 115-kV TRANSMISSION LINE AND SUBSTATION PROJECT, STANISLAUS COUNTY, CALIFORNIA

Prepared for

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Prepared by

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USGS 7.5-Minute Quadrangles
1953 Ceres (PR 1987) and 1953 Denair (PR 1987), CA

June 2, 2010

Keywords: Survey, Positive, Stanislaus County
Southern Pacific Railroad (CA-STA-350H, P-50-000001), Tidewater Southern Railway (CA-STA-425H, P-50-000083), Turlock Irrigation District Water Conveyance System (CA-STA-426H, P-50-000073), Speckens Farm (P-50-001905)

MANAGEMENT SUMMARY/ABSTRACT

Purpose and Scope: Parus Consulting was retained by the Turlock Irrigation District (TID) to conduct a supplemental cultural resources inventory for the proposed Hughson-Grayson 115-kV Transmission Line and Substation Project located in the unincorporated area of Stanislaus County, California, between the cities of Hughson and Ceres. Along with an initial cultural resources inventory prepared in 2009, this study forms part of the background information required for a project-level Environmental Impact Report. The proposed project would include construction of a new 115-kilovolt (kV) transmission line, two 69-kV transmission line sections, and a substation. This supplemental cultural resources inventory included a systematic pedestrian survey of approximately 172 acres within project alternatives (Lateral 2 1/2 Route west of Faith Home Road, Lateral 2 Route west of Mitchell Road, Geer Road Design Option, and proposed Grayson Substation) that were not part of the initial cultural resources inventory for this project.

Dates of Investigation: Pedestrian survey for this supplemental report was performed on April 8 and May 26, 2010. A supplemental literature search was completed by the Central California Information Center on May 19, 2010. The initial cultural resources inventory report for this project details a records search and Native American Heritage Commission Sacred Lands File search completed in January 2009, and results of the survey of February and March 2009 (Arrington et al. 2009).

Investigation Constraints: Ground visibility within the proposed Grayson Substation (7.4 acres) was poor to good due to an active almond orchard. Ground visibility within the linear survey corridor (164.6 acres) was excellent but restricted by previous disturbance by developmental infrastructure (e.g., roadways, railroads, waterways).

Summary of Findings: The initial inventory report for this project was completed in April 2009, and identified segments of four historic-era resources within the project area (Atchison Topeka & Santa Fe Railroad [P-50-002006], Southern Pacific Railroad [P-50-000001], Tidewater Southern Railway [P-50-000083], and TID Water Conveyance System [P-50-000073]), each of which was recommended not eligible for listing on the National Register or California Register and thus do not qualify as historic properties or historical resources.

Segments of three historic-era resources (Southern Pacific Railroad [P-50-000001], Tidewater Southern Railway [P-50-000083], and TID Water Conveyance System [P-50-000073]), occur within the acreage surveyed for this supplemental report. None of the segments recorded within the project area are recommended eligible for listing on the National Register or California Register. Updates for these three sites and one historic-era resource (Speckens Farm [P-50-001905]) immediately adjacent to, but outside, the project area are provided. No previously unknown prehistoric or ethnohistoric resources were identified during this survey or the survey completed in 2009.

Recommendations Summary: The proposed project will cause no significant adverse impacts to known cultural resources. No additional cultural resources work is recommended at this time. However, in the event that cultural resources are discovered during construction grading, trenching, augering, and/or excavation, work must be halted in the immediate area and a qualified archaeologist notified, who will then evaluate the resource.

Disposition of Data: Copies of this report will be filed with TID; Central California Information Center at California State University–Stanislaus; and Parus Consulting, Inc. Original documentation will remain on file at the Roseville, California office of Parus Consulting.

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INTRODUCTION

Contracting Data: Parus Consulting, Inc. was retained by the Turlock Irrigation District (TID) to conduct a supplemental cultural resources survey for the proposed Hughson-Grayson 115-kV Transmission Line and Substation Project near Ceres in Stanislaus County, California. Along with an initial cultural resources inventory prepared in 2009, this survey forms part of the background information required for a project-level Environmental Impact Report (EIR). A Draft EIR was prepared by Strachan Consulting, with assistance from Parus Consulting, and was filed on August 10, 2009. This study will support the Revised Draft EIR underway by Strachan Consulting and Parus Consulting for TID.

The proposed Hughson-Grayson 115-kV Transmission Line and Substation Project would include construction of a new 115-kilovolt (kV) transmission line, two 69-kV transmission line sections, and a substation. The proposed transmission line would be approximately 11 miles in length and span the distance between the cities of Hughson and Ceres in Stanislaus County, California. Along much of this distance, existing power lines would be consolidated onto newly constructed poles.

This supplemental cultural resources study included a systematic pedestrian survey of project alternatives that were not part of the initial cultural resources inventory for this project plus a supplemental records search. The initial inventory report was completed by Cultural Research Associates (CRA) on April 7, 2009 (Arrington et al. 2009) and presented results of a literature search, Sacred Lands File search, and intensive-level pedestrian survey of alternative transmission line segments, two 69-kV transmission line sections, and acreage for the substation. This supplemental report covers changes to the Lateral 2 1/2 Route west of Faith Home Road, Lateral 2 Route west of Mitchell Road, the Geer Road Design Option, and the proposed Grayson Substation.

TID has developed this project with the objectives of greatly increasing the reliability of the TID transmission system and relieving congestion on TID's existing 69-kV transmission system. Further benefit may result from the ability of the proposed project to serve anticipated future load growth in the Ceres area.

Purpose: The current study was completed to comply with the provisions of the California Environmental Quality Act (CEQA). Sections 21083.2 and 21084.1 of the Statutes of CEQA, Public Resources Code (PRC) Section 5024.1, and Section 15064.5 of the Guidelines were also used as guidelines for the study (Governor's Office of Planning and Research 1998). PRC Section 5024.1 requires evaluation of cultural resources that can be expected to be directly or indirectly affected by a proposed project to determine their eligibility for listing on the California Register of Historical Resources (CRHR). The purpose of the register is to maintain listings of the state's historical resources and to indicate which properties are to be protected, as feasible, from substantial adverse change.

A "historical resource" is a resource listed in, or determined to be eligible for listing in, the CRHR (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5[a][2]), or any object, building, structure, site, area, place, record or manuscript which a lead agency determines to be historically significant (Section 15064.5[a][3]). The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing on the National Register of Historic Places (NRHP).

According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it retains integrity and meets at least one of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) Is associated with the lives of persons important in our past;

(3) Embodies the distinctive characteristics of a type, period, region, or method of installation, or represents the work of an important creative individual, or possesses high artistic values; or

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

In order to be listed on the CRHR, historical resources must meet at least one of the above significance criteria and possess the quality of integrity (location, design, setting, materials, workmanship, feeling, and association). Historic-era resources must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance.

Section 21083.2(g) describes a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; or

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Impacts that adversely alter the significance of a resource listed in, or eligible for listing in, the CRHR are considered a significant effect on the environment. Impacts to historical resources from a proposed project are thus considered significant if the project physically destroys or damages all or part of a resource, changes the character of the use of the resource or physical feature within the setting of the resource which contribute to its significance, or introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources. If it can be demonstrated that a project will cause damage to a historic resource or a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Sections 21083.2[a], [b], and [c]).

Resources that do not meet any of the four significance criteria for listing on the CRHR or do not qualify as a “unique archaeological resource” under CEQA PRC Section 21083.2 are viewed as not significant. Under CEQA, “A nonunique archaeological resource need be given no further consideration, other than the simple recording of its existence by the lead agency if it so elects” (PRC Section 21083.2[h]).

Report Format: The format of this report follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (Office of Historic Preservation 1990).

Undertaking: The eastern endpoint of the Lateral 2 1/2 Route or Lateral 2 Route would be located at the existing Hughson Substation near the corner of East Whitmore Avenue and Geer Road, east of the City of Hughson. The western terminus of the main 115-kV line would be at the proposed Grayson Substation, which would be located south of the City of Ceres, north of East Grayson Road, and east of Crows Landing Road. The proposed project also includes the construction of two 69-kV transmission lines, each

of which would terminate at the proposed Grayson Substation. One 69-kV transmission line would be located between Morgan Road and the proposed Grayson Substation north of TID Lower Lateral No. 2; the second 69kV transmission line would connect the proposed Grayson Substation to TID's existing Almond Power Plant.

The proposed project would entail construction of:

- Approximately 11 miles of new 115-kV double circuit with 12-kV underbuild;
- Approximately 0.6 mile of new 69-kV double circuit (between Morgan Road and Grayson Substation north of TID Lower Lateral No. 2);
- Approximately 1,000 feet of new 69-kV single circuit (between Grayson Substation and existing Almond Power Plant 69-kV switchyard); and
- The Grayson Substation (which will be 500 x 640 feet, and encompass 7.4 acres).

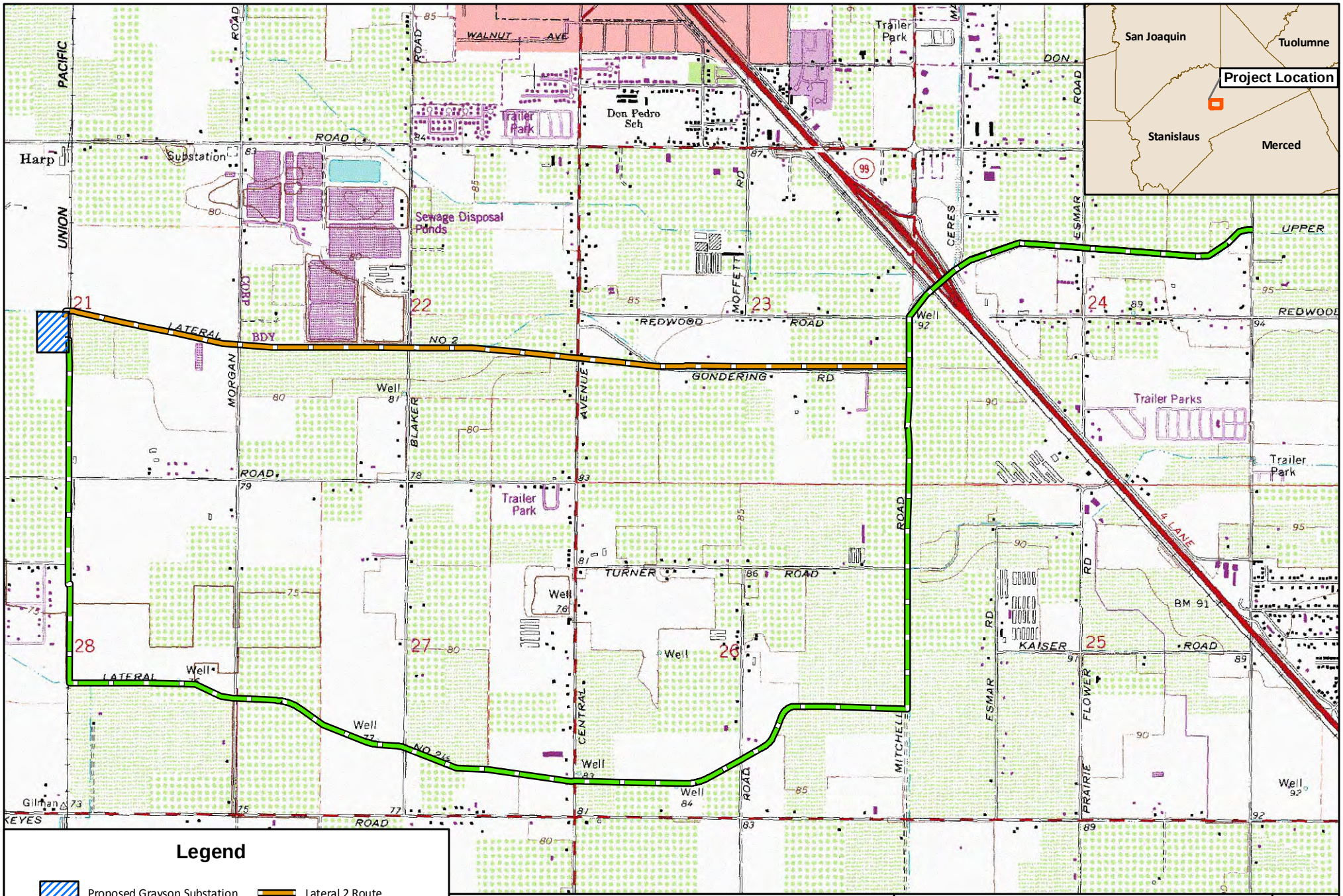
For portion of the Lateral 2 ½ Route under study here, 6 miles of new 115-kV double circuit with 12-kV underbuild would be constructed west from Faith Home Road to the proposed Grayson Substation. For the portion of the Lateral 2 Route under study here, 3.8 miles of new 115-kV double circuit with 12-kV underbuild would be constructed west from Mitchell Road to the proposed Grayson Substation. For the Geer Road Design Option under study here, the transmission line would exit the existing Hughson Substation and follow Geer Road south for 1 mile before turning west at East Service Road on the north side of Upper Lateral No. 2 towards Santa Fe Avenue. This option could apply to either the Lateral 2 ½ Route or Lateral 2 route, both of which would otherwise exit the existing Hughson Substation and proceed west along Whitmore Avenue, turn south for 1 mile along Euclid Avenue, and then turn west at the intersection of Santa Fe Avenue with East Service Road and continue on the north side of Upper Lateral No. 2.

Project Location: The proposed project is located in an unincorporated area of Stanislaus County, California, between the cities of Hughson and Ceres. Surrounding land uses are generally agricultural and residential in nature. The western terminus of the main 115-kV line (Lateral 2 1/2 Route or Lateral 2 Route) would be at the proposed Grayson Substation, which would be located south of the City of Ceres, north of East Grayson Road, and east of Crows Landing Road. This supplemental report covers changes to the Lateral 2 ½ Route west of Faith Home Road (6 miles), the Lateral 2 Route west of Mitchell Road (3.8 miles), the Geer Road Design Option (1.3 miles), and the proposed 7.4-acre Grayson Substation location. **Error! Reference source not found.** lists the approximate total acreage within the four project elements covered by the survey for this supplemental report (see Figures 1 and 2). The width of the linear corridor for the transmission line routes would be 30 meters (100 feet).

Table 1. Project Elements and Acreage Surveyed for this Supplemental Report

Project Element	Corridor Length km/miles	Corridor Width meters/feet	Substation Acreage	Acreage (approx.)
Lateral 2 ½ Route	9.6 km (6 miles)	30 m (100 feet)	--	72.5
Lateral 2 Route	6.1 km (3.8 miles)	30 m (100 feet)	--	76.3
Geer Road Design Option	2.1 km (1.3 miles)	30 m (100 feet)		15.8
Grayson Substation Alternative	--	--	7.4	7.4
				Total = 172

Note that additional survey for the undertaking, including the routes east of Faith Home Road, Grayson Road Alternative Route, and Grayson Substation Alternative, was accomplished by CRA in 2009 (Arrington et al. 2009).



Legend

- Proposed Grayson Substation
- Lateral 2 Route
- Lateral 2 1/2 Route

Hughson-Grayson 115-kV Transmission Line and Substation Project

1:24,000

0 2,000 4,000 Feet

N

Quad Name: Ceres PR 1987

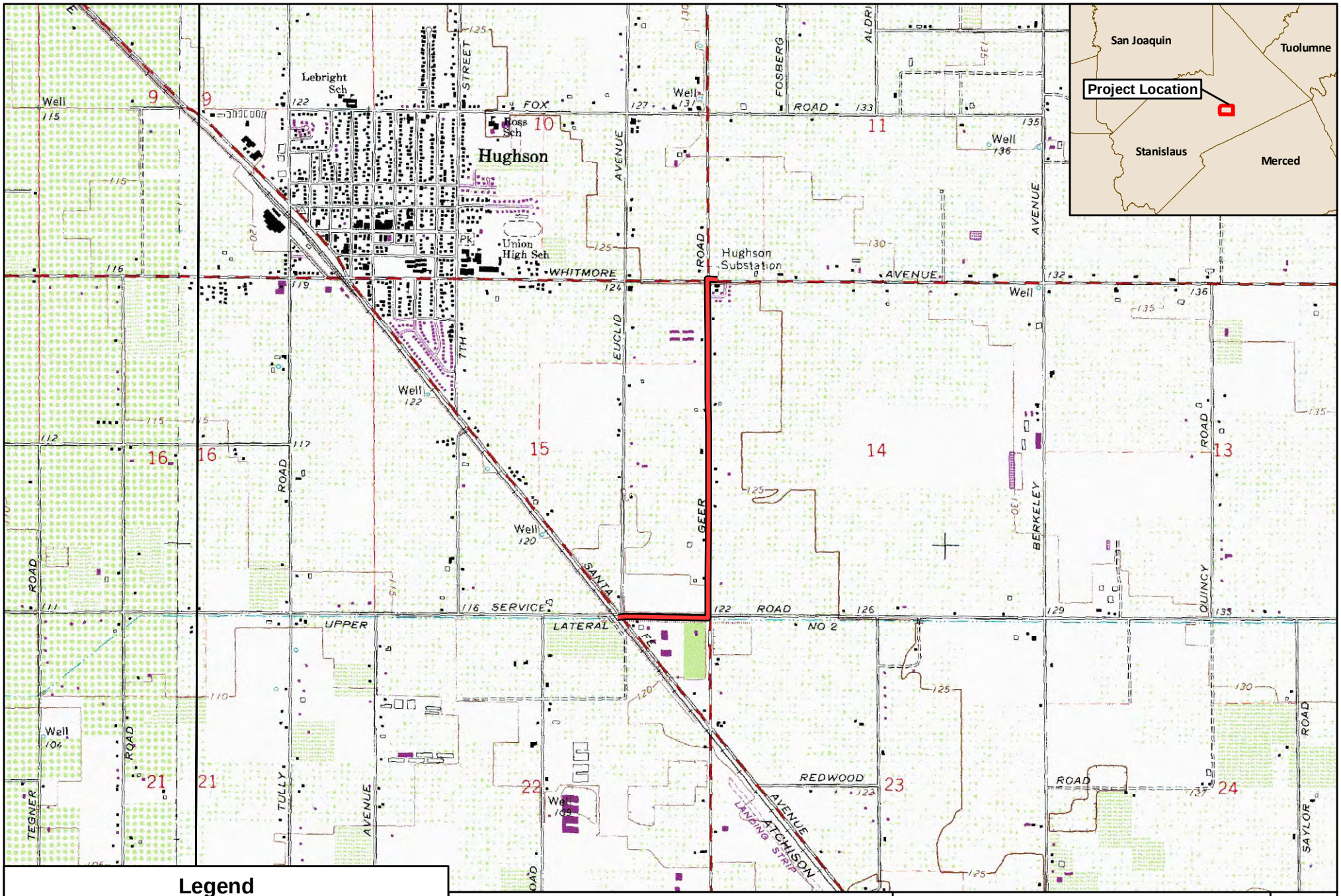
Township: 4 S, Range: 9 & 10 E

Project Location Map

Figure 1

Revised: June 2, 2010

PARUS CONSULTING, INC.



Legend

Geer Road Design Option

Hughson-Grayson 115-kV Transmission Line and Substation Project

1:24,000

0 2,000 4,000 Feet

N

Quad Name: Denair PR 1987

Township: 4 S, Range: 10 E

Project Location Map

Figure 2

Revised: June 2, 2010

PARUS CONSULTING, INC.

The project area for this supplemental survey encompasses portions of Sections 21, 22, 23, 24, 25, 26 27, and 28, in Township 4 South, Range 9 East, as depicted on the 1953 Ceres (Photorevised 1987) U.S. Geological Survey (USGS) 7.5-Minute quadrangle (Figure 1), and Sections 10, 11, and 15 in Township 4 South, Range 10 East, as depicted on the 1953 Denair (Photorevised 1987) USGS 7.5-minute quadrangle (Figure 2) (Mount Diablo Base and Meridian).

Project Personnel: Dr. Nancy Sikes served as the Principal Investigator for this survey, and authored this report. Peter Morris performed the pedestrian survey and was responsible for recording the updates for known cultural resources identified during the survey.

NATURAL AND CULTURAL SETTING

The environmental and cultural setting (prehistory, ethnography, history) for this project is presented in full within the initial inventory report completed by CRA one year ago (Arrington et al. 2009:5–12), and is not repeated here.

BACKGROUND RESEARCH

PROJECT HISTORY

A record search was completed on behalf of CRA by the Central California Information Center (CCIC), located at the University of California, Stanislaus, on January 23, 2009. As summarized in CRA's report (Arrington et al. 2009:12–14), 10 cultural resources studies have been previously completed within the project area, and an additional three cultural resources studies within a quarter-mile radius. That record search also indicated four historic-era resources had been previously recorded within the quarter-mile radius, but no prehistoric or historic-era resources were recorded within the project area.

In response to CRA's request for search of their Sacred Lands File, a letter by the Native American Heritage Commission (NAHC) dated January 23, 2009 indicated that their search failed to indicate the presence of Native American sacred lands or traditional cultural properties within the immediate project area.

CRA completed an intensive-level survey, with transects spaced no greater than 15 meters apart, on February 19-20 and March 21, 2009 within approximately 299.6 acres. Surface visibility was fair to good along the linear project corridor (292.3 acres) and moderate within the proposed substation alternative (7.35 acres) due to prior disturbance by developmental infrastructure (e.g., roadways, waterways) and agricultural use.

Segments of four historic-era resources (Atchison Topeka & Santa Fe Railroad, Southern Pacific Railroad [SPRR], Tidewater Southern Railway, and TID Water Conveyance System) were formally recorded on Department of Parks and Recreation (DPR) series 523 forms within the acreage initially surveyed for this project (Table 2; see Arrington et al. 2009:15–21). No prehistoric or ethnohistoric cultural resources were identified.

As indicated inTable 2, three of the four resources recorded or updated during the initial study occur within the current supplemental survey area.

Table 2. Cultural Resources Recorded within Area Surveyed in 2009 by CRA

Trinomial	Primary No.	Brief Description	Proximity to Current Supplemental Survey Area
CA-STA-350H	P-50-000001	Southern Pacific Railroad	Within
CA-STA-424H	P-50-002006	Atchison Topeka & Santa Fe Railroad	Outside
CA-STA-425H	P-50-000083	Tidewater Southern Railway	Within
CA-STA-426H	P-50-000073	Turlock Irrigation District Water Conveyance System	Within

The segments of the four historic-era resources recorded during the initial survey for this project were recommended not eligible for listing on the NRHP and CRHR. The initial inventory report also noted the proposed transmission line alignment crossings would have no impact on the material integrity on the segments of the four historic-era resources within the project area (Arrington et al. 2009:22). The background and findings presented in the initial cultural inventory was used to prepare the cultural resources section of the Draft EIR, which was filed on August 10, 2009.

SUPPLEMENTAL LITERATURE SEARCH

A literature search for the Geer Road Design Option was completed by the Central California Information Center (CCIC), located at the University of California, Stanislaus, on May 19, 2010 (Appendix A). The search included a review of the available documents and site records within a 0.25-mile radius.

The prior literature search completed for this project by CRA (Arrington et al. 2009), described above, covers the remaining three supplemental survey elements (Lateral 2 1/2 Route west of Faith Home Road, Lateral 2 Route west of Mitchell Road, and proposed Grayson Substation) and a 0.25-mile radius.

The supplemental record search indicates seven studies have been previously completed within or immediately adjacent to portions of the Geer Road Design Option, including the CRA report (Arrington et al. 2009) (Table 3).

Table 3. Prior Cultural Resources Studies within or adjacent to Geer Road Design Option

CCIC Report No.	Author(s)	Date	Study Title	Proximity to Geer Road Design Option Survey Area
ST-1451	Napton	1992	Cultural Resource Investigations of the proposed Livingston Cogeneration Project Merced and Stanislaus Counties	Adjacent
ST-1793	Napton	1992	Cultural Resource Investigations of the proposed Livingston Cogeneration Project Merced and Stanislaus Counties. Addendum 1	Portion within
ST-2930	Jensen & Associates	1996	Archaeological Inventory Survey: Tracy to Fresno Longhaul Fiberoptics Data Transmission Line	Adjacent
ST-6446	Peak & Associates	2006	Cultural Resources Assessment for the Turlock Irrigation District's Regional Water Supply Project	Portion within
ST-6487	Basin Research Associates	2007	Archaeological Resources Assessment-Turlock Irrigation District Transmission Line Route and Substation Relocation	Adjacent
ST-5514	PAR	2004	Final Report for Cultural Resources Inventory of Stanislaus County Traffic Congestion Relief Project "A" California	Portion within
ST-6977	Arrington, Harrington and Daly	2009	Cultural Resources Inventory for the Hughson-Grayson 115kV Transmission Line and Substation Project in Stanislaus County, California	Adjacent

The supplemental record search further indicates one historic-era resource has been previously recorded within the Geer Road Design Option (Table 4). One additional historic-era resource is located immediately adjacent to, but outside, the route. Within the 0.25-mile search radius are an additional historic-era resource and two bridges. None of these resources is considered eligible for listing on the NRHP or CRHR.

No prehistoric resources have been previously recorded within the Geer Road Design Option or within a 0.25-mile radius of that route.

Table 4. Previously Recorded Resources within 0.25-mile radius of Geer Road Design Option

Trinomial	Primary No.	Bridge No.	Brief Description	Proximity to Geer Road Supplemental Survey Area
CA-STA-424H	P-50-002006		Atchison Topeka & Santa Fe Railroad	Outside
CA-STA-426H	P-50-000073		Turlock Irrigation District Water Conveyance System	Within
	P-50-001905		Speckens Farm residence and ancillary buildings built in 1936	Adjacent & Outside
		38C-314	Griffin Road at Upper Lateral No. 2	Outside
		38C-325	Santa Fe Avenue at Upper Lateral No. 2	Outside

KNOWN CULTURAL RESOURCES WITHIN SUPPLEMENTAL SURVEY AREA

Segments of three previously recorded cultural resources are present within the acreage surveyed for this supplemental report. The information provided in the DPR forms on the SPRR, Tidewater Southern Railway, and TID Water Conveyance System is summarized below for each of these three resources.

Southern Pacific Railroad (CA-STA-350H, P-50-000001)

A 29-mile segment of the SPRR (now the Union Pacific Railroad [UPRR]) in Stanislaus County was initially recorded by Costello and Marvin in 1993, with a small section of track (0.21 mile) added by Pam Daly in 2009. The section of track from Lathrop to Bakersfield was the first leg of the new SPRR, with construction beginning in 1869. The path of the SPRR through the Central Valley and Southern California has remained unchanged since its original construction. The line was taken over by UPRR, and over the years, the rails, ties and ballast have been upgraded.

In the site record update, Pam Daly evaluated the eligibility of the SPRR/UPRR for listing in the NRHP and CRHR for the railroad's significant role in the transportation history of the United States, and its association with the lives of persons significant to California and the United States. The period of significance of the railroad system is from 1869 to 1907, and Daly considered that portions of the SPRR/UPRR line may be eligible. The SPRR is directly associated with the patterns of events that led to the settlement of the Central Valley of California and the shipment of agricultural goods within the state and throughout the United States. The SPRR is also directly associated with Leland Stanford, Collis Huntington, Charles Crocker, and Mark Hopkins, known as the "Big Four" who built the first transcontinental railroad, the Central Pacific Railroad in 1861.

As part of the initial inventory for this project, a short segment of the SPRR crossing TID Upper Lateral No. 2 ½ near Prairie Flower Road was recorded by Daly in 2009. Although the SPRR line appears eligible for NRHP and CRHR listing, the short segment within the project area has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards and other related equipment.

Daly concluded the segment has not retained the historical integrity of materials, workmanship, setting and feeling, and is not eligible for NRHP or CRHR listing.

Tidewater Southern Railway (CA-STA-425H, P-50-000083)

A short, 400-foot segment of the Tidewater Southern Railway was recorded by Pam Daly in 2009. The segment is located immediately north of Lower Lateral No. 2, north of Grayson Road and west of Morgan Road. Additional segments of the line have been recorded in neighboring San Joaquin County (P-39-000015/CA-SJO-256H). An interurban rail line that ran from Stockton to Turlock, the Tidewater Southern was constructed beginning in 1910. The line was taken over by UPRR, and over the years, the rails, ties and ballast have been upgraded.

In the site record, Daly evaluated the eligibility of the Tidewater Southern Railway for listing in the NRHP and CRHR for being an important inter-urban railroad transportation line. The period of significance of the railroad is from 1910 to 1917. While Daly concluded that the Tidewater Southern Railway line appears eligible for listing in the NRHP and CRHR, the small recorded segment has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards and other related equipment. The segment of the railroad recorded immediately north of Lower Lateral No. 2 is thus not eligible for listing on the NRHP or CRHR.

Turlock Irrigation District Water Conveyance System (CA-STA-426H, P-50-000073)

The TID Water Conveyance System was established in 1887 and is the oldest example of a publicly owned irrigation district in California. The district is bordered by the San Joaquin, Tuolumne and Merced Rivers, and provides irrigation water to 307 acres of the low lying, level land in the San Joaquin Valley. All of the main canals and laterals (smaller canals) were completed between 1890 and 1900. Between 1917 and 1920, the original earthen canals and laterals were lined with concrete or gunite. The main canals run north/south and are approximately 20 feet deep and 30 feet wide; the laterals run east/west and average 6 to 8 feet deep and 15 feet wide.

Five separate areas within the TID Water Conveyance System were recorded by Pam Daly in 2009, including segments of the Ceres Main Canal, Upper Lateral No. 2 Canal, Upper Lateral No. 2 1/2, and Lower Lateral No. 2. The Ceres Main Canal is one of the two main north/south distribution canals that deliver water from the Turlock Main Canal that runs from the main reservoir at La Grange. Upper Lateral No. 2, Upper Lateral No. 2 ½, and Lower Lateral No. 2 are distribution canals that run on a general east/west axis and deliver water from the Ceres Main Canal. The upper laterals are located east of the Ceres Main Canal; the lower laterals are situated west of the Ceres Main Canal.

In the site record, Daly evaluated the eligibility of the TID Water Conveyance System for listing in the NRHP and CRHR for its association with the development of the first publicly owned irrigation district in California. The period of significance of the district is from 1887 to 1925. Although the TID system appears eligible for listing in the NRHP and CRHR, Daly concluded the individual, recorded canal segments have lost their integrity in workmanship, setting, materials, and feeling since the canals are constantly being repaired and maintained and many of the water diversion features (e.g., gates, valves, chutes, bridges) have had their historic parts replaced, or altered, to adapt to current conditions.

KNOWN CULTURAL RESOURCE ADJACENT TO SUPPLEMENTAL SURVEY AREA

As provided by the supplemental literature search from the CCIC, one previously recorded cultural resource is located adjacent to, but outside of, the Geer Road Design Option. This resource is described next.

Speckens Farm (P-50-001905)

A single-family residence with associated barn, sheds, garage, and landscaping that fronts Geer Road was recorded in 2004 by Maniery. The house and ancillary buildings are part of a family-owned almond farm, and are surrounded by orchards. Mainery concluded that the property does not appear to qualify for listing on the CRHR. The Minimal Traditional-style residence built in 1936 has been significantly altered. Also, it is but one example in the county and region of this style of housing that was popular during the Depression era.

FIELD METHODS

Parus archaeologist Peter Morris, who meets or exceeds the Secretary of the Interior's Standards (National Park Service 1983), conducted an intensive-level pedestrian survey for the proposed project on two occasions in the spring of 2010. The segment of the Lateral 2 ½ Route west of Faith Home Road, the Lateral 2 Route west of Mitchell Road, and the proposed Grayson Substation were surveyed on April 8, 2010 (Figure 1). Survey for the Geer Road Design Option was accomplished on May 26, 2010 (Figure 2). The acreage within each of the four project elements (**Error! Reference source not found.**) was intensively surveyed at transects spaced no greater than 15 meters. This acreage comprises the maximum physical footprint of potential ground-disturbing activities associated with the project elements covered by this supplemental report.

The ground surface within the project area was examined for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, baked clay, fire-affected rock), soil discoloration that might indicate the presence of a cultural midden, and soil depressions, and features that might be indicative of the former presence of historic structures and buildings (e.g., postholes, foundations), and historic debris (e.g., metal, glass, ceramics). Ground disturbances including rodent burrows, cut banks, animal trails, and eroded areas were visually inspected. Photographs of the supplemental survey areas, potential features, and items of interest were taken with a digital camera. The surveyed acreage was recorded with a handheld Trimble GeoXT global positioning system (GPS) unit. Records for previously recorded resources occurring within and immediately adjacent to the survey areas were updated using standard DPR series 523 forms.

FIELD RESULTS

SUMMARY

The findings for each of the four project elements (Lateral 2 ½ Route, Lateral 2 Route, Geer Road Design Option, and Proposed Grayson Substation) are presented separately below. Overall ground visibility within the linear survey corridor (164.6 acres) was excellent, although it was restricted by previous disturbance of developmental infrastructure (e.g., roadways, railroads, waterways). Within the proposed Grayson Substation (7.4 acres), ground visibility was poor to good due to the presence of an active almond orchard.

Three previously recorded historic-era resources are present within the surveyed acreage for the four elements. As outlined in Table 5, these include the SPRR, Tidewater Southern Railway, and the TID Water Conveyance System (Ceres Main Canal, Upper Lateral No. 2, Lower Lateral No. 2, and Lower Lateral No. 2 ½). In addition, one previously recorded historic-era residence and associated structures (Speckens Farm) is located on Geer Road immediately adjacent to, but outside of, the Geer Road Design Option. A summary for each resource is provided below; updated DPR forms for each resource are attached as Appendix A.

No prehistoric or ethnohistoric cultural resources were identified during the supplemental survey reported here.

Table 5. Cultural Resources Updated within Supplemental Area Surveyed in 2010 by Parus

Trinomial	Primary No.	Brief Description	Project Element
	P-50-001905	Speckens Farm: residence, barn, and associated structures built in 1936	Outside project; immediately adjacent to Geer Road Design Option
CA-STA-350H	P-50-000001	Southern Pacific Railroad	Crossed by Lateral 2 1/2 Route
CA-STA-425H	P-50-000083	Tidewater Southern Railway	Parallels or crossed by Lateral 2 1/2 Route, Lateral 2 Route, and Proposed Grayson Substation
CA-STA-426H	P-50-000073	Turlock Irrigation District Water Conveyance System • Main Ceres Canal • Upper Lateral No. 2 • Lower Lateral No. 2 • Lower Lateral No. 2 1/2	• Crossed by and parallels Lateral 2 1/2 Route • Parallels or crossed by Lateral 2 1/2 Route, Geer Road Design Option • Parallels Lateral 2 Route and Proposed Grayson Substation • Crossed by and parallels Lateral 2 1/2 Route

LATERAL 2 ½ ROUTE

The Lateral 2 ½ Route between the proposed Grayson Substation and Faith Home Road is relatively flat, with elevations ranging between 25 and 30 meters (82–97 feet) above mean sea level (msl). Between Faith Home Road and the Ceres Main Canal, the route would parallel the north side of Upper Lateral No. 2. It would cross State Route 99 (SR 99) and the SPRR/UPRR perpendicular on the south side of the Ceres Main Canal, then turn southward, cross, and parallel the west side of the Ceres Main Canal, before turning west at the intersection of the Ceres Main Canal with Lower Lateral No. 2 ½. Next, the route would cross and parallel the south side of Lower Lateral No. 2 ½, and then turn north alongside the east side of the Tidewater Southern Railway/UPRR. Approximately 0.3 miles north of Lower Lateral No. 2 ½, the Lateral 2 ½ Route would cross to the west side of the Tidewater Southern tracks, and would continue until it terminates at the proposed Grayson Substation.

Along Upper Lateral No. 2 between Faith Home Road and the Ceres Main Canal, the Lateral 2 ½ Route is crossed by Esmar Road and Moore Road. The portion of the route along the Ceres Main Canal is crossed by Frontage Road, SR 99, the tracks of the SPRR/UPRR, and Lucas Road. The segment of the Lateral 2 ½ Route paralleling Lower Lateral No. 2 ½ is crossed by four roadways (Moffett Road, Central Avenue, Blaker Road, and Morgan Road). East Grayson Road crosses the segment paralleling the tracks of the Tidewater Southern Railway/UPRR.

The area along the Lateral 2 ½ Route is rural in nature. Ground cover along the route is mainly agricultural fields and orchards (75%), with some residential areas (10%) and areas previously impacted by roadway, railroad, or waterway development (15%). Ground visibility within the Lateral 2 ½ Route was generally excellent, ranging from 90 to 100 percent. The sand-covered levee crown and the immediate landside of the levee were clear of vegetation, offering excellent visibility on April 8, 2010. The ballast covering the ground adjacent to the SPRR/UPRR and Tidewater Southern Railway tracks was devoid of vegetation.

LATERAL 2 ROUTE

The Lateral 2 Route between the west side of the Ceres Main Canal and existing Almond Power Plant is relatively flat, with elevations ranging between 25 and 27.7 meters (82–91 feet) above msl. Three roads cross this route (Central Avenue, Blaker Road, and Morgan Road). The Alternate Route for the transmission line would parallel the north side of Lower Lateral No. 2, terminating at the power plant after crossing the Tidewater Southern tracks. Gondring Road parallels the southern side of the Lower Lateral No. 2 canal between the Ceres Main Canal and Central Avenue.

The Lateral 2 Route is mainly rural in nature. Ground cover along the route is a combination of holding ponds (10%), industrial property (10%), agricultural fields and orchards (65%), and residential development (15%). Ground visibility within the Lateral 2 Route was generally excellent, ranging from 90 to 100 percent. The sand-covered levee crown and the immediate landside of the levee were clear of vegetation, offering excellent visibility. The ballast covering the ground adjacent to the Tidewater Southern Railway/UPRR tracks was devoid of vegetation on April 8, 2010.

GEER ROAD DESIGN OPTION

The Geer Road Design Option between the existing Hughson Substation and Santa Fe Avenue is relatively flat, with elevations ranging between 36.6 and 38 meters (120–125 feet) above msl. Heading south, the route would parallel the west side of Geer Road between East Whitmore Avenue and East Service Road, before turning west and paralleling East Service Road along the north side of Upper Lateral No. 2 between Geer Road and Santa Fe Avenue. Santa Fe Avenue parallels the eastern side of the Atchison, Topeka and Santa Fe Railroad (now Burlington Northern Santa Fe) which is outside the supplemental survey area.

The Geer Road Design Option route is mainly rural in nature. Ground cover along the route is mainly agricultural fields and orchards (75%), with limited residential, industrial, and retail development (15%), and areas previously disturbed by roadway and waterway construction (10%). Ground visibility within the Geer Road Design Option route was generally excellent, ranging from 90 to 100 percent. The sand-covered levee crown along Upper Lateral No. 2 was clear of vegetation, offering excellent visibility on May 26, 2010. Immediately north of the levee crown and paralleling the canal is the paved East Service Road.

PROPOSED GRAYSON SUBSTATION

The acreage for the Proposed Grayson Substation lies immediately west of the Tidewater Southern Railway/UPRR and south of Lower Lateral No. 2. Agricultural use, consisting of an active almond orchard, covered 100 percent of the proposed 7.4-acre area at the time of the survey on April 8, 2010. Ground visibility among the almond trees was moderate, ranging from 25 to 75 percent.

UPDATES TO PREVIOUSLY RECORDED HISTORIC-ERA RESOURCES

Southern Pacific Railroad (CA-STA-350H, P-50-000001)

An approximately 50-foot linear segment of the SPRR/UPRR is crossed by the Lateral 2 ½ Route in Section 24. The short recorded segment begins on the northwest side of the Ceres Main Canal and ends on the southeast side of that canal (Photograph 1). The SPRR/UPRR segment parallels the west side of SR-99, and is currently in use. In this segment of the railroad, there are two sets of standard gauge tracks resting on a slightly elevated bed of coarse granite rock track ballast. The tracks run northwest to southeast between the concrete floodwalls of the Ceres Main Canal.

Segments of the SPRR in Stanislaus County were initially recorded by Costello and Marvin in 1993, with a 0.21-mile section of track added by Daly in 2009 as part of the initial cultural resources inventory for the current project (Arrington et al. 2009). In general, portions of the line may be eligible for listing in the NRHP and CRHR for the SPRR's significant role in the transportation history of the United States, and its association with the lives of persons significant to California and the United States. Consistent with the conclusion reached in the site record by Daly and the initial cultural resources inventory for the current project (Arrington et al. 2009:16–17), however, the 50-foot segment recorded here on April 8, 2010 does not appear eligible for listing. The line has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards and other related equipment. This segment has not retained the historical integrity of materials, workmanship, setting and feeling, and it is not eligible for listing in the NRHP or CRHR.

Photograph 1. Overview of SPRR crossing Ceres Main Canal (view to southeast)

Tidewater Southern Railway (CA-STA-425H, P-50-000083)

A 1.1-mile segment of the Tidewater Southern Railway parallels the Lateral 2 ½ Route in Sections 21 and 28 between the proposed Grayson Substation and Lower Lateral No. 2 ½ (Photograph 2). The Lateral 2 ½ Route would cross the tracks once in Section 28; the Lateral 2 Route would cross the tracks once in Section 21. The tracks also lie immediately east of the proposed Grayson Substation. The rail line runs north–south and is currently in use as part of the UPRR.

Within the 1.1-mile recorded segment, there is a single set of standard gauge railroad tracks with wood ties, which is set on a slightly raised bed of coarse granite and quartz ballast. The surrounding landscape

includes almond orchards, private residences and properties including livestock pens (i.e., horse and chicken), fallow fields, and a walnut packing plant at the northeast corner of East Grayson Road and the railroad.

The Tidewater Southern Railway was an interurban rail line that ran from Stockton to Turlock. A short, 400-foot segment of the Tidewater Southern Railway was recorded by Daly in 2009 as part of the initial cultural resources inventory for the current project (Arrington et al. 2009). Overall, the Tidewater Southern Railway line appears eligible for listing in the NRHP and CRHR under Criteria A/1 for being an important inter-urban railroad transportation line. However, consistent with the conclusion reached in the site record by Daly and the initial cultural resources inventory for the current project (Arrington et al. 2009:18), the 1-mile segment recorded here on April 8, 2010 does not appear eligible as it has been continually upgraded with the replacement of rails, ties, ballast bed, crossing guards and other related equipment. This segment has not retained the historical integrity of materials, workmanship, setting and feeling, and it is not eligible for listing in the NRHP or CRHR.

Photograph 2. Tidewater Southern Railway at Grayson Ave (view to northwest)

Turlock Irrigation District Water Conveyance System (CA-STA-426H, P-50-000073)

The Lateral 2 ½ Route and Lateral 2 Route cross or parallel five portions of the TID Water Conveyance System (Ceres Main Canal, Upper Lateral No. 2, Lower Lateral No. 2, and Lower Lateral No. 2 ½), detailed below. The Proposed Grayson Substation would also be situated immediately south of Lower Lateral No. 2. Additional segments of the TID Water Conveyance System (Ceres Main Canal, Upper Lateral No. 2, Upper Lateral No. 2 ½, and Lower Lateral No. 2) were recorded by Daly in 2009 as part of the initial cultural resources inventory for the current project (Arrington et al. 2009). The Ceres Main Canal runs in a north-south direction and is approximately 20 feet deep and 30 feet wide. The laterals run generally in an east-west direction and are constructed with the same materials, but are not as deep, nor as wide, as the Main Canal. Between 1917 and 1920, the original earthen canals and laterals were lined with concrete or gunite. The levees along the canal segments were even with or a maximum of approximately 12 inches higher than the surrounding landscape.

The TID is the oldest example of a publicly owned irrigation district in California, established in 1887, and was responsible for the maintenance and upkeep of the main canals and laterals. Although the TID system appears eligible for listing in the NRHP and CRHR, the individual, canal segments recorded by Daly for the initial cultural resources inventory for the current project (Arrington et al. 2009) have lost

their integrity in workmanship, setting, materials, and feeling since the canals are constantly being repaired and maintained and many of the water diversion features (e.g., gates, valves, chutes, bridges) have had their historic parts replaced, or altered, to adapt to current conditions.

Consistent with the conclusion reached in the initial cultural resources inventory for the current project (Arrington et al. 2009:20–21), segments of the Ceres Main Canal, Upper Lateral No. 2, Lower Lateral No. 2, and Lower Lateral No. 2 ½ recorded here do not appear eligible for listing. The main canal and laterals continue to be used as part of an active irrigation system. Due to continual upkeep and maintenance, the canal segments have lost integrity in materials, design, setting and workmanship, and are not eligible for listing in the NRHP or CRHR.

Ceres Main Canal

A 1.36-mile segment of the Ceres Main Canal in Sections 23, 24, and 26 was recorded on April 8, 2010 (Photograph 3). This segment begins on the east side of SR 99 and terminates to the south at the intersection with Lower Lateral No. 2 ½. The Lateral 2 ½ Route would cross SR 99 perpendicular on the south side of the Ceres Main Canal and then cross the canal west of the SPRR/UPRR in Section 23 near E. Redwood Road. The route would then parallel the west side of the canal to its junction with Lower Lateral No. 2 ½. An existing roadway, Mitchell Road, parallels the west side of the canal.

This segment of the Ceres Main Canal delivers water to orchards and agricultural properties on the east and west sides of the canal. At the intersection with Lateral No. 2 at Mitchell Road and Gondring Road, there is a drop and chute on the main canal and regulator gates leading west to Lower Lateral No. 2. Occasional water control drop gates with valves are set into the canal waterside slopes. Like the rest of the Ceres Main Canal, this segment runs in a north-south direction and is approximately 20 feet deep and 30 feet wide.

Photograph 3. Ceres Main Canal near SR 99 (view to southwest)

Upper Lateral No. 2 Canal

Two segments of Upper Lateral No. 2 were recorded during the supplemental surveys. On April 8, 2009, a 0.92-mile segment of Upper Lateral No. 2 was recorded in Section 24 (Photograph 4). This segment runs east to west, proceeding west from Faith Home Road to the canal's junction with the Ceres Main Canal east of SR 99 at Moore Road. The Lateral 2 ½ Route would parallel the north side of Upper Lateral

No. 2, and cross the canal in Section 24 before proceeding perpendicular on the south side of the Ceres Main Canal.

Upper Lateral No. 2 delivers water to agricultural properties on the north and south sides of the canal, and also feeds into the Ceres Main Canal. Two roads, Esmar Road and Moore Road, cross this section of the canal from north to south via modern concrete bridges over the canal. There are water diversion features along the canal that consist of regulator gates, valves, checks, drops, and chutes. Some of the regulator gates have steel and concrete frames with iron wheels and screws for manual adjustment. Three pedestrian bridges cross the canal in this segment, two at the regulator gates and chutes and one standing alone.

Photograph 4. Upper Lateral No. 2 Canal near Faith Home Rd (view to west)

On May 26, 2010, a 0.26-mile segment of Upper Lateral No. 2 was recorded in Section 15 (**Error! Reference source not found.**). This segment runs east to west, paralleling East Service Road between Geer Road on the east and Santa Fe Avenue on the west. The Geer Road Design Option would parallel the north side of Upper Lateral No. 2 along this segment of the canal.

Photograph 5. Upper Lateral No. 2 Canal near Geer Rd (view to west)

There is one water diversion feature along this 0.26-mile segment of the Upper Lateral No. 2 canal in Section 15. The feature consists of regulator gates, valves, checks, drops, and chutes. The regulator gates have steel and concrete frames with iron wheels and screws for manual adjustment. Two pedestrian bridges cross the canal in this segment at the regulator gates and chutes. The position of these pedestrian bridges is approximately 207 feet west of Geer Road.

Lower Lateral No. 2

A 2.6-mile segment of Lower Lateral No. 2 in Sections 21, 22, and 23 was recorded on April 8, 2010 (Photograph 6). This segment runs east-west between the Ceres Main Canal and the existing Almond Power Plant. The Lateral 2 Route for the transmission line would parallel the north side of Lower Lateral No. 2. The Proposed Grayson Substation would be situated immediately south of Lower Lateral No. 2; the existing Almond Power Plant is on the north side of Lower Lateral No. 2. Gondring Road parallels the southern side of Lower Lateral No. 2 east of Central Avenue.

Lower Lateral No. 2 delivers water to agricultural properties on the north and south sides of the canal, as well as to land further downstream. It also feeds into the Ceres Main Canal. Near Central Avenue, an approximately 0.25-mile section veers northwest along with Gondring Road, straightens out for a short segment, and then veers southwest again to straighten out to an east-west direction. Three roads cross the canal from north to south (Central Avenue, Blaker Road, and Morgan Road) via modern concrete bridges over the canal. There are water diversion features consisting of regulator gates, valves, checks, drops, and chutes. Some of the regulator gates have steel and concrete frames with iron wheels and screws for manual adjustment. Pedestrian bridges cross the canal at the regulator gates.

Photograph 6. Lower Lateral No. 2 Canal near Ceres Main (view to west)

Lower Lateral No. 2 ½

A 2.65-mile segment of the Lower Lateral No. 2 ½ canal in Sections 26, 27, and 28 was recorded on April 8, 2010 (Photograph 7). This segment runs east-west between the Ceres Main Canal and the Tidewater Southern Railway/UPRR. The Lateral 2 ½ Route would cross Lower Lateral No. 2 ½ in Section 26 at the Ceres Main Canal, parallel the south side of Lower Lateral No. 2 ½ and cross this lower lateral again in Section 28 before proceeding northward on the east side of the Tidewater Southern Railway/UPRR tracks.

Lower Lateral No. 2 ½ delivers water to agricultural properties on the north and south sides of the canal, as well as to land further downstream. It also feeds into the Ceres Main Canal. Within the recorded

segment, four roads cross the canal from north to south (Moffett Road, Central Avenue, Blaker Road, and Morgan Road) via modern concrete bridges over the canal. There are water diversion features along the canal consisting of regulator gates, valves, checks, drops, and chutes. Some of the drop gates have wood cantilevers, as well as concrete counterweights for automatic adjustment, and some gates have iron wheels and screws for adjusting manually. Pedestrian bridges cross the canal at the regulator gates.

Photograph 7. Lower Lateral No. 2 ½ Canal at Morgan Rd (view to west)

Speckens Farm (P-50-001905)

Geer Road fronts the east side the Speckens Farm property, but the single-family residence and ancillary buildings are outside the project area. The condition of the buildings within the family-owned almond farm or the surrounding landscape has not been modified since the initial recordation in 2004 by Maniery. Almond orchards still surround the buildings on the north, west and south by almond orchards. Mainery concluded that the property does not appear to qualify for listing on the CRHR. New GPS coordinates have been recorded on the site record update.

Photograph 8. Speckens Farm fronting Geer Road (view to west-northwest).

PROJECT EFFECTS ASSESSMENT

REGULATORY REQUIREMENTS

CEQA regulations state "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC Section 21084.1). "Substantial adverse change" means "demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired" (PRC Section 5020.1(q)).

A historical resource is a resource listed in, or determined to be eligible for listing in, the CRHR (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5(a)(2)), or any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant (Section 15064.5 (a)(3)).

DETERMINATION OF EFFECTS

Based on the results of this study, summarized in Table 6, all of the known cultural resources within the proposed Hughson-Grayson 115-kV Transmission Line and Substation Project investigated for this supplemental report do not qualify as historical resources. The known resources also do not qualify as historic properties listed in, or eligible for listing in, the NRHP.

Table 6. Cultural Resources within Supplemental Survey Area and Eligibility Recommendations

Trinomial	Primary Number	Resource Description	NRHP/CRHR Eligibility Recommendations
CA-STA-350H	P-50-000001	Southern Pacific Railroad	Recommended not eligible
CA-STA-425H	P-50-000083	Tidewater Southern Railway	Recommended not eligible
CA-STA-426H	P-50-000073	Turlock Irrigation District Water Conveyance System	Recommended not eligible

Since there are no cultural resources that qualify as historic properties/historical resources within the project area, Parus Consulting recommends that the proposed project will not cause a substantial adverse change in the significance of any cultural resources located within the acreage inventoried for this supplemental study.

RECOMMENDATIONS FOR UNANTICIPATED DISCOVERIES

Construction Monitoring and Notification Procedures

No previously unrecorded prehistoric cultural resources were identified during this supplemental survey of proposed project elements, although visibility was restricted by vegetation in the almond orchards, and by the roadway, railroad, and waterway infrastructure. Based on the results of the records search, sensitivity of the previously disturbed project area, and pedestrian survey within the project elements, Parus Consulting does not recommend construction monitoring.

Although the area has been disturbed by residential development, agricultural practices and construction of development infrastructure (e.g., roadways, waterways, electrical substations), cultural materials may exist beneath dense vegetation or at greater depth within this area. The potential for the existence of buried archaeological materials within the disturbed project area may be greater along the drainages and within agricultural lands. Prehistoric materials might include flaked stone tools, tool-making debris, stone

milling tools, fire-affected rock, or soil darkened by cultural activities (midden). Historic materials might include building remains, metal, glass, or ceramic artifacts or debris.

Should cultural resources be encountered during construction grading, trenching, augering, and/or excavation for the transmission lines, proposed substation, and related infrastructure, work in the area must be halted and a qualified archaeologist who meets the Secretary of the Interior's Standards for archaeologists (National Park Service 1983) should be notified immediately to evaluate the resource(s) encountered and recommend the development of mitigation measures for potentially significant resources consistent with CEQA Guidelines Section 15126.4(b).

Human Remains

Although unlikely, the discovery of human remains is always a possibility; State of California Health and Safety Code Section 7050.5 covers these findings, except on federal lands. This code section states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a Most Likely Descendent (MLD). The MLD shall complete the inspection of the site within 24 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

REFERENCES

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APPENDIX A:
Records Search Results

APPENDIX B:
DPR Forms for Resource Updates

Revision to 2009 TID EIR EMF Analysis for Hughson-Grayson 115-kV Transmission Line and Substation Project

PREPARED FOR: Parus Consulting, Inc.

PREPARED BY: CH2M HILL

DATE: June 21, 2010

Introduction

The proposed Hughson-Grayson 115-kV Transmission Line and Substation Project (the Project) would consist of a new 115 kilovolt (kV) transmission line, two 69-kV transmission line sections, the Grayson Substation, and related facilities. The 115-kV transmission line feature of the Project would be approximately 10 miles in length, and would span the distance between the cities of Hughson and Ceres in Stanislaus County, California.

In the 2009 Turlock Irrigation District (TID) Environmental Impact Report (EIR), electric and magnetic field (EMF) calculations were performed for two line designs that are components of the Project (a double circuit 115-kV transmission line with 12-kV underbuild and a double circuit 115-kV transmission line with a 69-kV and a 12-kV underbuild).

In this revision to the 2009 TID EIR, EMF calculations are performed for five additional line designs that are components of the Project:

- Double circuit 115-kV transmission line without underbuild
- Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line
- Double circuit 230-kV transmission line with double circuit 115-kV underbuild
- Double circuit 69-kV transmission line
- Single circuit 69-kV transmission line

The eastern endpoint of the 115-kV transmission line route would be located at the existing Hughson Substation near the corner of East Whitmore Avenue and Geer Road, east of the City of Hughson. The western terminus of the 115-kV line would be at the proposed Grayson Substation, which would be located south of Lateral No. 2 and north of East Grayson Road, near the existing Almond Power Plant, south of the City of Ceres. Where there are existing 230-kV transmission lines along the proposed route, poles would be larger and accommodate "co-location" of both line types on a single structure. Similarly, existing distribution lines would be underbuilt on the 115-kV towers in many locations.

In addition to the new 115-kV transmission line, the Project would also include the construction of two 69-kV transmission line sections that would both terminate at the Grayson Substation. Section One of the 69-kV transmission line would be located along Lateral No. 2 between the substation and Morgan Road, and the second 69-kV transmission line section (Section Two)

would connect the Grayson Substation to TID's existing Almond Power Plant. A new bus expansion and circuit breaker would be installed at the power plant to accommodate the transmission line.

Overview of Electric and Magnetic Fields

EMF is a term that means electric and magnetic fields. All electric utility wires and devices generate alternating EMF. The earth itself generates steady-state magnetic and electric fields. The EMF produced by the AC electrical power system in the United States has a frequency of 60 hertz (Hz), meaning that the fields change from positive to negative and back to positive, 60 times per second.

In AC power systems, voltage swings positive to negative and back to positive, a 360-degree cycle, 60 times every second. Current follows the voltage, flowing forward, reversing direction, and returning to the forward direction, again a 360-degree cycle, 60 times every second. Each AC three-phase circuit carries power over three conductors. One phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degree cycle. The fields from these conductors tend to cancel out because of the phase difference. However, when a person stands under a transmission line or over a buried circuit of underground lines, one conductor is always significantly closer and will most likely contribute a net uncanceled field at the person's location assuming the three-phase currents are equal.

Electric Fields

Electric fields around transmission lines are produced by electrical charges, measured as voltage, on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The electric field is inversely proportional to the distance a sensor is from the conductors, so that the electric field strength declines as the distance from the conductor increases. For these transmission lines, the voltage and electric field alternate at a frequency of 60 Hz. The strength of the electric field is measured in units of kilovolts per meter (kV/m). The voltage, and therefore the electric field, around a transmission line remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic Fields

Magnetic fields around transmission lines are produced by the electrical load, or the amount of current flow, through the conductors measured in terms of amperage. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. The magnetic field strength is directly proportional to the amperage; that is, increased power flow results in increased amperage which produces a stronger magnetic field. The magnetic field is inversely proportional to the sensor's distance from the conductors. Also, like the electric field, the magnetic field strength declines as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). However, unlike voltage, the amperage and therefore the magnetic field around a transmission line, fluctuate hourly and daily as the amount of current flow varies. The strength of the magnetic field depends on the current in the conductor, the geometry of the construction, the degree of cancellation from other conductors, and the distance from the conductors or cables.

Concern about Health Effects from Exposure to Electric and Magnetic Fields

Many thousands of studies have been conducted worldwide addressing the concern about exposure to EMF and possible adverse health effects in humans and animals. The results of this body of research and the question of possible health effects due to 60 Hz electric and magnetic fields have been analyzed and reviewed by numerous authors and scientific panels. Although the reviews addressed the subject of EMF bioeffects, no panel of experts has ever conclusively established a link between exposure to EMF and any adverse health effects.

Electric fields are a very common phenomenon. All household appliances and other devices that operate on electricity as well as power lines and household wiring create electric fields. Electric fields are caused by the voltage in the wire or appliance, and the electric field decreases rapidly with distance from the appliance or wire. An example is a lamp that is plugged into a wall outlet. The wire to the lamp will have an electric field around it whenever it is plugged in.

Electric fields caused by point sources (small-dimension) household appliances generally decreases more rapidly with distance than line source electric fields such as from transmission power lines. Table 1 shows typical electric fields measured one foot away from some common appliances.

TABLE 1
Typical Electric Field Values for Appliances, at a distance of 1 foot

Appliance	Typical Electric Field Strength (kV/m)
Electric Blanket	0.25*
Broiler	0.13
Stereo	0.09
Refrigerator	0.06
Iron	0.06
Hand Mixer	0.05
Coffee Pot	0.03

* 1 to 10 kV/m next to blanket wires (Enertech 1985)

Magnetic fields are also quite common in the home. Magnetic fields are caused by electrical current flowing in a wire or in an appliance. In the lamp example, if the lamp is turned on, in addition to the electric field around the cord a magnetic field will also be created around the lamp cord which is caused by the electrical current flowing in the cord.

Magnetic field levels in the home from appliances are comparable to or greater than those from transmission lines. Table 2 shows typical magnetic fields found in and around the home.

TABLE 2
Typical Magnetic Field Values for Appliances

Appliance	Magnetic Field (mG)	
	Distance of 1 foot	Maximum
Electric Range	3 to 30	100 to 1,200
Electric Oven	2 to 25	10 to 50
Garbage Disposal	10 to 20	850 to 1,250

TABLE 2
Typical Magnetic Field Values for Appliances

Appliance	Magnetic Field (mG)	
	Distance of 1 foot	Maximum
Refrigerator	0.3 to 3	4 to 15
Clothes Washer	2 to 30	10 to 400
Clothes Dryer	1 to 3	3 to 80
Coffee Maker	0.8 to 1	15 to 250
Toaster	0.6 to 8	70 to 150
Crock Pot	0.8 to 1	15 to 80
Iron	1 to 3	90 to 300
Can Opener	35 to 250	10,000 to 20,000
Mixer	6 to 100	500 to 7,000
Blender, Popper, Processor	6 to 20	250 to 1,050
Vacuum Cleaner	20 to 200	2,000 to 8,000
Portable Heater	1 to 40	100 to 1,100
Fans/blowers	0.4 to 40	20 to 300
Hair Dryer	1 to 70	60 to 20,000
Electric Shaver	1 to 100	150 to 15,000
Color TV	9 to 20	150 to 500
Fluorescent Fixture	2 to 40	140 to 2,000
Fluorescent Desk Lamp	6 to 20	400 to 3,500
Circular Saw	10 to 250	2,000 to 10,000
Electric Drill	25 to 35	4,000 to 8,000

Source: Gauger 1985

Initially concern and research about possible biological effects from 60 Hz fields focused on electric fields. Magnetic fields from transmission lines did not receive the same early emphasis as electric fields because magnetic fields associated with transmission lines are at a low level compared to levels where effects have been observed and magnetically induced currents are at levels 1,000 times less than normal levels in the body.

The laboratory and epidemiologic evidence to date has provided no consistent and conclusive evidence of a health hazard to humans from being exposed to residential electric and magnetic fields from power lines or appliances. The epidemiologic evidence from both residential and occupational studies for an association between electric and/or magnetic fields and cancer and the adverse effects on humans is inconclusive and does not demonstrate a causal link. Research is underway in the United States and elsewhere to provide better exposure, assessment, and other determinants in both residential and occupational studies.

Of note are the results of two recent literature reviews commissioned by Congress and conducted by federally sponsored agencies. The first was done by the National Institutes of

Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH). NIEHS was instructed by Congress in the 1992 Energy Policy Act to perform a literature search and prepare a report to Congress on their findings. That report titled "NIEHS Report on Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields", NIH Publication No. 99-4493 is available on the Internet http://www.niehs.nih.gov/health/topics/agents/emf/. The report concludes that "the scientific evidence suggesting that electric and magnetic field exposure pose any health risk is weak."

Congress also instructed the National Academy of Sciences (NAS) in the 1992 Energy Policy Act to conduct a similar study. They prepared a report titled "Research on Power Frequency Fields, Completed Under the Energy policy Act of 1992". A link to this report is also available at the above web site. The NAS concludes "the results of the EMF-RAPID program do not support the contention that the use of electricity poses a major unrecognized public health danger." They go on to recommend that the federal government cease funding additional research on EMF. Subsequently the federally funded research program was shut down.

Based on these two literature reviews, there is no known mechanism that links human exposure to levels of magnetic fields that will be produced by this transmission line with any disease outcome. The bulk of the scientific literature on the subject fails to conclude that exposure to such fields is a threat to human health. While there are some studies that suggest such a link, the vast majority of the body of scientific literature indicates otherwise. Both the NIEHS and NAS reports referenced above also support this conclusion of no health effects are expected from this line. Therefore it can be concluded that the proposed transmission line designs for the Project will not likely cause adverse health effects so long as no direct contact with the energized conductors occurs.

EMF Analysis Methodology

The calculation methods used for the analysis of the five additional line designs presented in this revision to the 2009 TID EIR are provided in Chapter 7 of the *Electric Power Research Institute (EPRI) AC Transmission Line Reference Book – 200 kV and Above* (EPRI, 2005, Third Edition).

The EMF calculations for the Project are performed using EMF Workstation ENVIRO Version 3.52, a Windows-based model developed by the Electric Power Research Institute (EPRI). ENVIRO is a program that accurately predicts the electric and magnetic fields produced by linear transmission lines. The results of the ENVIRO program are provided in Attachments AA-1 through AA-5 for the five additional line designs.

It is important that any discussion of EMF include the assumptions used to calculate these fields. It is also important to remember that EMF in the vicinity of the power lines varies with regard to line design, line loading, distance from the line, and other factors. The electric field depends upon line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to line loading (amperage), which varies as power generation is changed. Maximum magnetic fields are produced at the maximum (peak) conductor currents.

Detailed data for the five additional line designs were gathered from TID to perform the EMF calculations using ENVIRO. The data provided included average and maximum current flows in the phase conductors, horizontal and vertical locations of each conductor and ground wire, conductor type, and operating voltage of each conductor.

The estimated average and maximum line loading[1] and conductor type for each circuit was provided by TID as follows:

TABLE 3
Line Design Data for EMF Calculations

Circuit	Amperes per Phase (Average Load)	Amperes per Phase (Maximum Load)	Conductor Type
230-kV (Circuit 1)	193[a]	385	954AA magnolia aluminum conductor, 2-conductor-bundle with 18-inch horizontal spacing assumed
230-kV (Circuit 2)	210[a]	420	954AA magnolia aluminum conductor, 2-conductor-bundle with 18-inch horizontal spacing assumed
115-kV (Circuit 1)	120	734	954AA magnolia aluminum conductor, no bundling
115-kV (Circuit 2)	50	734	954AA magnolia aluminum conductor, no bundling
69-kV (Circuit 1)	150	572	636AA orchid aluminum conductor, no bundling
69-kV (Circuit 2)	150	572	636AA orchid aluminum conductor, no bundling
12-kV	60	60	636AA orchid aluminum conductor, no bundling

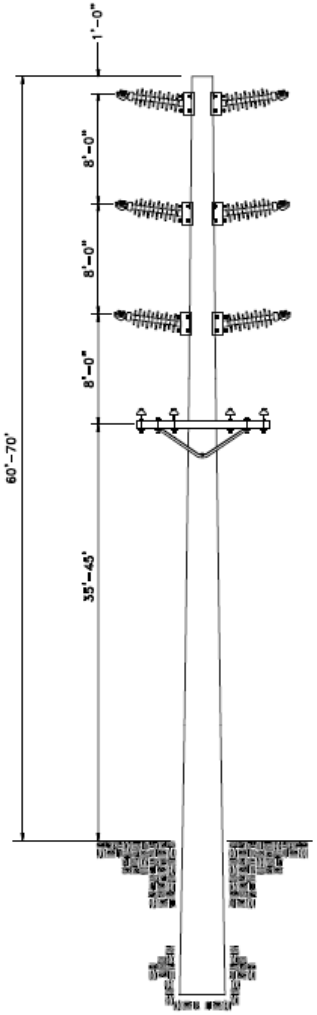
Notes

[a] Average Load was not provided for 230-kV Circuits 1 and 2, therefore the Average Load was assumed to be 50% of the Maximum Load.

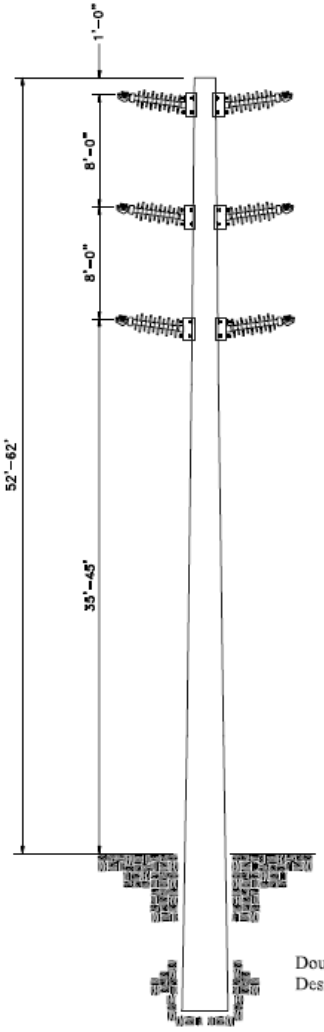
Figure 1 shows the typical transmission line structures used for the line designs provided by TID.

[1] The average load is based on the average daily current that would be expected on the transmission lines on an average day. The maximum load is an extreme worst case based on a system outage condition where one or more circuits are out of service elsewhere on the TID system, resulting in the Project transmission lines operating at the maximum load that could be accommodated for a short period of time (30 minutes to one hour). The maximum load is greater than loads experienced on a peak summer day.

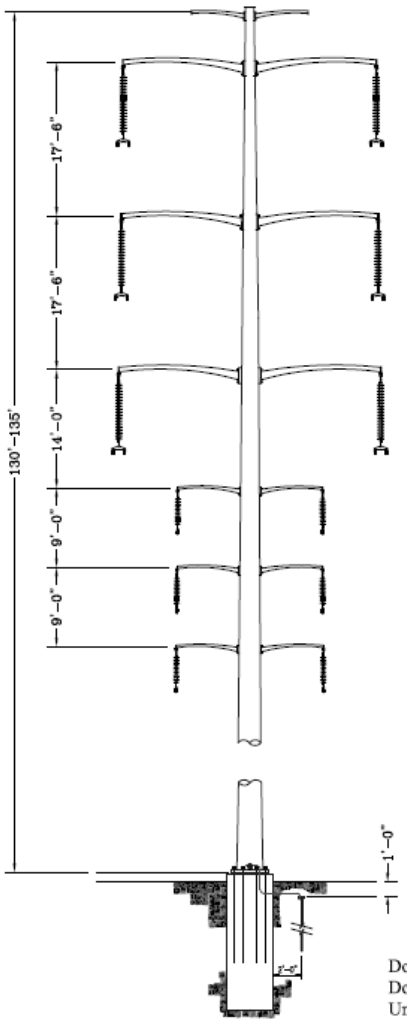
FIGURE 1
Typical Transmission Line Structures



Double-Circuit 115kV Pole
Design with Underbuild



Double-Circuit 115/69kV
Design without Underbuil



Double-Circuit 230kV with
Double-Circuit 115kV
Underbuild Pole Design

To estimate the maximum fields, calculations are performed at mid-span where the conductors have sagged to their lowest point between structures (the estimated maximum sag point). The calculations are computed at a height of 1 meter (3.3 feet) above the ground. For the line designs, the electric and magnetic fields are calculated out to distances 75 feet to the left and right of the centerline of the line designs. For the double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line, the electric and magnetic fields are calculated out to distances 75 feet to the left of the existing double circuit 230-kV transmission line and 75 feet to the right of the double circuit 115-kV transmission line with 12-kV underbuild.

The data were input into the ENVIRO program which produced results for EMF. These results were then plotted to produce the profiles presented in Figures 2 through 11 of the EMF Analysis Results section below. The accuracy of the ENVIRO program is dependent on the accuracy of the input data (i.e., if the average phase current is higher than what was modeled, so will the resulting magnetic fields). The resulting EMF plots are within a few percent of the true value for the conditions modeled.

Tables 4 and 5 summarize the electric and magnetic fields for the five line designs at 75 feet to the left and right of the centerline (or route in the case of the double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line), and the maximum. The complete results of the ENVIRO program are provided in Attachments AA-1 through AA-5 for the five additional line designs.

EMF Analysis Results

TABLE 4
Electric Field Results

Line Design	75' to Left (kV/m)	Maximum (kV/m)	75' to Right (kV/m)
Double circuit 115-kV transmission line without underbuild	0.03	0.81	0.03
Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line	0.21	0.77	0.07
Double circuit 230-kV transmission line with double circuit 115-kV underbuild	0.21	1.30	0.21
Double circuit 69-kV transmission line	0.02	0.47	0.02
Single circuit 69-kV transmission line	0.05	0.91	0.05

Notes

Since the electric field around a transmission line remains steady and is not affected by the common daily and seasonal fluctuations in usage of electricity, the electric field strength is the same for both the average and maximum loads.

TABLE 5
Magnetic Field Results

Line Design	Average Loading 75' to Left (mG)	Average Loading Maximum (mG)	Average Loading 75' to Right (mG)	Maximum Loading 75' to Left (mG)	Maximum Loading Maximum (mG)	Maximum Loading 75' to Right (mG)
Double circuit 115-kV transmission line with no underbuild	1.04	12.66	1.51	2.87	56.59	2.67
Double circuit 115-kV transmission line with 12-kV underbuild next to existing double circuit 230-kV transmission line	2.51	7.97	1.21	5.20	17.99	2.23
Double circuit 230-kV transmission line with double circuit 115-kV underbuild	2.88	18.17	2.75	8.61	98.67	6.91
Double circuit 69-kV transmission line	0.58	11.56	0.53	2.23	44.10	2.04
Single circuit 69-kV transmission line	2.59	23.17	3.00	9.89	88.34	11.44

Double Circuit 115-kV Transmission Line without Underbuild

FIGURE 2
Electric Field Results for Double Circuit 115-kV Transmission Line without Underbuild

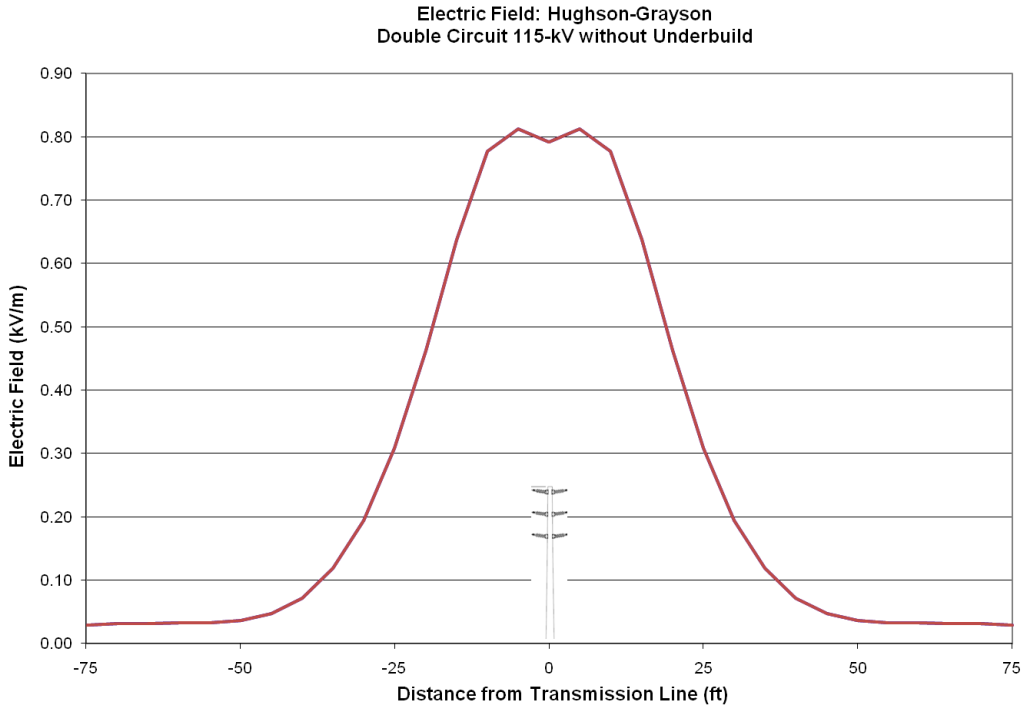
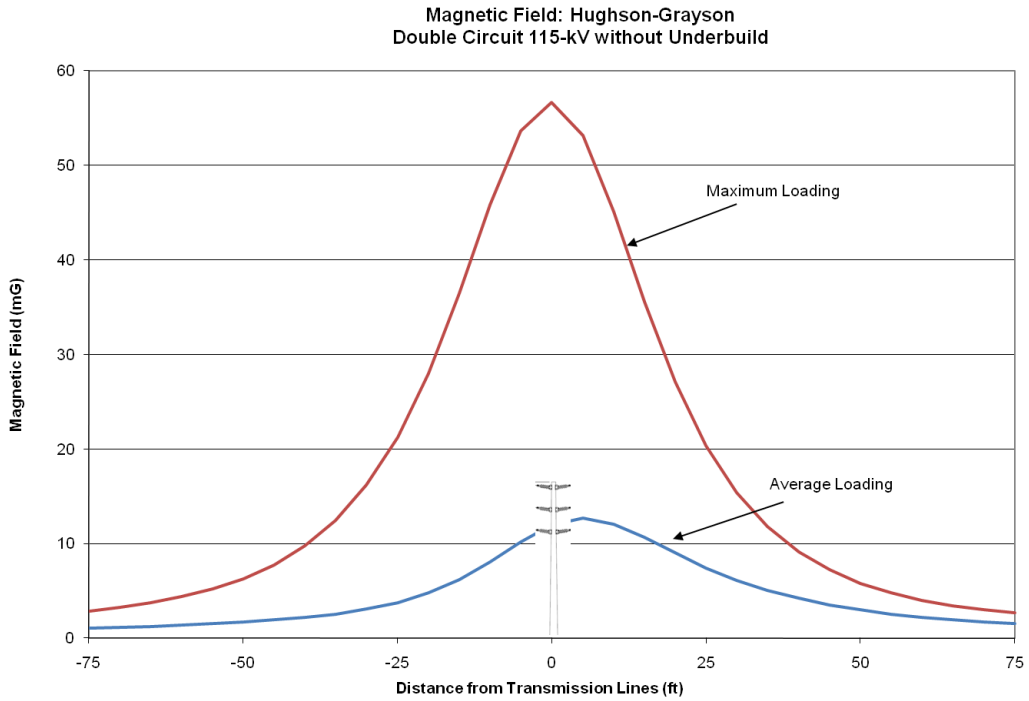


FIGURE 3
Magnetic Field Results for Double Circuit 115-kV Transmission Line without Underbuild



Double Circuit 115-kV Transmission Line with 12-kV Underbuild Next to Existing Double Circuit 230-kV Transmission Line

FIGURE 4

Electric Field Results for Double Circuit 115-kV Transmission Line with 12-kV Underbuild Next to Existing Double Circuit 230-kV Transmission Line

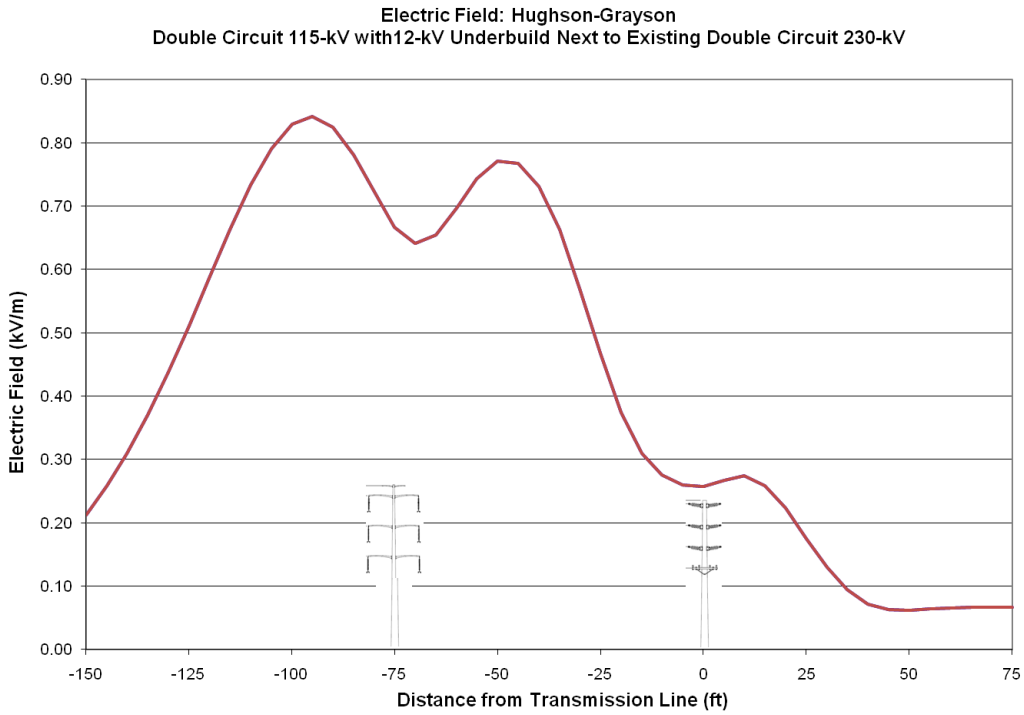
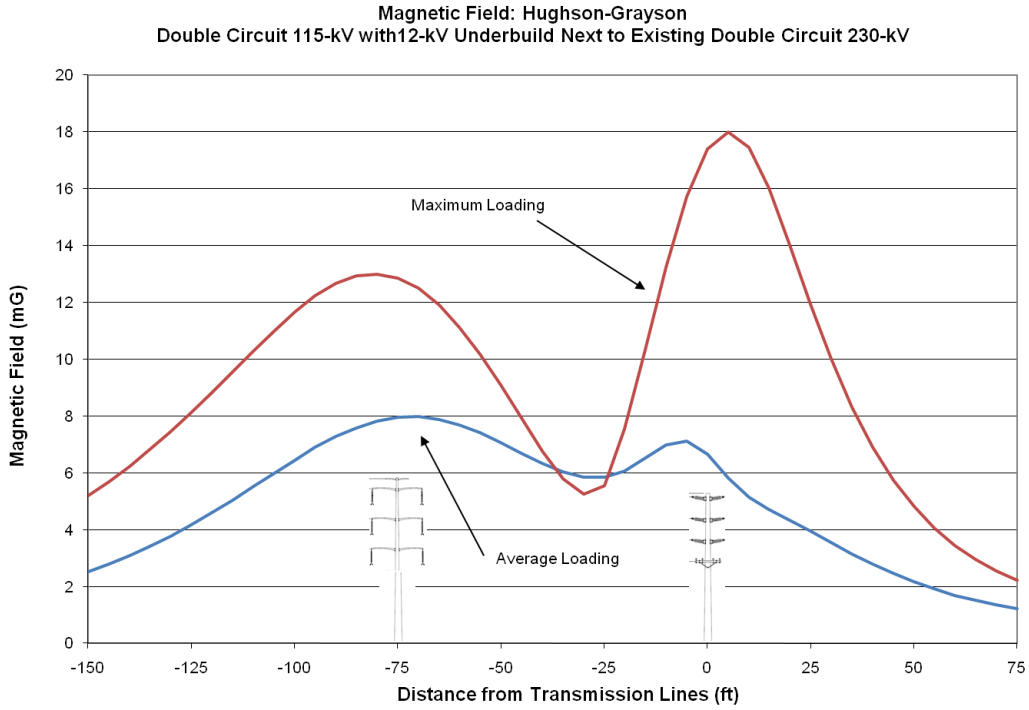


FIGURE 5

Magnetic Field Results for Double Circuit 115-kV Transmission Line with 12-kV Underbuild Next to Existing Double Circuit 230-kV Transmission Line



Double Circuit 230-kV Transmission Line with Double Circuit 115-kV Underbuild

FIGURE 6

Electric Field Results for Double Circuit 230-kV Transmission Line with Double Circuit 115-kV Underbuild

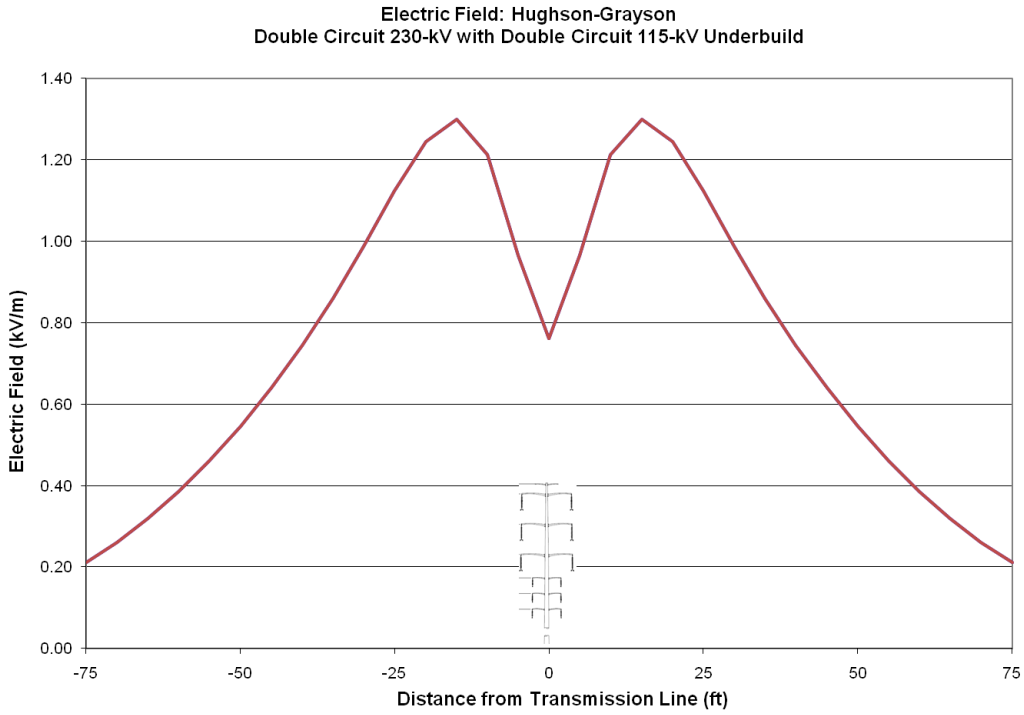
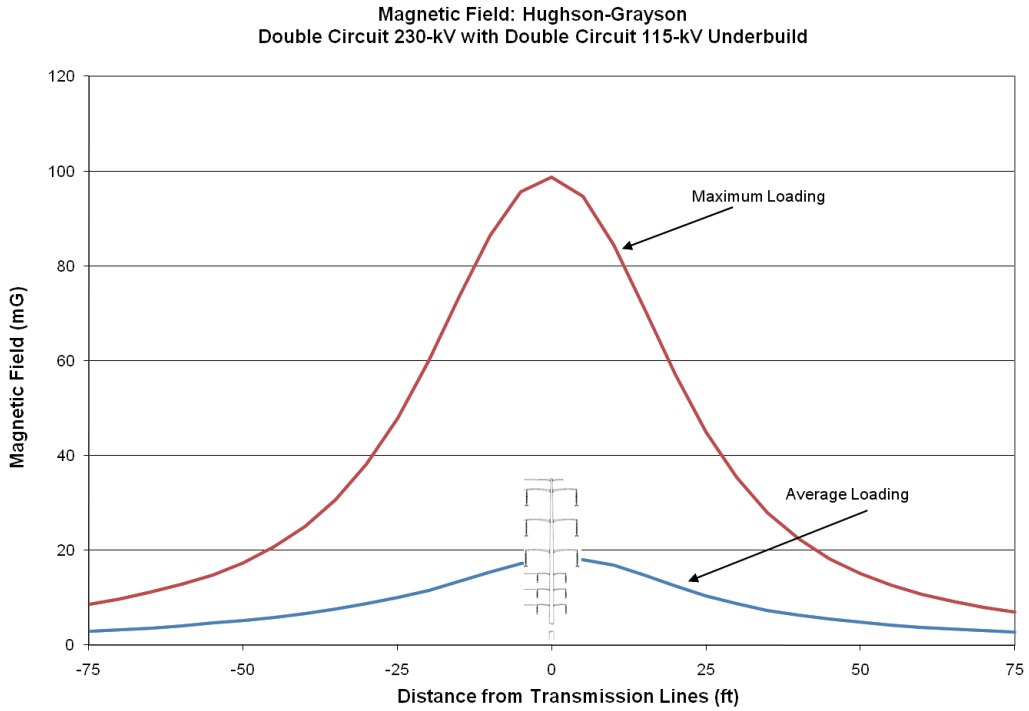


FIGURE 7

Magnetic Field Results for Double Circuit 230-kV Transmission Line with Double Circuit 115-kV Underbuild



Double Circuit 69-kV Transmission Line

FIGURE 8
Electric Field Results for Double Circuit 69-kV Transmission Line

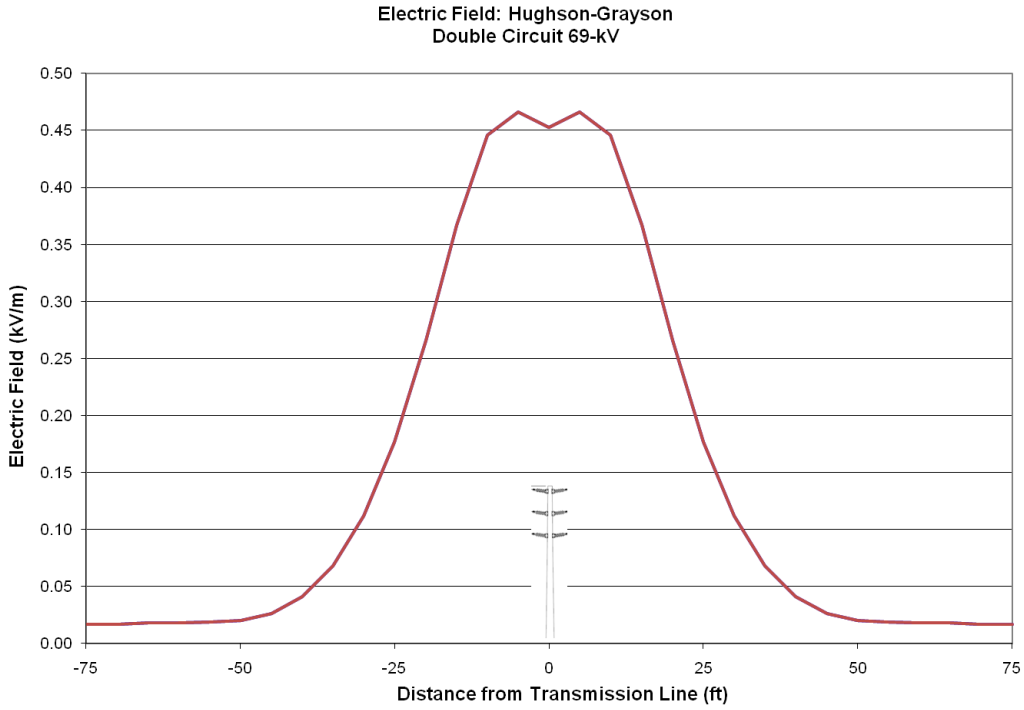
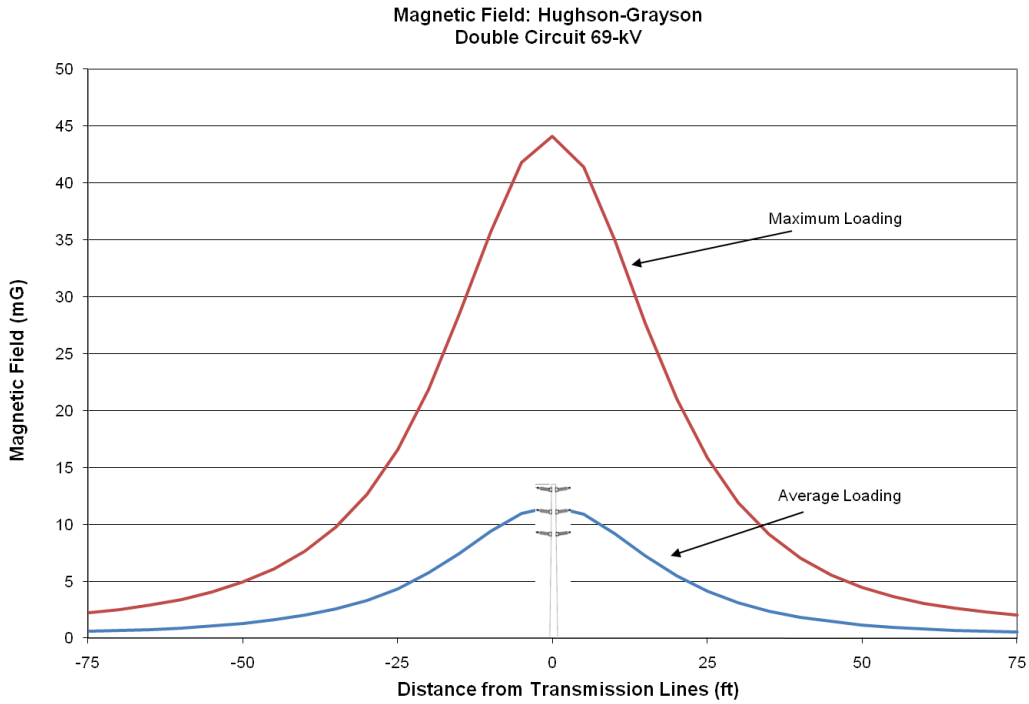


FIGURE 9
Magnetic Field Results for Double Circuit 69-kV Transmission Line



Single Circuit 69-kV Transmission Line

FIGURE 10
Electric Field Results for Single Circuit 69-kV Transmission Line

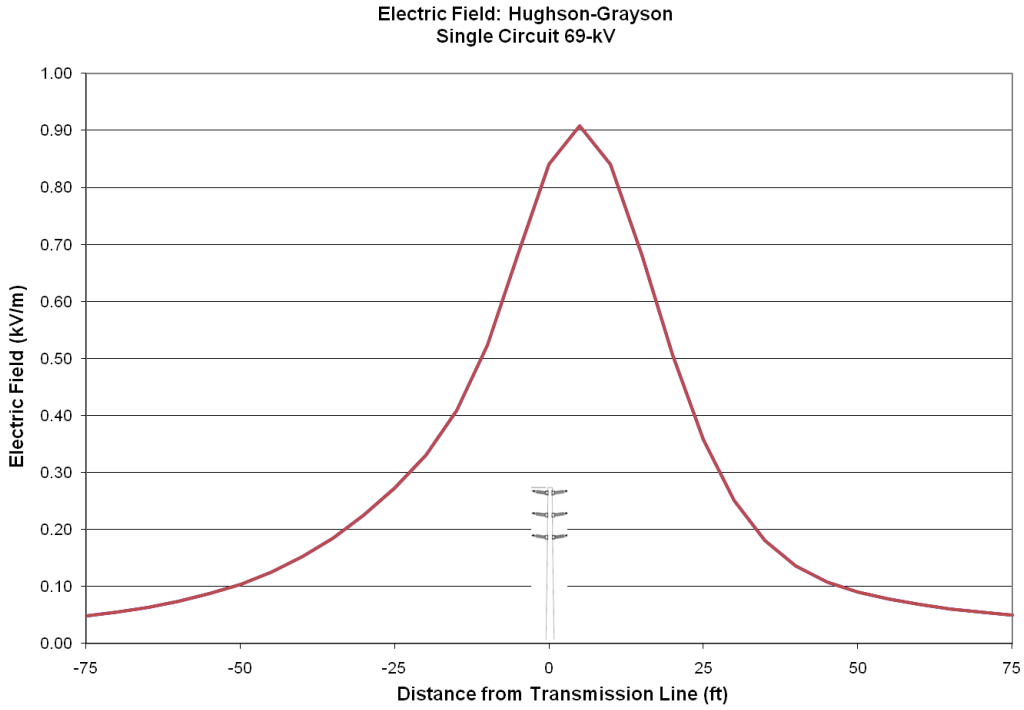
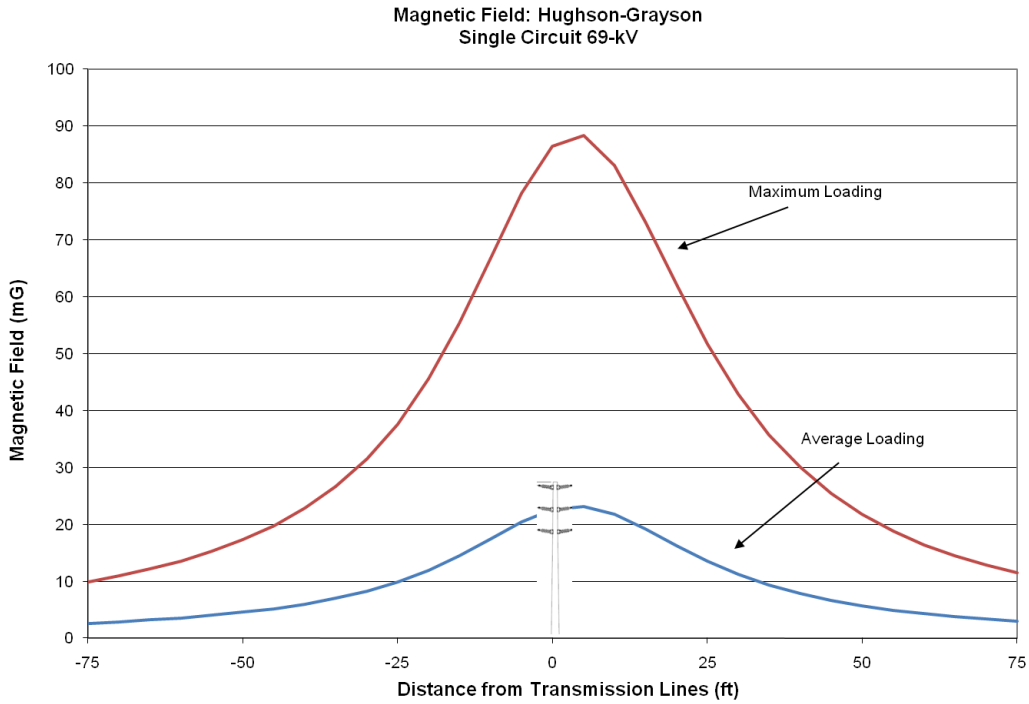


FIGURE 11
Magnetic Field Results for Single Circuit 69-kV Transmission Line



References

EPRI. 2005. *EPRI AC Transmission Line Reference Book – 200 kV and Above, Third Edition.* December. Electric Power Research Institute, Palo Alto, California.

Attachments

The following attachments to this technical memorandum provide the results of the ENVIRO program for the five additional line designs.

- Attachment AA-1 Results of the EPRI EMF Workstation ENVIRO Program for Double Circuit 115-kV Transmission Line without Underbuild
- Attachment AA-2 Results of the EPRI EMF Workstation ENVIRO Program for Double Circuit 115-kV Transmission Line with 12-kV Underbuild Next to Existing Double Circuit 230-kV Transmission Line
- Attachment AA-3 Results of the EPRI EMF Workstation ENVIRO Program for Double Circuit 230-kV Transmission Line with Double Circuit 115-kV Underbuild
- Attachment AA-4 Results of the EPRI EMF Workstation ENVIRO Program for Double Circuit 69-kV Transmission Line
- Attachment AA-5 Results of the EPRI EMF Workstation ENVIRO Program for Single Circuit 69-kV Transmission Line

ATTACHMENT AA-4

Results of the EPRI EMF Workstation: ENVIRO Program for Double Circuit 69-kV Transmission Line

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGH-GRP.I01

DATE: 6/18/2010 TIME: 14:44

Typical Loading for Hughson-Gr

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* BUNDLE INFORMATION *

****

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	69.0	.0	572.0	.0	1	-4.0	39.0	A
2	1	69.0	240.0	572.0	120.0	1	-4.0	31.0	B
3	1	69.0	120.0	572.0	240.0	1	-4.0	23.0	C
4	2	69.0	.0	572.0	.0	1	4.0	23.0	A
5	2	69.0	240.0	572.0	120.0	1	4.0	31.0	B
6	2	69.0	120.0	572.0	240.0	1	4.0	39.0	C
7	3	.0	.0	.0	.0	1	.0	40.0	GND

****

* MINIMUM GROUND CLEARANCE = 23.000 FT. *

****

****

* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *

****

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	.918	.000	.14640	.14900	.428000
2	.918	.000	.14640	.14900	.428000
3	.918	.000	.14640	.14900	.428000
4	.918	.000	.14640	.14900	.428000
5	.918	.000	.14640	.14900	.428000
6	.918	.000	.14640	.14900	.428000
7	.918	.000	.14640	.14900	.428000

****

* MAXIMUM SURFACE GRADIENT (kV/cm) *

****

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	6.67	9.43	-9.43
2	AC	6.24	8.83	-8.83
3	AC	6.63	9.37	-9.37
4	AC	6.63	9.37	-9.37
5	AC	6.24	8.83	-8.83
6	AC	6.67	9.43	-9.43
7	Ground Wire	.66	.94	-.94

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* AC ELECTRIC FIELD PROFILE *

* at 3.28 feet above ground *

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LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.017	.014	.017	.001	.017
-70.0	-21.34	.017	.028	.017	.001	.017
-65.0	-19.81	.018	.051	.018	.001	.018
-60.0	-18.29	.018	.091	.018	.002	.018
-55.0	-16.76	.019	.158	.019	.003	.019
-50.0	-15.24	.020	.235	.020	.005	.020
-45.0	-13.72	.026	.234	.026	.009	.026
-40.0	-12.19	.041	.149	.039	.014	.040
-35.0	-10.67	.068	.069	.064	.023	.066
-30.0	-9.14	.112	.016	.106	.035	.109
-25.0	-7.62	.177	.022	.170	.050	.173
-20.0	-6.10	.266	.053	.258	.064	.260
-15.0	-4.57	.367	.088	.362	.069	.357
-10.0	-3.05	.446	.145	.445	.072	.433
-5.0	-1.52	.466	.243	.466	.113	.452
.0	.00	.453	.320	.453	.145	.442
5.0	1.52	.466	.243	.466	.113	.452
10.0	3.05	.446	.145	.445	.072	.433
15.0	4.57	.367	.088	.362	.069	.357
20.0	6.10	.266	.053	.258	.064	.260
25.0	7.62	.177	.022	.170	.050	.173
30.0	9.14	.112	.016	.106	.035	.109
35.0	10.67	.068	.069	.064	.023	.066
40.0	12.19	.041	.149	.039	.014	.040
45.0	13.72	.026	.234	.026	.009	.026
50.0	15.24	.020	.235	.020	.005	.020
55.0	16.76	.019	.158	.019	.003	.019
60.0	18.29	.018	.091	.018	.002	.018
65.0	19.81	.018	.051	.018	.001	.018
70.0	21.34	.017	.028	.017	.001	.017
75.0	22.86	.017	.014	.017	.001	.017

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  AC CURRENTS IN EACH BUNDLE:
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BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	572.00	.00	572.00	-4.00	39.00
2	-286.00	495.37	572.00	-4.00	31.00
3	-286.00	-495.37	572.00	-4.00	23.00
4	572.00	.00	572.00	4.00	23.00
5	-286.00	495.37	572.00	4.00	31.00
6	-286.00	-495.37	572.00	4.00	39.00
7	-9.37	11.23	14.63	.00	40.00

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*                                      *
*                                      *
*       MAGNETIC FIELD PROFILE         *
*     at   3.28 feet  above ground     *
*                                      *
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<----------- AC MAGNETIC FIELD ------------>

HUGH-GRP

LATERAL DISTANCE (feet)	(meters)	MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	2.23	.628	2.16	1.51	2.63
-70.0	-21.34	2.53	.650	2.46	1.75	3.02
-65.0	-19.81	2.91	.667	2.84	2.05	3.50
-60.0	-18.29	3.41	.677	3.33	2.43	4.12
-55.0	-16.76	4.06	.679	3.96	2.90	4.90
-50.0	-15.24	4.92	.673	4.78	3.51	5.93
-45.0	-13.72	6.07	.660	5.84	4.34	7.27
-40.0	-12.19	7.63	.642	7.19	5.53	9.07
-35.0	-10.67	9.75	.620	8.84	7.31	11.47
-30.0	-9.14	12.65	.595	10.69	10.12	14.72
-25.0	-7.62	16.60	.566	12.37	14.52	19.07
-20.0	-6.10	21.86	.533	13.26	20.92	24.77
-15.0	-4.57	28.47	.496	14.13	28.47	31.78
-10.0	-3.05	35.75	.460	21.55	32.94	39.36
-5.0	-1.52	41.81	.433	36.17	27.72	45.57
.0	.00	44.10	.424	44.10	18.71	47.90
5.0	1.52	41.40	.438	36.28	26.94	45.19
10.0	3.05	35.05	.470	21.72	32.06	38.72
15.0	4.57	27.64	.511	14.13	27.64	31.04
20.0	6.10	21.02	.554	13.03	20.19	24.03
25.0	7.62	15.81	.595	12.02	13.93	18.40
30.0	9.14	11.93	.633	10.27	9.70	14.13
35.0	10.67	9.11	.670	8.40	7.05	10.97
40.0	12.19	7.06	.706	6.75	5.40	8.64
45.0	13.72	5.56	.739	5.41	4.31	6.92
50.0	15.24	4.47	.767	4.37	3.55	5.63
55.0	16.76	3.66	.785	3.58	2.98	4.66
60.0	18.29	3.07	.789	2.98	2.53	3.91
65.0	19.81	2.63	.777	2.53	2.17	3.33
70.0	21.34	2.30	.753	2.18	1.87	2.88
75.0	22.86	2.04	.721	1.92	1.63	2.51

```
*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer	Fair	L5 RAIN	L50 RAIN
1	AC	******		******	******
2	AC	******		******	******
3	AC	******		******	******
4	AC	******		******	******
5	AC	******		******	******
6	AC	******		******	******
7	Ground Wire	******		******	******

♀

```
*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
*****************************************
```

<---------- HVTRC CALCULATION METHOD ---------->

HUGH-GRP

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	.0	.0	.0	.0
-70.0	-21.34	.0	.0	.0	.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0
-60.0	-18.29	.0	.0	.0	.0	.0
-55.0	-16.76	.0	.0	.0	.0	.0
-50.0	-15.24	.0	.0	.0	.0	.0
-45.0	-13.72	.0	.0	.0	.0	.0
-40.0	-12.19	.0	.0	.0	.0	.0
-35.0	-10.67	.0	.0	.0	.0	.0
-30.0	-9.14	.0	.0	.0	.0	.0
-25.0	-7.62	.0	.0	.0	.0	.0
-20.0	-6.10	.0	.0	.0	.0	.0
-15.0	-4.57	.0	.0	.0	.0	.0
-10.0	-3.05	.0	.0	.0	.0	.0
-5.0	-1.52	.0	.0	.0	.0	.0
.0	.00	.0	.0	.0	.0	.0
5.0	1.52	.0	.0	.0	.0	.0
10.0	3.05	.0	.0	.0	.0	.0
15.0	4.57	.0	.0	.0	.0	.0
20.0	6.10	.0	.0	.0	.0	.0
25.0	7.62	.0	.0	.0	.0	.0
30.0	9.14	.0	.0	.0	.0	.0
35.0	10.67	.0	.0	.0	.0	.0
40.0	12.19	.0	.0	.0	.0	.0
45.0	13.72	.0	.0	.0	.0	.0
50.0	15.24	.0	.0	.0	.0	.0
55.0	16.76	.0	.0	.0	.0	.0
60.0	18.29	.0	.0	.0	.0	.0
65.0	19.81	.0	.0	.0	.0	.0
70.0	21.34	.0	.0	.0	.0	.0
75.0	22.86	.0	.0	.0	.0	.0

```
*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
```

LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ
		<------ BPA METHOD ------->				<- CRIEPI -->				
-75.0	-22.86	.0	.0	.0	.0	.0	.0	16.0	11.8	.0
-70.0	-21.34	.0	.0	.0	.0	.0	.0	16.3	12.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0	.0	16.5	12.3	.0
-60.0	-18.29	.0	.0	.0	.0	.0	.0	16.8	12.6	.0
-55.0	-16.76	.0	.0	.0	.0	.0	.0	17.2	12.9	.0
-50.0	-15.24	.0	.0	.0	.0	.0	.0	17.5	13.3	

.0										
	-45.0	-13.72	.0	.4	.0	.0	.0	.0	17.8	13.6
.0										
	-40.0	-12.19	.0	.8	.0	.0	.0	.0	18.2	14.0
.0										
	-35.0	-10.67	.0	1.3	.0	.0	.0	.0	18.6	14.4
.0										
	-30.0	-9.14	.0	1.8	.0	.0	.0	.0	19.0	14.8
.0										
	-25.0	-7.62	.0	2.3	.0	.0	.0	.0	19.5	15.2
.0										
	-20.0	-6.10	.0	2.8	.0	.0	.0	.0	19.9	15.7
.0										
	-15.0	-4.57	.0	3.3	.0	.0	.0	.0	20.3	16.1
.0										
	-10.0	-3.05	.0	3.7	.2	.0	.0	.0	20.7	16.5
.0										
	-5.0	-1.52	.0	4.0	.5	.0	.0	.0	21.0	16.8
.0										
	.0	.00	.0	4.1	.6	.0	.0	.0	21.1	16.9
.0										
	5.0	1.52	.0	4.0	.5	.0	.0	.0	21.0	16.8
.0										
	10.0	3.05	.0	3.7	.2	.0	.0	.0	20.7	16.5
.0										
	15.0	4.57	.0	3.3	.0	.0	.0	.0	20.3	16.1
.0										
	20.0	6.10	.0	2.8	.0	.0	.0	.0	19.9	15.7
.0										
	25.0	7.62	.0	2.3	.0	.0	.0	.0	19.5	15.2
.0										
	30.0	9.14	.0	1.8	.0	.0	.0	.0	19.0	14.8
.0										
	35.0	10.67	.0	1.3	.0	.0	.0	.0	18.6	14.4
.0										
	40.0	12.19	.0	.8	.0	.0	.0	.0	18.2	14.0
.0										
	45.0	13.72	.0	.4	.0	.0	.0	.0	17.8	13.6
.0										
	50.0	15.24	.0	.0	.0	.0	.0	.0	17.5	13.3
.0										
	55.0	16.76	.0	.0	.0	.0	.0	.0	17.2	12.9
.0										
	60.0	18.29	.0	.0	.0	.0	.0	.0	16.8	12.6
.0										
	65.0	19.81	.0	.0	.0	.0	.0	.0	16.5	12.3
.0										
	70.0	21.34	.0	.0	.0	.0	.0	.0	16.3	12.0
.0										
	75.0	22.86	.0	.0	.0	.0	.0	.0	16.0	11.8
.0										

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGH-GRT.I01

DATE: 6/18/2010 TIME: 14:44

Typical Loading for Hughson-Gr

BUNDLE INFORMATION

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	COORDINATES Y (FT)	PHASE
1	1	69.0	.0	150.0	.0	1	-4.0	39.0	A
2	1	69.0	240.0	150.0	120.0	1	-4.0	31.0	B
3	1	69.0	120.0	150.0	240.0	1	-4.0	23.0	C
4	2	69.0	.0	150.0	.0	1	4.0	23.0	A
5	2	69.0	240.0	150.0	120.0	1	4.0	31.0	B
6	2	69.0	120.0	150.0	240.0	1	4.0	39.0	C
7	3	.0	.0	.0	.0	1	.0	40.0	GND

MINIMUM GROUND CLEARANCE = 23.000 FT.

SUBCONDUCTOR INFORMATION - REGULAR BUNDLES

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	.918	.000	.14640	.14900	.428000
2	.918	.000	.14640	.14900	.428000
3	.918	.000	.14640	.14900	.428000
4	.918	.000	.14640	.14900	.428000
5	.918	.000	.14640	.14900	.428000
6	.918	.000	.14640	.14900	.428000
7	.918	.000	.14640	.14900	.428000

MAXIMUM SURFACE GRADIENT (kV/cm)

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	6.67	9.43	-9.43
2	AC	6.24	8.83	-8.83
3	AC	6.63	9.37	-9.37
4	AC	6.63	9.37	-9.37
5	AC	6.24	8.83	-8.83
6	AC	6.67	9.43	-9.43
7	Ground Wire	.66	.94	-.94

♀

AC ELECTRIC FIELD PROFILE
at 3.28 feet above ground

HUGH-GRT

LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.017	.014	.017	.001	.017
-70.0	-21.34	.017	.028	.017	.001	.017
-65.0	-19.81	.018	.051	.018	.001	.018
-60.0	-18.29	.018	.091	.018	.002	.018
-55.0	-16.76	.019	.158	.019	.003	.019
-50.0	-15.24	.020	.235	.020	.005	.020
-45.0	-13.72	.026	.234	.026	.009	.026
-40.0	-12.19	.041	.149	.039	.014	.040
-35.0	-10.67	.068	.069	.064	.023	.066
-30.0	-9.14	.112	.016	.106	.035	.109
-25.0	-7.62	.177	.022	.170	.050	.173
-20.0	-6.10	.266	.053	.258	.064	.260
-15.0	-4.57	.367	.088	.362	.069	.357
-10.0	-3.05	.446	.145	.445	.072	.433
-5.0	-1.52	.466	.243	.466	.113	.452
.0	.00	.453	.320	.453	.145	.442
5.0	1.52	.466	.243	.466	.113	.452
10.0	3.05	.446	.145	.445	.072	.433
15.0	4.57	.367	.088	.362	.069	.357
20.0	6.10	.266	.053	.258	.064	.260
25.0	7.62	.177	.022	.170	.050	.173
30.0	9.14	.112	.016	.106	.035	.109
35.0	10.67	.068	.069	.064	.023	.066
40.0	12.19	.041	.149	.039	.014	.040
45.0	13.72	.026	.234	.026	.009	.026
50.0	15.24	.020	.235	.020	.005	.020
55.0	16.76	.019	.158	.019	.003	.019
60.0	18.29	.018	.091	.018	.002	.018
65.0	19.81	.018	.051	.018	.001	.018
70.0	21.34	.017	.028	.017	.001	.017
75.0	22.86	.017	.014	.017	.001	.017

♀

AC CURRENTS IN EACH BUNDLE:

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	150.00	.00	150.00	-4.00	39.00
2	-75.00	129.90	150.00	-4.00	31.00
3	-75.00	-129.90	150.00	-4.00	23.00
4	150.00	.00	150.00	4.00	23.00
5	-75.00	129.90	150.00	4.00	31.00
6	-75.00	-129.90	150.00	4.00	39.00
7	-2.46	2.95	3.84	.00	40.00

♀

MAGNETIC FIELD PROFILE
at 3.28 feet above ground

<---------- AC MAGNETIC FIELD ---------->

HUGH-GRT

LATERAL DISTANCE (feet)	(meters)	MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	.58	.628	.57	.39	.69
-70.0	-21.34	.66	.650	.64	.46	.79
-65.0	-19.81	.76	.667	.74	.54	.92
-60.0	-18.29	.89	.677	.87	.64	1.08
-55.0	-16.76	1.06	.679	1.04	.76	1.29
-50.0	-15.24	1.29	.673	1.25	.92	1.55
-45.0	-13.72	1.59	.660	1.53	1.14	1.91
-40.0	-12.19	2.00	.642	1.89	1.45	2.38
-35.0	-10.67	2.56	.620	2.32	1.92	3.01
-30.0	-9.14	3.32	.595	2.80	2.65	3.86
-25.0	-7.62	4.35	.566	3.24	3.81	5.00
-20.0	-6.10	5.73	.533	3.48	5.49	6.50
-15.0	-4.57	7.47	.496	3.71	7.47	8.34
-10.0	-3.05	9.38	.460	5.65	8.64	10.32
-5.0	-1.52	10.97	.433	9.48	7.27	11.95
.0	.00	11.56	.424	11.56	4.91	12.56
5.0	1.52	10.86	.438	9.51	7.06	11.85
10.0	3.05	9.19	.470	5.69	8.41	10.15
15.0	4.57	7.25	.511	3.71	7.25	8.14
20.0	6.10	5.51	.554	3.42	5.29	6.30
25.0	7.62	4.15	.595	3.15	3.65	4.82
30.0	9.14	3.13	.633	2.69	2.54	3.70
35.0	10.67	2.39	.670	2.20	1.85	2.88
40.0	12.19	1.85	.706	1.77	1.42	2.27
45.0	13.72	1.46	.739	1.42	1.13	1.81
50.0	15.24	1.17	.767	1.15	.93	1.48
55.0	16.76	.96	.785	.94	.78	1.22
60.0	18.29	.81	.789	.78	.66	1.03
65.0	19.81	.69	.777	.66	.57	.87
70.0	21.34	.60	.753	.57	.49	.75
75.0	22.86	.53	.721	.50	.43	.66

```
*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	******	******	******
2	AC	******	******	******
3	AC	******	******	******
4	AC	******	******	******
5	AC	******	******	******
6	AC	******	******	******
7	Ground Wire	******	******	******

♀

```
*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
*****************************************
```

<---------- HVTRC CALCULATION METHOD ---------->

HUGH-GRT

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	.0	.0	.0	.0
-70.0	-21.34	.0	.0	.0	.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0
-60.0	-18.29	.0	.0	.0	.0	.0
-55.0	-16.76	.0	.0	.0	.0	.0
-50.0	-15.24	.0	.0	.0	.0	.0
-45.0	-13.72	.0	.0	.0	.0	.0
-40.0	-12.19	.0	.0	.0	.0	.0
-35.0	-10.67	.0	.0	.0	.0	.0
-30.0	-9.14	.0	.0	.0	.0	.0
-25.0	-7.62	.0	.0	.0	.0	.0
-20.0	-6.10	.0	.0	.0	.0	.0
-15.0	-4.57	.0	.0	.0	.0	.0
-10.0	-3.05	.0	.0	.0	.0	.0
-5.0	-1.52	.0	.0	.0	.0	.0
.0	.00	.0	.0	.0	.0	.0
5.0	1.52	.0	.0	.0	.0	.0
10.0	3.05	.0	.0	.0	.0	.0
15.0	4.57	.0	.0	.0	.0	.0
20.0	6.10	.0	.0	.0	.0	.0
25.0	7.62	.0	.0	.0	.0	.0
30.0	9.14	.0	.0	.0	.0	.0
35.0	10.67	.0	.0	.0	.0	.0
40.0	12.19	.0	.0	.0	.0	.0
45.0	13.72	.0	.0	.0	.0	.0
50.0	15.24	.0	.0	.0	.0	.0
55.0	16.76	.0	.0	.0	.0	.0
60.0	18.29	.0	.0	.0	.0	.0
65.0	19.81	.0	.0	.0	.0	.0
70.0	21.34	.0	.0	.0	.0	.0
75.0	22.86	.0	.0	.0	.0	.0

```
*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
```

LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ
		<------ BPA METHOD ------->				<- CRIEPI -->				
-75.0	-22.86	.0	.0	.0	.0	.0	.0	16.0	11.8	.0
-70.0	-21.34	.0	.0	.0	.0	.0	.0	16.3	12.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0	.0	16.5	12.3	.0
-60.0	-18.29	.0	.0	.0	.0	.0	.0	16.8	12.6	.0
-55.0	-16.76	.0	.0	.0	.0	.0	.0	17.2	12.9	.0
-50.0	-15.24	.0	.0	.0	.0	.0	.0	17.5	13.3	

.0										
	-45.0	-13.72	.0	.4	.0	.0	.0	.0	17.8	13.6
.0										
	-40.0	-12.19	.0	.8	.0	.0	.0	.0	18.2	14.0
.0										
	-35.0	-10.67	.0	1.3	.0	.0	.0	.0	18.6	14.4
.0										
	-30.0	-9.14	.0	1.8	.0	.0	.0	.0	19.0	14.8
.0										
	-25.0	-7.62	.0	2.3	.0	.0	.0	.0	19.5	15.2
.0										
	-20.0	-6.10	.0	2.8	.0	.0	.0	.0	19.9	15.7
.0										
	-15.0	-4.57	.0	3.3	.0	.0	.0	.0	20.3	16.1
.0										
	-10.0	-3.05	.0	3.7	.2	.0	.0	.0	20.7	16.5
.0										
	-5.0	-1.52	.0	4.0	.5	.0	.0	.0	21.0	16.8
.0										
	.0	.00	.0	4.1	.6	.0	.0	.0	21.1	16.9
.0										
	5.0	1.52	.0	4.0	.5	.0	.0	.0	21.0	16.8
.0										
	10.0	3.05	.0	3.7	.2	.0	.0	.0	20.7	16.5
.0										
	15.0	4.57	.0	3.3	.0	.0	.0	.0	20.3	16.1
.0										
	20.0	6.10	.0	2.8	.0	.0	.0	.0	19.9	15.7
.0										
	25.0	7.62	.0	2.3	.0	.0	.0	.0	19.5	15.2
.0										
	30.0	9.14	.0	1.8	.0	.0	.0	.0	19.0	14.8
.0										
	35.0	10.67	.0	1.3	.0	.0	.0	.0	18.6	14.4
.0										
	40.0	12.19	.0	.8	.0	.0	.0	.0	18.2	14.0
.0										
	45.0	13.72	.0	.4	.0	.0	.0	.0	17.8	13.6
.0										
	50.0	15.24	.0	.0	.0	.0	.0	.0	17.5	13.3
.0										
	55.0	16.76	.0	.0	.0	.0	.0	.0	17.2	12.9
.0										
	60.0	18.29	.0	.0	.0	.0	.0	.0	16.8	12.6
.0										
	65.0	19.81	.0	.0	.0	.0	.0	.0	16.5	12.3
.0										
	70.0	21.34	.0	.0	.0	.0	.0	.0	16.3	12.0
.0										
	75.0	22.86	.0	.0	.0	.0	.0	.0	16.0	11.8
.0										

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

ATTACHMENT AA-3

Results of the EPRI EMF Workstation: ENVIRO Program for Double Circuit 230-kV Transmission Line with Double Circuit 115-kV Underbuild

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGRADDP.I01

DATE: 6/18/2010 TIME: 14:31

HUGRADDP

BUNDLE INFORMATION

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	230.0	.0	420.0	.0	2	-16.0	92.0	A
2	1	230.0	240.0	420.0	120.0	2	-16.0	74.5	B
3	1	230.0	120.0	420.0	240.0	2	-16.0	57.0	C
4	2	230.0	.0	385.0	.0	2	16.0	57.0	A
5	2	230.0	240.0	385.0	120.0	2	16.0	74.5	B
6	2	230.0	120.0	385.0	240.0	2	16.0	92.0	C
7	3	.0	.0	.0	.0	1	-8.0	100.0	GND
8	4	115.0	.0	734.0	.0	1	-8.0	43.0	A
9	4	115.0	240.0	734.0	120.0	1	-8.0	34.0	B
10	4	115.0	120.0	734.0	240.0	1	-8.0	25.0	C
11	5	115.0	.0	734.0	.0	1	8.0	25.0	A
12	5	115.0	240.0	734.0	120.0	1	8.0	34.0	B
13	5	115.0	120.0	734.0	240.0	1	8.0	43.0	C
14	6	.0	.0	.0	.0	1	8.0	100.0	GND

MINIMUM GROUND CLEARANCE = 25.000 FT.

SUBCONDUCTOR INFORMATION - REGULAR BUNDLES

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	18.000	.09750	.10100	.403000
2	1.124	18.000	.09750	.10100	.403000
3	1.124	18.000	.09750	.10100	.403000
4	1.124	18.000	.09750	.10100	.403000
5	1.124	18.000	.09750	.10100	.403000
6	1.124	18.000	.09750	.10100	.403000
8	1.124	.000	.09750	.10100	.403000
9	1.124	.000	.09750	.10100	.403000
10	1.124	.000	.09750	.10100	.403000
11	1.124	.000	.09750	.10100	.403000
12	1.124	.000	.09750	.10100	.403000
13	1.124	.000	.09750	.10100	.403000
7	1.124	.000	.09750	.10100	.403000
14	1.124	.000	.09750	.10100	.403000

MAXIMUM SURFACE GRADIENT (kV/cm)

BNDL #	Type	ACrms	HUGRADDP PEAK(+)	PEAK(-)
1	AC	11.82	16.71	-16.71
2	AC	11.96	16.92	-16.92
3	AC	11.95	16.91	-16.91
4	AC	11.95	16.91	-16.91
5	AC	11.96	16.92	-16.92
6	AC	11.82	16.71	-16.71
8	AC	9.54	13.49	-13.49
9	AC	9.31	13.17	-13.17
10	AC	8.43	11.93	-11.93
11	AC	8.43	11.93	-11.93
12	AC	9.31	13.17	-13.17
13	AC	9.54	13.49	-13.49
7	Ground Wire	2.49	3.52	-3.52
14	Ground Wire	2.49	3.52	-3.52

```
**************************************
*                                    *
*     AC  ELECTRIC FIELD PROFILE     *
*    at   3.28 feet above ground     *
*                                    *
**************************************
```

LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.211	.005	.209	.030	.210
-70.0	-21.34	.261	.001	.259	.035	.260
-65.0	-19.81	.319	.002	.316	.041	.317
-60.0	-18.29	.385	.004	.382	.046	.383
-55.0	-16.76	.461	.005	.458	.053	.459
-50.0	-15.24	.545	.006	.542	.059	.544
-45.0	-13.72	.640	.008	.636	.065	.638
-40.0	-12.19	.744	.010	.741	.072	.742
-35.0	-10.67	.860	.013	.856	.080	.858
-30.0	-9.14	.987	.019	.984	.088	.984
-25.0	-7.62	1.123	.028	1.119	.091	1.117
-20.0	-6.10	1.244	.043	1.242	.080	1.231
-15.0	-4.57	1.299	.067	1.299	.088	1.275
-10.0	-3.05	1.212	.125	1.206	.196	1.175
-5.0	-1.52	.966	.279	.947	.331	.927
.0	.00	.761	.513	.761	.390	.755
5.0	1.52	.966	.279	.947	.331	.927
10.0	3.05	1.212	.125	1.206	.196	1.175
15.0	4.57	1.299	.067	1.299	.088	1.275
20.0	6.10	1.244	.043	1.242	.080	1.231
25.0	7.62	1.123	.028	1.119	.091	1.117
30.0	9.14	.987	.019	.984	.088	.984
35.0	10.67	.860	.013	.856	.080	.858
40.0	12.19	.744	.010	.741	.072	.742
45.0	13.72	.640	.008	.636	.065	.638
50.0	15.24	.545	.006	.542	.059	.544
55.0	16.76	.461	.005	.458	.053	.459
60.0	18.29	.385	.004	.382	.046	.383
65.0	19.81	.319	.002	.316	.041	.317
70.0	21.34	.261	.001	.259	.035	.260
75.0	22.86	.211	.005	.209	.030	.210

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  AC CURRENTS IN EACH BUNDLE:
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      ----- AC CURRENTS (Amperes) -----       BUNDLE POSITION
```

BNDL #	REAL	IMAGINARY	TOTAL	X-COORD	Y-COORD
1	420.00	.00	420.00	-16.00	92.00
2	-210.00	363.73	420.00	-16.00	74.50
3	-210.00	-363.73	420.00	-16.00	57.00
4	385.00	.00	385.00	16.00	57.00
5	-192.50	333.42	385.00	16.00	74.50
6	-192.50	-333.42	385.00	16.00	92.00
8	734.00	.00	734.00	-8.00	43.00
9	-367.00	635.66	734.00	-8.00	34.00
10	-367.00	-635.66	734.00	-8.00	25.00
11	734.00	.00	734.00	8.00	25.00
12	-367.00	635.66	734.00	8.00	34.00
13	-367.00	-635.66	734.00	8.00	43.00
7	-36.86	-21.59	42.72	-8.00	100.00
14	27.83	27.17	38.90	8.00	100.00

```
*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
*************************************
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LATERAL DISTANCE (feet)	(meters)	<---------- AC MAGNETIC FIELD ----------> MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	8.61	.323	8.43	3.27	9.04
-70.0	-21.34	9.76	.319	9.43	3.99	10.24
-65.0	-19.81	11.13	.316	10.56	4.96	11.67
-60.0	-18.29	12.80	.313	11.85	6.27	13.41
-55.0	-16.76	14.85	.311	13.31	8.04	15.55
-50.0	-15.24	17.43	.309	14.96	10.44	18.24
-45.0	-13.72	20.73	.309	16.76	13.77	21.69
-40.0	-12.19	25.02	.308	18.61	18.42	26.18
-35.0	-10.67	30.69	.306	20.15	24.98	32.10
-30.0	-9.14	38.17	.302	20.62	34.12	39.87
-25.0	-7.62	47.88	.292	18.87	46.18	49.88
-20.0	-6.10	59.93	.276	16.59	59.92	62.17
-15.0	-4.57	73.50	.255	28.38	70.35	75.86
-10.0	-3.05	86.46	.233	56.86	68.18	88.78
-5.0	-1.52	95.68	.217	86.12	46.56	97.90
.0	.00	98.67	.212	98.65	20.95	100.85
5.0	1.52	94.60	.221	86.48	43.68	96.88
10.0	3.05	84.50	.242	57.57	65.14	86.94
15.0	4.57	70.98	.269	29.32	67.39	73.49
20.0	6.10	57.12	.294	16.82	57.12	59.54
25.0	7.62	45.00	.316	18.03	43.61	47.19
30.0	9.14	35.33	.331	19.27	31.84	37.22
35.0	10.67	27.95	.342	18.52	23.01	29.54
40.0	12.19	22.41	.351	16.81	16.76	23.74
45.0	13.72	18.24	.358	14.88	12.40	19.38
50.0	15.24	15.08	.365	13.05	9.35	16.06
55.0	16.76	12.65	.372	11.42	7.19	13.49
60.0	18.29	10.73	.381	10.00	5.64	11.48
65.0	19.81	9.19	.390	8.77	4.52	9.87
70.0	21.34	7.94	.400	7.71	3.70	8.55
75.0	22.86	6.91	.411	6.79	3.11	7.47

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*                               *
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HUGRADDP

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*          AUDIBLE NOISE          *
*   GENERATED ACOUSTIC POWER      *
*       (dB above 1uW/m)          *
*                                 *
*********************************
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BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	-93.31	-66.70	-81.29
2	AC	-92.21	-66.02	-80.34
3	AC	-92.27	-66.06	-80.39
4	AC	-92.27	-66.06	-80.39
5	AC	-92.21	-66.02	-80.34
6	AC	-93.31	-66.70	-81.29
8	AC	******	-81.25	******
9	AC	******	-82.98	******
10	AC	******	-90.41	******
11	AC	******	-90.41	******
12	AC	******	-82.98	******
13	AC	******	-81.25	******
7	Ground Wire	******	******	******
14	Ground Wire	******	******	******

♀

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*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
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<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	14.1	40.5	26.0	24.6	32.4
-70.0	-21.34	14.3	40.7	26.2	24.8	32.6
-65.0	-19.81	14.4	40.8	26.4	24.9	32.8
-60.0	-18.29	14.6	41.0	26.5	25.1	33.0
-55.0	-16.76	14.8	41.2	26.7	25.3	33.1
-50.0	-15.24	15.0	41.4	26.9	25.5	33.3
-45.0	-13.72	15.1	41.5	27.1	25.6	33.5
-40.0	-12.19	15.3	41.7	27.2	25.8	33.6
-35.0	-10.67	15.5	41.9	27.4	25.9	33.8
-30.0	-9.14	15.6	42.0	27.5	26.1	33.9
-25.0	-7.62	15.7	42.1	27.6	26.2	34.0
-20.0	-6.10	15.8	42.2	27.7	26.3	34.1
-15.0	-4.57	15.9	42.3	27.8	26.4	34.2
-10.0	-3.05	15.9	42.4	27.9	26.4	34.3
-5.0	-1.52	16.0	42.4	27.9	26.5	34.3
.0	.00	16.0	42.4	27.9	26.5	34.3
5.0	1.52	16.0	42.4	27.9	26.5	34.3
10.0	3.05	15.9	42.4	27.9	26.4	34.3
15.0	4.57	15.9	42.3	27.8	26.4	34.2
20.0	6.10	15.8	42.2	27.7	26.3	34.1
25.0	7.62	15.7	42.1	27.6	26.2	34.0
30.0	9.14	15.6	42.0	27.5	26.1	33.9
35.0	10.67	15.5	41.9	27.4	25.9	33.8
40.0	12.19	15.3	41.7	27.2	25.8	33.6
45.0	13.72	15.1	41.5	27.1	25.6	33.5
50.0	15.24	15.0	41.4	26.9	25.5	33.3
55.0	16.76	14.8	41.2	26.7	25.3	33.1

60.0	18.29	14.6	41.0	26.5	25.1	33.0
65.0	19.81	14.4	40.8	26.4	24.9	32.8
70.0	21.34	14.3	40.7	26.2	24.8	32.6
75.0	22.86	14.1	40.5	26.0	24.6	32.4

♀

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*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
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LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	BPA METHOD L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	CRIEPI AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)
-75.0	-22.86	5.0	33.5	30.0	.0	.0	.0	41.8	39.6	.0
-70.0	-21.34	5.2	33.7	30.2	.0	.0	.0	41.9	39.8	.0
-65.0	-19.81	5.4	33.9	30.4	.0	.0	.0	42.1	40.0	.0
-60.0	-18.29	5.6	34.1	30.6	.0	.0	.0	42.2	40.1	.0
-55.0	-16.76	5.7	34.2	30.7	.0	.0	.0	42.4	40.3	.0
-50.0	-15.24	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-45.0	-13.72	6.1	34.6	31.1	.0	.0	.0	42.7	40.6	.0
-40.0	-12.19	6.3	34.8	31.3	.0	.0	.0	42.9	40.8	.0
-35.0	-10.67	6.5	35.0	31.5	.0	.0	.0	43.0	40.9	.0
-30.0	-9.14	6.6	35.1	31.6	.0	.0	.0	43.2	41.1	.0
-25.0	-7.62	6.8	35.3	31.8	.0	.0	.0	43.3	41.2	.0
-20.0	-6.10	6.9	35.4	31.9	.0	.0	.0	43.4	41.3	.0
-15.0	-4.57	7.0	35.5	32.0	.0	.0	.0	43.5	41.4	.0
-10.0	-3.05	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
-5.0	-1.52	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
.0	.00	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
5.0	1.52	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
10.0	3.05	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
15.0	4.57	7.0	35.5	32.0	.0	.0	.0	43.5	41.4	.0
20.0	6.10	6.9	35.4	31.9	.0	.0	.0	43.4	41.3	.0
25.0	7.62	6.8	35.3	31.8	.0	.0	.0	43.3	41.2	.0

30.0	9.14	6.6	35.1	31.6	.0	.0	.0	43.2	41.1	.0
35.0	10.67	6.5	35.0	31.5	.0	.0	.0	43.0	40.9	.0
40.0	12.19	6.3	34.8	31.3	.0	.0	.0	42.9	40.8	.0
45.0	13.72	6.1	34.6	31.1	.0	.0	.0	42.7	40.6	.0
50.0	15.24	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
55.0	16.76	5.7	34.2	30.7	.0	.0	.0	42.4	40.3	.0
60.0	18.29	5.6	34.1	30.6	.0	.0	.0	42.2	40.1	.0
65.0	19.81	5.4	33.9	30.4	.0	.0	.0	42.1	40.0	.0
70.0	21.34	5.2	33.7	30.2	.0	.0	.0	41.9	39.8	.0
75.0	22.86	5.0	33.5	30.0	.0	.0	.0	41.8	39.6	.0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGRADDT.I01

DATE: 6/18/2010 TIME: 14:30

HUGRADDT

BUNDLE INFORMATION

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	230.0	.0	210.0	.0	2	-16.0	92.0	A
2	1	230.0	240.0	210.0	120.0	2	-16.0	74.5	B
3	1	230.0	120.0	210.0	240.0	2	-16.0	57.0	C
4	2	230.0	.0	193.0	.0	2	16.0	57.0	A
5	2	230.0	240.0	193.0	120.0	2	16.0	74.5	B
6	2	230.0	120.0	193.0	240.0	2	16.0	92.0	C
7	3	.0	.0	.0	.0	1	-8.0	100.0	GND
8	4	115.0	.0	50.0	.0	1	-8.0	43.0	A
9	4	115.0	240.0	50.0	120.0	1	-8.0	34.0	B
10	4	115.0	120.0	50.0	240.0	1	-8.0	25.0	C
11	5	115.0	.0	120.0	.0	1	8.0	25.0	A
12	5	115.0	240.0	120.0	120.0	1	8.0	34.0	B
13	5	115.0	120.0	120.0	240.0	1	8.0	43.0	C
14	6	.0	.0	.0	.0	1	8.0	100.0	GND

MINIMUM GROUND CLEARANCE = 25.000 FT.

SUBCONDUCTOR INFORMATION - REGULAR BUNDLES

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	18.000	.09750	.10100	.403000
2	1.124	18.000	.09750	.10100	.403000
3	1.124	18.000	.09750	.10100	.403000
4	1.124	18.000	.09750	.10100	.403000
5	1.124	18.000	.09750	.10100	.403000
6	1.124	18.000	.09750	.10100	.403000
8	1.124	.000	.09750	.10100	.403000
9	1.124	.000	.09750	.10100	.403000
10	1.124	.000	.09750	.10100	.403000
11	1.124	.000	.09750	.10100	.403000
12	1.124	.000	.09750	.10100	.403000
13	1.124	.000	.09750	.10100	.403000
7	1.124	.000	.09750	.10100	.403000
14	1.124	.000	.09750	.10100	.403000

MAXIMUM SURFACE GRADIENT (kV/cm)

BNDL #	Type	ACrms	HUGRADDT PEAK(+)	HUGRADDT PEAK(-)
1	AC	11.82	16.71	-16.71
2	AC	11.96	16.92	-16.92
3	AC	11.95	16.91	-16.91
4	AC	11.95	16.91	-16.91
5	AC	11.96	16.92	-16.92
6	AC	11.82	16.71	-16.71
8	AC	9.54	13.49	-13.49
9	AC	9.31	13.17	-13.17
10	AC	8.43	11.93	-11.93
11	AC	8.43	11.93	-11.93
12	AC	9.31	13.17	-13.17
13	AC	9.54	13.49	-13.49
7	Ground Wire	2.49	3.52	-3.52
14	Ground Wire	2.49	3.52	-3.52

```
****************************************
*                                      *
*     AC  ELECTRIC FIELD PROFILE       *
*    at   3.28 feet above ground       *
*                                      *
****************************************
```

LATERAL DISTANCE (feet)	LATERAL DISTANCE (meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.211	.005	.209	.030	.210
-70.0	-21.34	.261	.001	.259	.035	.260
-65.0	-19.81	.319	.002	.316	.041	.317
-60.0	-18.29	.385	.004	.382	.046	.383
-55.0	-16.76	.461	.005	.458	.053	.459
-50.0	-15.24	.545	.006	.542	.059	.544
-45.0	-13.72	.640	.008	.636	.065	.638
-40.0	-12.19	.744	.010	.741	.072	.742
-35.0	-10.67	.860	.013	.856	.080	.858
-30.0	-9.14	.987	.019	.984	.088	.984
-25.0	-7.62	1.123	.028	1.119	.091	1.117
-20.0	-6.10	1.244	.043	1.242	.080	1.231
-15.0	-4.57	1.299	.067	1.299	.088	1.275
-10.0	-3.05	1.212	.125	1.206	.196	1.175
-5.0	-1.52	.966	.279	.947	.331	.927
.0	.00	.761	.513	.761	.390	.755
5.0	1.52	.966	.279	.947	.331	.927
10.0	3.05	1.212	.125	1.206	.196	1.175
15.0	4.57	1.299	.067	1.299	.088	1.275
20.0	6.10	1.244	.043	1.242	.080	1.231
25.0	7.62	1.123	.028	1.119	.091	1.117
30.0	9.14	.987	.019	.984	.088	.984
35.0	10.67	.860	.013	.856	.080	.858
40.0	12.19	.744	.010	.741	.072	.742
45.0	13.72	.640	.008	.636	.065	.638
50.0	15.24	.545	.006	.542	.059	.544
55.0	16.76	.461	.005	.458	.053	.459
60.0	18.29	.385	.004	.382	.046	.383
65.0	19.81	.319	.002	.316	.041	.317
70.0	21.34	.261	.001	.259	.035	.260
75.0	22.86	.211	.005	.209	.030	.210

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  AC CURRENTS IN EACH BUNDLE:
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      ----- AC CURRENTS (Amperes) -----       BUNDLE POSITION
```

BNDL #	REAL	IMAGINARY	TOTAL	X-COORD	Y-COORD
1	210.00	.00	210.00	-16.00	92.00
2	-105.00	181.87	210.00	-16.00	74.50
3	-105.00	-181.87	210.00	-16.00	57.00
4	193.00	.00	193.00	16.00	57.00
5	-96.50	167.14	193.00	16.00	74.50
6	-96.50	-167.14	193.00	16.00	92.00
8	50.00	.00	50.00	-8.00	43.00
9	-25.00	43.30	50.00	-8.00	34.00
10	-25.00	-43.30	50.00	-8.00	25.00
11	120.00	.00	120.00	8.00	25.00
12	-60.00	103.92	120.00	8.00	34.00
13	-60.00	-103.92	120.00	8.00	43.00
7	-16.98	-10.03	19.72	-8.00	100.00
14	14.40	13.64	19.84	8.00	100.00

```
*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
*************************************
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LATERAL DISTANCE (feet)	(meters)	<---------- AC MAGNETIC FIELD ----------> MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	2.88	.270	1.81	2.37	2.98
-70.0	-21.34	3.23	.262	1.83	2.80	3.34
-65.0	-19.81	3.64	.253	1.80	3.29	3.75
-60.0	-18.29	4.10	.245	1.71	3.86	4.22
-55.0	-16.76	4.63	.235	1.56	4.49	4.75
-50.0	-15.24	5.23	.226	1.37	5.18	5.36
-45.0	-13.72	5.91	.217	1.29	5.91	6.05
-40.0	-12.19	6.70	.209	1.59	6.65	6.84
-35.0	-10.67	7.61	.202	2.44	7.37	7.76
-30.0	-9.14	8.69	.197	3.79	8.00	8.86
-25.0	-7.62	9.99	.194	5.68	8.45	10.18
-20.0	-6.10	11.58	.191	8.18	8.49	11.79
-15.0	-4.57	13.44	.186	11.32	7.67	13.68
-10.0	-3.05	15.43	.177	14.71	5.40	15.67
-5.0	-1.52	17.16	.169	17.16	2.89	17.40
.0	.00	18.17	.166	17.11	6.83	18.42
5.0	1.52	18.10	.174	13.86	12.06	18.37
10.0	3.05	16.88	.191	8.62	14.87	17.18
15.0	4.57	14.84	.212	4.08	14.61	15.17
20.0	6.10	12.55	.232	3.12	12.50	12.88
25.0	7.62	10.44	.248	4.03	9.98	10.76
30.0	9.14	8.71	.261	4.52	7.79	9.01
35.0	10.67	7.36	.270	4.59	6.09	7.63
40.0	12.19	6.31	.279	4.46	4.80	6.55
45.0	13.72	5.49	.288	4.25	3.82	5.71
50.0	15.24	4.82	.297	4.00	3.05	5.03
55.0	16.76	4.27	.306	3.74	2.44	4.47
60.0	18.29	3.80	.316	3.47	1.97	3.99
65.0	19.81	3.40	.326	3.20	1.59	3.58
70.0	21.34	3.05	.335	2.94	1.30	3.22
75.0	22.86	2.75	.345	2.69	1.09	2.91

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HUGRADDT

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*          AUDIBLE NOISE          *
*   GENERATED ACOUSTIC POWER      *
*       (dB above 1uW/m)          *
*                                 *
*********************************
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BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	-93.31	-66.70	-81.29
2	AC	-92.21	-66.02	-80.34
3	AC	-92.27	-66.06	-80.39
4	AC	-92.27	-66.06	-80.39
5	AC	-92.21	-66.02	-80.34
6	AC	-93.31	-66.70	-81.29
8	AC	******	-81.25	******
9	AC	******	-82.98	******
10	AC	******	-90.41	******
11	AC	******	-90.41	******
12	AC	******	-82.98	******
13	AC	******	-81.25	******
7	Ground Wire	******	******	******
14	Ground Wire	******	******	******

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*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
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<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	14.1	40.5	26.0	24.6	32.4
-70.0	-21.34	14.3	40.7	26.2	24.8	32.6
-65.0	-19.81	14.4	40.8	26.4	24.9	32.8
-60.0	-18.29	14.6	41.0	26.5	25.1	33.0
-55.0	-16.76	14.8	41.2	26.7	25.3	33.1
-50.0	-15.24	15.0	41.4	26.9	25.5	33.3
-45.0	-13.72	15.1	41.5	27.1	25.6	33.5
-40.0	-12.19	15.3	41.7	27.2	25.8	33.6
-35.0	-10.67	15.5	41.9	27.4	25.9	33.8
-30.0	-9.14	15.6	42.0	27.5	26.1	33.9
-25.0	-7.62	15.7	42.1	27.6	26.2	34.0
-20.0	-6.10	15.8	42.2	27.7	26.3	34.1
-15.0	-4.57	15.9	42.3	27.8	26.4	34.2
-10.0	-3.05	15.9	42.4	27.9	26.4	34.3
-5.0	-1.52	16.0	42.4	27.9	26.5	34.3
.0	.00	16.0	42.4	27.9	26.5	34.3
5.0	1.52	16.0	42.4	27.9	26.5	34.3
10.0	3.05	15.9	42.4	27.9	26.4	34.3
15.0	4.57	15.9	42.3	27.8	26.4	34.2
20.0	6.10	15.8	42.2	27.7	26.3	34.1
25.0	7.62	15.7	42.1	27.6	26.2	34.0
30.0	9.14	15.6	42.0	27.5	26.1	33.9
35.0	10.67	15.5	41.9	27.4	25.9	33.8
40.0	12.19	15.3	41.7	27.2	25.8	33.6
45.0	13.72	15.1	41.5	27.1	25.6	33.5
50.0	15.24	15.0	41.4	26.9	25.5	33.3
55.0	16.76	14.8	41.2	26.7	25.3	33.1

60.0	18.29	14.6	41.0	26.5	25.1	33.0
65.0	19.81	14.4	40.8	26.4	24.9	32.8
70.0	21.34	14.3	40.7	26.2	24.8	32.6
75.0	22.86	14.1	40.5	26.0	24.6	32.4

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*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
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LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	BPA METHOD L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	CRIEPI AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 dB(A)
-75.0	-22.86	5.0	33.5	30.0	.0	.0	.0	41.8	39.6	.0
-70.0	-21.34	5.2	33.7	30.2	.0	.0	.0	41.9	39.8	.0
-65.0	-19.81	5.4	33.9	30.4	.0	.0	.0	42.1	40.0	.0
-60.0	-18.29	5.6	34.1	30.6	.0	.0	.0	42.2	40.1	.0
-55.0	-16.76	5.7	34.2	30.7	.0	.0	.0	42.4	40.3	.0
-50.0	-15.24	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-45.0	-13.72	6.1	34.6	31.1	.0	.0	.0	42.7	40.6	.0
-40.0	-12.19	6.3	34.8	31.3	.0	.0	.0	42.9	40.8	.0
-35.0	-10.67	6.5	35.0	31.5	.0	.0	.0	43.0	40.9	.0
-30.0	-9.14	6.6	35.1	31.6	.0	.0	.0	43.2	41.1	.0
-25.0	-7.62	6.8	35.3	31.8	.0	.0	.0	43.3	41.2	.0
-20.0	-6.10	6.9	35.4	31.9	.0	.0	.0	43.4	41.3	.0
-15.0	-4.57	7.0	35.5	32.0	.0	.0	.0	43.5	41.4	.0
-10.0	-3.05	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
-5.0	-1.52	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
.0	.00	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
5.0	1.52	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
10.0	3.05	7.1	35.6	32.1	.0	.0	.0	43.6	41.5	.0
15.0	4.57	7.0	35.5	32.0	.0	.0	.0	43.5	41.4	.0
20.0	6.10	6.9	35.4	31.9	.0	.0	.0	43.4	41.3	.0
25.0	7.62	6.8	35.3	31.8	.0	.0	.0	43.3	41.2	.0

30.0	9.14	6.6	35.1	31.6	.0	.0	.0	43.2	41.1
.0									
35.0	10.67	6.5	35.0	31.5	.0	.0	.0	43.0	40.9
.0									
40.0	12.19	6.3	34.8	31.3	.0	.0	.0	42.9	40.8
.0									
45.0	13.72	6.1	34.6	31.1	.0	.0	.0	42.7	40.6
.0									
50.0	15.24	5.9	34.4	30.9	.0	.0	.0	42.6	40.5
.0									
55.0	16.76	5.7	34.2	30.7	.0	.0	.0	42.4	40.3
.0									
60.0	18.29	5.6	34.1	30.6	.0	.0	.0	42.2	40.1
.0									
65.0	19.81	5.4	33.9	30.4	.0	.0	.0	42.1	40.0
.0									
70.0	21.34	5.2	33.7	30.2	.0	.0	.0	41.9	39.8
.0									
75.0	22.86	5.0	33.5	30.0	.0	.0	.0	41.8	39.6
.0									

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

ATTACHMENT AA-2

Results of the EPRI EMF Workstation: ENVIRO Program for Double Circuit 115-kV Transmission Line with 12-kV Underbuild next to Existing Double Circuit 230-kV Transmission Line

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\H-GDDDCP.I01

DATE: 6/18/2010 TIME: 14:18

H-G 115kV DC, 12 kV under, exi

****

* BUNDLE INFORMATION *

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	115.0	.0	734.0	.0	1	-4.0	47.0	A
2	1	115.0	240.0	734.0	120.0	1	-4.0	39.0	B
3	1	115.0	120.0	734.0	240.0	1	-4.0	31.0	C
4	2	115.0	.0	734.0	.0	1	4.0	31.0	A
5	2	115.0	240.0	734.0	120.0	1	4.0	39.0	B
6	2	115.0	120.0	734.0	240.0	1	4.0	47.0	C
7	3	12.0	.0	60.0	.0	1	-3.0	23.0	A
8	3	12.0	240.0	60.0	120.0	1	-1.0	23.0	B
9	3	12.0	120.0	60.0	240.0	1	3.0	23.0	C
10	4	.0	.0	.0	.0	1	1.0	23.0	GND
11	5	230.0	.0	420.0	.0	2	-86.0	92.0	A
12	5	230.0	240.0	420.0	120.0	2	-86.0	74.5	B
13	5	230.0	120.0	420.0	240.0	2	-86.0	57.0	C
14	6	230.0	.0	385.0	.0	2	-54.0	57.0	A
15	6	230.0	240.0	385.0	120.0	2	-54.0	74.5	B
16	6	230.0	120.0	385.0	240.0	2	-54.0	92.0	C
17	7	.0	.0	.0	.0	1	-78.0	100.0	GND
18	8	.0	.0	.0	.0	1	-62.0	100.0	GND

* MINIMUM GROUND CLEARANCE = 23.000 FT. *

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* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	.000	.09750	.10100	.403000
2	1.124	.000	.09750	.10100	.403000
3	1.124	.000	.09750	.10100	.403000
4	1.124	.000	.09750	.10100	.403000
5	1.124	.000	.09750	.10100	.403000
6	1.124	.000	.09750	.10100	.403000
7	.918	.000	.14640	.14900	.428000
8	.918	.000	.14640	.14900	.428000
9	.918	.000	.14640	.14900	.428000
11	1.124	18.000	.09750	.10100	.403000
12	1.124	18.000	.09750	.10100	.403000
13	1.124	18.000	.09750	.10100	.403000
14	1.124	18.000	.09750	.10100	.403000
15	1.124	18.000	.09750	.10100	.403000
16	1.124	18.000	.09750	.10100	.403000
10	.918	.000	.14640	.14900	.428000
17	1.124	.000	.09750	.10100	.403000
18	1.124	.000	.09750	.10100	.403000

```
**************************************
*                                    *
* MAXIMUM SURFACE GRADIENT (kV/cm)   *
*                                    *
**************************************
```

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	9.19	12.99	-12.99
2	AC	8.91	12.60	-12.60
3	AC	9.58	13.54	-13.54
4	AC	9.45	13.37	-13.37
5	AC	8.89	12.57	-12.57
6	AC	9.35	13.22	-13.22
7	AC	1.46	2.07	-2.07
8	AC	1.82	2.58	-2.58
9	AC	1.53	2.16	-2.16
11	AC	11.82	16.72	-16.72
12	AC	12.00	16.96	-16.96
13	AC	11.59	16.40	-16.40
14	AC	11.60	16.40	-16.40
15	AC	12.01	16.99	-16.99
16	AC	11.81	16.70	-16.70
10	Ground Wire	.28	.39	-.39
17	Ground Wire	2.49	3.53	-3.53
18	Ground Wire	2.51	3.55	-3.55

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****************************************
*                                      *
*     AC  ELECTRIC FIELD PROFILE       *
*    at   3.28 feet above ground       *
*                                      *
****************************************
```

LATERAL DISTANCE (feet)	LATERAL DISTANCE (meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-150.0	-45.72	.212	.013	.211	.027	.212
-145.0	-44.20	.258	.007	.256	.032	.257
-140.0	-42.67	.310	.002	.308	.037	.309
-135.0	-41.15	.370	.003	.368	.042	.369
-130.0	-39.62	.438	.007	.435	.046	.436
-125.0	-38.10	.511	.010	.508	.049	.508
-120.0	-36.58	.587	.014	.585	.051	.585
-115.0	-35.05	.663	.018	.661	.050	.660
-110.0	-33.53	.733	.023	.732	.046	.730
-105.0	-32.00	.791	.029	.790	.039	.787
-100.0	-30.48	.829	.038	.829	.036	.824
-95.0	-28.96	.841	.050	.841	.042	.836
-90.0	-27.43	.824	.068	.824	.060	.819
-85.0	-25.91	.781	.095	.780	.082	.775
-80.0	-24.38	.722	.130	.721	.102	.717
-75.0	-22.86	.667	.168	.667	.115	.664
-70.0	-21.34	.641	.186	.641	.119	.639
-65.0	-19.81	.655	.170	.655	.113	.652
-60.0	-18.29	.697	.131	.697	.097	.693
-55.0	-16.76	.743	.093	.743	.074	.738
-50.0	-15.24	.771	.063	.771	.050	.765
-45.0	-13.72	.768	.040	.768	.033	.762
-40.0	-12.19	.731	.019	.730	.038	.725
-35.0	-10.67	.663	.002	.660	.054	.657
-30.0	-9.14	.570	.032	.567	.068	.565
-25.0	-7.62	.468	.073	.463	.074	.464

-20.0	-6.10	.374	.120	.371	.069	.373
-15.0	-4.57	.309	.130	.308	.050	.310
-10.0	-3.05	.276	.062	.276	.022	.278
-5.0	-1.52	.260	.039	.260	.012	.261
.0	.00	.257	.105	.257	.027	.257
5.0	1.52	.267	.111	.267	.030	.265
10.0	3.05	.274	.084	.274	.023	.270
15.0	4.57	.259	.049	.259	.022	.255
20.0	6.10	.223	.014	.221	.029	.219
25.0	7.62	.175	.027	.173	.032	.173
30.0	9.14	.130	.082	.127	.029	.128
35.0	10.67	.094	.153	.092	.024	.093
40.0	12.19	.072	.214	.071	.018	.072
45.0	13.72	.063	.205	.063	.013	.063
50.0	15.24	.062	.146	.062	.009	.062
55.0	16.76	.064	.093	.064	.006	.064
60.0	18.29	.066	.059	.066	.004	.066
65.0	19.81	.067	.037	.067	.003	.067
70.0	21.34	.067	.024	.067	.002	.067
75.0	22.86	.067	.016	.067	.001	.067

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AC CURRENTS IN EACH BUNDLE:

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	734.00	.00	734.00	-4.00	47.00
2	-367.00	635.66	734.00	-4.00	39.00
3	-367.00	-635.66	734.00	-4.00	31.00
4	734.00	.00	734.00	4.00	31.00
5	-367.00	635.66	734.00	4.00	39.00
6	-367.00	-635.66	734.00	4.00	47.00
7	60.00	.00	60.00	-3.00	23.00
8	-30.00	51.96	60.00	-1.00	23.00
9	-30.00	-51.96	60.00	3.00	23.00
11	420.00	.00	420.00	-86.00	92.00
12	-210.00	363.73	420.00	-86.00	74.50
13	-210.00	-363.73	420.00	-86.00	57.00
14	385.00	.00	385.00	-54.00	57.00
15	-192.50	333.42	385.00	-54.00	74.50
16	-192.50	-333.42	385.00	-54.00	92.00
10	-10.25	5.18	11.49	1.00	23.00
17	-33.49	-22.79	40.51	-78.00	100.00
18	28.37	23.79	37.03	-62.00	100.00

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*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
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LATERAL DISTANCE (feet)	(meters)	MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	<---------- AC MAGNETIC FIELD ----------> VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-150.0	-45.72	5.20	.237	4.51	2.88	5.35
-145.0	-44.20	5.69	.231	4.68	3.48	5.84
-140.0	-42.67	6.22	.224	4.79	4.20	6.38

-135.0	-41.15	6.81	.216	4.80	5.04	6.96
-130.0	-39.62	7.44	.208	4.67	5.99	7.60
-125.0	-38.10	8.11	.199	4.35	7.03	8.27
-120.0	-36.58	8.82	.190	3.80	8.13	8.98
-115.0	-35.05	9.55	.180	3.01	9.23	9.71
-110.0	-33.53	10.29	.171	2.11	10.22	10.44
-105.0	-32.00	11.00	.160	1.84	10.99	11.14
-100.0	-30.48	11.66	.151	3.07	11.38	11.79
-95.0	-28.96	12.22	.141	5.07	11.26	12.35
-90.0	-27.43	12.66	.133	7.28	10.49	12.77
-85.0	-25.91	12.93	.126	9.38	9.05	13.03
-80.0	-24.38	13.00	.121	11.09	6.97	13.09
-75.0	-22.86	12.86	.119	12.16	4.45	12.95
-70.0	-21.34	12.49	.120	12.42	1.98	12.58
-65.0	-19.81	11.91	.124	11.81	2.14	12.00
-60.0	-18.29	11.13	.132	10.36	4.32	11.22
-55.0	-16.76	10.17	.145	8.23	6.16	10.28
-50.0	-15.24	9.08	.164	5.68	7.25	9.21
-45.0	-13.72	7.92	.197	3.09	7.46	8.07
-40.0	-12.19	6.77	.259	1.75	6.77	6.99
-35.0	-10.67	5.80	.382	3.17	5.34	6.21
-30.0	-9.14	5.25	.602	4.72	3.92	6.13
-25.0	-7.62	5.56	.807	5.43	4.65	7.15
-20.0	-6.10	7.56	.699	5.42	7.46	9.22
-15.0	-4.57	10.34	.586	6.60	10.00	11.99
-10.0	-3.05	13.23	.522	10.58	10.53	14.93
-5.0	-1.52	15.72	.490	15.08	8.89	17.51
.0	.00	17.39	.481	17.31	8.52	19.29
5.0	1.52	17.99	.488	16.12	11.87	20.02
10.0	3.05	17.46	.505	12.55	15.01	19.56
15.0	4.57	16.01	.527	9.15	15.60	18.09
20.0	6.10	14.03	.551	7.77	14.01	16.02
25.0	7.62	11.94	.577	7.62	11.49	13.79
30.0	9.14	10.00	.603	7.44	9.00	11.68
35.0	10.67	8.32	.629	6.91	6.98	9.82
40.0	12.19	6.91	.656	6.18	5.48	8.26
45.0	13.72	5.75	.683	5.39	4.42	6.97
50.0	15.24	4.82	.711	4.64	3.66	5.91
55.0	16.76	4.06	.739	3.97	3.12	5.05
60.0	18.29	3.45	.767	3.40	2.71	4.35
65.0	19.81	2.95	.795	2.92	2.38	3.77
70.0	21.34	2.55	.820	2.53	2.12	3.30
75.0	22.86	2.23	.840	2.21	1.90	2.91

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*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
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BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	******	-83.95	******
2	AC	******	-86.17	******
3	AC	******	-81.00	******
4	AC	******	-81.91	******
5	AC	******	-86.35	******
6	AC	******	-82.70	******
7	AC	******	******	******
8	AC	******	******	******
9	AC	******	******	******
11	AC	-93.26	-66.67	-81.25
12	AC	-91.96	-65.87	-80.12

13	AC	-95.06	-67.79	-82.82
14	AC	-95.06	-67.79	-82.82
15	AC	-91.84	-65.79	-80.02
16	AC	-93.39	-66.75	-81.37
10	Ground Wire	******	******	******
17	Ground Wire	******	******	******
18	Ground Wire	******	******	******

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*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
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<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-150.0	-45.72	13.1	39.7	25.1	23.7	31.6
-145.0	-44.20	13.3	39.9	25.3	23.9	31.7
-140.0	-42.67	13.5	40.1	25.5	24.1	31.9
-135.0	-41.15	13.6	40.2	25.6	24.2	32.1
-130.0	-39.62	13.8	40.4	25.8	24.4	32.3
-125.0	-38.10	14.0	40.6	26.0	24.6	32.4
-120.0	-36.58	14.1	40.8	26.1	24.7	32.6
-115.0	-35.05	14.3	40.9	26.3	24.9	32.8
-110.0	-33.53	14.4	41.1	26.4	25.1	32.9
-105.0	-32.00	14.6	41.2	26.6	25.2	33.0
-100.0	-30.48	14.7	41.3	26.7	25.3	33.2
-95.0	-28.96	14.8	41.5	26.8	25.4	33.3
-90.0	-27.43	14.9	41.5	26.9	25.5	33.4
-85.0	-25.91	15.0	41.6	27.0	25.6	33.4
-80.0	-24.38	15.0	41.7	27.0	25.6	33.5
-75.0	-22.86	15.1	41.7	27.1	25.7	33.5
-70.0	-21.34	15.1	41.7	27.1	25.7	33.5
-65.0	-19.81	15.1	41.7	27.1	25.7	33.5
-60.0	-18.29	15.0	41.7	27.0	25.6	33.5
-55.0	-16.76	15.0	41.7	27.0	25.6	33.4
-50.0	-15.24	14.9	41.6	26.9	25.5	33.4
-45.0	-13.72	14.8	41.5	26.8	25.4	33.3
-40.0	-12.19	14.7	41.4	26.7	25.3	33.2
-35.0	-10.67	14.6	41.3	26.6	25.2	33.0
-30.0	-9.14	14.5	41.2	26.5	25.1	32.9
-25.0	-7.62	14.3	41.1	26.3	24.9	32.8
-20.0	-6.10	14.2	40.9	26.2	24.7	32.6
-15.0	-4.57	14.0	40.8	26.0	24.6	32.4
-10.0	-3.05	13.8	40.6	25.9	24.4	32.3
-5.0	-1.52	13.7	40.5	25.7	24.2	32.1
.0	.00	13.5	40.3	25.5	24.1	31.9
5.0	1.52	13.3	40.2	25.4	23.9	31.7
10.0	3.05	13.1	40.0	25.2	23.7	31.6
15.0	4.57	13.0	39.8	25.0	23.5	31.4
20.0	6.10	12.8	39.6	24.8	23.4	31.2
25.0	7.62	12.6	39.4	24.6	23.2	31.0
30.0	9.14	12.4	39.2	24.5	23.0	30.9
35.0	10.67	12.3	39.1	24.3	22.8	30.7
40.0	12.19	12.1	38.9	24.1	22.7	30.5
45.0	13.72	11.9	38.7	24.0	22.5	30.4
50.0	15.24	11.8	38.5	23.8	22.3	30.2
55.0	16.76	11.6	38.4	23.6	22.2	30.0
60.0	18.29	11.4	38.2	23.5	22.0	29.9

65.0	19.81	11.3	38.0	23.3	21.9	29.7
70.0	21.34	11.1	37.9	23.2	21.7	29.6
75.0	22.86	11.0	37.7	23.0	21.6	29.4

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*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
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LATERAL DISTANCE (feet)	(meters)	<------ BPA METHOD -------> FAIR WEATHER dB(A)	L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	<- CRIEPI --> AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)
-150.0	-45.72	4.2	32.7	29.2	.0	.0	.0	41.2	39.0	.0
-145.0	-44.20	4.4	32.9	29.4	.0	.0	.0	41.3	39.2	.0
-140.0	-42.67	4.6	33.1	29.6	.0	.0	.0	41.5	39.3	.0
-135.0	-41.15	4.8	33.3	29.8	.0	.0	.0	41.6	39.5	.0
-130.0	-39.62	4.9	33.4	29.9	.0	.0	.0	41.8	39.6	.0
-125.0	-38.10	5.1	33.6	30.1	.0	.0	.0	41.9	39.8	.0
-120.0	-36.58	5.3	33.8	30.3	.0	.0	.0	42.1	39.9	.0
-115.0	-35.05	5.4	33.9	30.4	.0	.0	.0	42.2	40.1	.0
-110.0	-33.53	5.6	34.1	30.6	.0	.0	.0	42.4	40.2	.0
-105.0	-32.00	5.7	34.2	30.7	.0	.0	.0	42.5	40.3	.0
-100.0	-30.48	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-95.0	-28.96	6.0	34.5	31.0	.0	.0	.0	42.7	40.6	.0
-90.0	-27.43	6.1	34.6	31.1	.0	.0	.0	42.8	40.7	.0
-85.0	-25.91	6.2	34.7	31.2	.0	.0	.0	42.9	40.7	.0
-80.0	-24.38	6.2	34.7	31.2	.0	.0	.0	43.0	40.8	.0
-75.0	-22.86	6.3	34.8	31.3	.0	.0	.0	43.0	40.8	.0
-70.0	-21.34	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-65.0	-19.81	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-60.0	-18.29	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-55.0	-16.76	6.3	34.8	31.3	.0	.0	.0	43.0	40.8	.0
-50.0	-15.24	6.2	34.7	31.2	.0	.0	.0	42.9	40.8	.0
-45.0	-13.72	6.1	34.6	31.1	.0	.0	.0	42.9	40.7	

-40.0	-12.19	6.1	34.6	31.1	.0	.0	.0	42.8	40.7	.0
-35.0	-10.67	6.0	34.5	31.0	.0	.0	.0	42.7	40.6	.0
-30.0	-9.14	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-25.0	-7.62	5.8	34.3	30.8	.0	.0	.0	42.5	40.4	.0
-20.0	-6.10	5.7	34.2	30.7	.0	.0	.0	42.4	40.4	.0
-15.0	-4.57	5.6	34.1	30.6	.0	.0	.0	42.3	40.3	.0
-10.0	-3.05	5.5	34.0	30.5	.0	.0	.0	42.2	40.2	.0
-5.0	-1.52	5.3	33.8	30.3	.0	.0	.0	42.1	40.1	.0
.0	.00	5.2	33.7	30.2	.0	.0	.0	42.0	40.0	.0
5.0	1.52	5.0	33.5	30.0	.0	.0	.0	41.8	39.8	.0
10.0	3.05	4.9	33.4	29.9	.0	.0	.0	41.7	39.7	.0
15.0	4.57	4.7	33.2	29.7	.0	.0	.0	41.5	39.5	.0
20.0	6.10	4.5	33.0	29.5	.0	.0	.0	41.3	39.3	.0
25.0	7.62	4.3	32.8	29.3	.0	.0	.0	41.1	39.1	.0
30.0	9.14	4.1	32.6	29.1	.0	.0	.0	41.0	39.0	.0
35.0	10.67	3.9	32.4	28.9	.0	.0	.0	40.8	38.8	.0
40.0	12.19	3.7	32.2	28.7	.0	.0	.0	40.6	38.6	.0
45.0	13.72	3.5	32.0	28.5	.0	.0	.0	40.5	38.4	.0
50.0	15.24	3.3	31.8	28.3	.0	.0	.0	40.3	38.3	.0
55.0	16.76	3.1	31.6	28.1	.0	.0	.0	40.2	38.1	.0
60.0	18.29	3.0	31.5	28.0	.0	.0	.0	40.0	38.0	.0
65.0	19.81	2.8	31.3	27.8	.0	.0	.0	39.9	37.8	.0
70.0	21.34	2.6	31.1	27.6	.0	.0	.0	39.7	37.7	.0
75.0	22.86	2.5	31.0	27.5	.0	.0	.0	39.6	37.5	.0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\H-GDDDCT.I01

DATE: 6/18/2010 TIME: 14:16

H-G 115kV DC, 12 kV under, exi

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* BUNDLE INFORMATION *

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	115.0	.0	50.0	.0	1	-4.0	47.0	A
2	1	115.0	240.0	50.0	120.0	1	-4.0	39.0	B
3	1	115.0	120.0	50.0	240.0	1	-4.0	31.0	C
4	2	115.0	.0	120.0	.0	1	4.0	31.0	A
5	2	115.0	240.0	120.0	120.0	1	4.0	39.0	B
6	2	115.0	120.0	120.0	240.0	1	4.0	47.0	C
7	3	12.0	.0	60.0	.0	1	-3.0	23.0	A
8	3	12.0	240.0	60.0	120.0	1	-1.0	23.0	B
9	3	12.0	120.0	60.0	240.0	1	3.0	23.0	C
10	4	.0	.0	.0	.0	1	1.0	23.0	GND
11	5	230.0	.0	210.0	.0	2	-86.0	92.0	A
12	5	230.0	240.0	210.0	120.0	2	-86.0	74.5	B
13	5	230.0	120.0	210.0	240.0	2	-86.0	57.0	C
14	6	230.0	.0	193.0	.0	2	-54.0	57.0	A
15	6	230.0	240.0	193.0	120.0	2	-54.0	74.5	B
16	6	230.0	120.0	193.0	240.0	2	-54.0	92.0	C
17	7	.0	.0	.0	.0	1	-78.0	100.0	GND
18	8	.0	.0	.0	.0	1	-62.0	100.0	GND

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* MINIMUM GROUND CLEARANCE = 23.000 FT. *

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* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	.000	.09750	.10100	.403000
2	1.124	.000	.09750	.10100	.403000
3	1.124	.000	.09750	.10100	.403000
4	1.124	.000	.09750	.10100	.403000
5	1.124	.000	.09750	.10100	.403000
6	1.124	.000	.09750	.10100	.403000
7	.918	.000	.14640	.14900	.428000
8	.918	.000	.14640	.14900	.428000
9	.918	.000	.14640	.14900	.428000
11	1.124	18.000	.09750	.10100	.403000
12	1.124	18.000	.09750	.10100	.403000
13	1.124	18.000	.09750	.10100	.403000
14	1.124	18.000	.09750	.10100	.403000
15	1.124	18.000	.09750	.10100	.403000
16	1.124	18.000	.09750	.10100	.403000
10	.918	.000	.14640	.14900	.428000
17	1.124	.000	.09750	.10100	.403000
18	1.124	.000	.09750	.10100	.403000

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*************************************
*                                   *
* MAXIMUM SURFACE GRADIENT (kV/cm)  *
*                                   *
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BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	9.19	12.99	-12.99
2	AC	8.91	12.60	-12.60
3	AC	9.58	13.54	-13.54
4	AC	9.45	13.37	-13.37
5	AC	8.89	12.57	-12.57
6	AC	9.35	13.22	-13.22
7	AC	1.46	2.07	-2.07
8	AC	1.82	2.58	-2.58
9	AC	1.53	2.16	-2.16
11	AC	11.82	16.72	-16.72
12	AC	12.00	16.96	-16.96
13	AC	11.59	16.40	-16.40
14	AC	11.60	16.40	-16.40
15	AC	12.01	16.99	-16.99
16	AC	11.81	16.70	-16.70
10	Ground Wire	.28	.39	-.39
17	Ground Wire	2.49	3.53	-3.53
18	Ground Wire	2.51	3.55	-3.55

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***************************************
*                                     *
*     AC  ELECTRIC FIELD PROFILE      *
*    at   3.28 feet above ground      *
*                                     *
***************************************
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LATERAL DISTANCE (feet)	LATERAL DISTANCE (meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-150.0	-45.72	.212	.013	.211	.027	.212
-145.0	-44.20	.258	.007	.256	.032	.257
-140.0	-42.67	.310	.002	.308	.037	.309
-135.0	-41.15	.370	.003	.368	.042	.369
-130.0	-39.62	.438	.007	.435	.046	.436
-125.0	-38.10	.511	.010	.508	.049	.508
-120.0	-36.58	.587	.014	.585	.051	.585
-115.0	-35.05	.663	.018	.661	.050	.660
-110.0	-33.53	.733	.023	.732	.046	.730
-105.0	-32.00	.791	.029	.790	.039	.787
-100.0	-30.48	.829	.038	.829	.036	.824
-95.0	-28.96	.841	.050	.841	.042	.836
-90.0	-27.43	.824	.068	.824	.060	.819
-85.0	-25.91	.781	.095	.780	.082	.775
-80.0	-24.38	.722	.130	.721	.102	.717
-75.0	-22.86	.667	.168	.667	.115	.664
-70.0	-21.34	.641	.186	.641	.119	.639
-65.0	-19.81	.655	.170	.655	.113	.652
-60.0	-18.29	.697	.131	.697	.097	.693
-55.0	-16.76	.743	.093	.743	.074	.738
-50.0	-15.24	.771	.063	.771	.050	.765
-45.0	-13.72	.768	.040	.768	.033	.762
-40.0	-12.19	.731	.019	.730	.038	.725
-35.0	-10.67	.663	.002	.660	.054	.657
-30.0	-9.14	.570	.032	.567	.068	.565
-25.0	-7.62	.468	.073	.463	.074	.464

-20.0	-6.10	.374	.120	.371	.069	.373
-15.0	-4.57	.309	.130	.308	.050	.310
-10.0	-3.05	.276	.062	.276	.022	.278
-5.0	-1.52	.260	.039	.260	.012	.261
.0	.00	.257	.105	.257	.027	.257
5.0	1.52	.267	.111	.267	.030	.265
10.0	3.05	.274	.084	.274	.023	.270
15.0	4.57	.259	.049	.259	.022	.255
20.0	6.10	.223	.014	.221	.029	.219
25.0	7.62	.175	.027	.173	.032	.173
30.0	9.14	.130	.082	.127	.029	.128
35.0	10.67	.094	.153	.092	.024	.093
40.0	12.19	.072	.214	.071	.018	.072
45.0	13.72	.063	.205	.063	.013	.063
50.0	15.24	.062	.146	.062	.009	.062
55.0	16.76	.064	.093	.064	.006	.064
60.0	18.29	.066	.059	.066	.004	.066
65.0	19.81	.067	.037	.067	.003	.067
70.0	21.34	.067	.024	.067	.002	.067
75.0	22.86	.067	.016	.067	.001	.067

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AC CURRENTS IN EACH BUNDLE:

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	50.00	.00	50.00	-4.00	47.00
2	-25.00	43.30	50.00	-4.00	39.00
3	-25.00	-43.30	50.00	-4.00	31.00
4	120.00	.00	120.00	4.00	31.00
5	-60.00	103.92	120.00	4.00	39.00
6	-60.00	-103.92	120.00	4.00	47.00
7	60.00	.00	60.00	-3.00	23.00
8	-30.00	51.96	60.00	-1.00	23.00
9	-30.00	-51.96	60.00	3.00	23.00
11	210.00	.00	210.00	-86.00	92.00
12	-105.00	181.87	210.00	-86.00	74.50
13	-105.00	-181.87	210.00	-86.00	57.00
14	193.00	.00	193.00	-54.00	57.00
15	-96.50	167.14	193.00	-54.00	74.50
16	-96.50	-167.14	193.00	-54.00	92.00
10	-2.70	-4.39	5.16	1.00	23.00
17	-16.84	-9.74	19.45	-78.00	100.00
18	14.48	13.94	20.10	-62.00	100.00

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*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
*************************************
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LATERAL DISTANCE (feet)	(meters)	<---------- AC MAGNETIC FIELD ----------> MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-150.0	-45.72	2.51	.304	2.03	1.66	2.63
-145.0	-44.20	2.78	.298	2.11	1.98	2.90
-140.0	-42.67	3.08	.292	2.16	2.36	3.20

-135.0	-41.15	3.40	.284	2.16	2.80	3.54
-130.0	-39.62	3.77	.276	2.10	3.30	3.91
-125.0	-38.10	4.16	.267	1.95	3.84	4.31
-120.0	-36.58	4.59	.258	1.72	4.41	4.74
-115.0	-35.05	5.04	.248	1.45	4.98	5.19
-110.0	-33.53	5.51	.237	1.30	5.51	5.66
-105.0	-32.00	5.98	.225	1.60	5.92	6.13
-100.0	-30.48	6.45	.214	2.39	6.15	6.60
-95.0	-28.96	6.89	.202	3.46	6.12	7.03
-90.0	-27.43	7.28	.191	4.65	5.77	7.41
-85.0	-25.91	7.59	.181	5.81	5.08	7.72
-80.0	-24.38	7.82	.172	6.81	4.08	7.94
-75.0	-22.86	7.95	.164	7.53	2.86	8.06
-70.0	-21.34	7.97	.158	7.89	1.66	8.07
-65.0	-19.81	7.88	.153	7.87	1.27	7.97
-60.0	-18.29	7.68	.148	7.48	2.10	7.77
-55.0	-16.76	7.41	.144	6.81	3.11	7.48
-50.0	-15.24	7.06	.137	5.96	3.91	7.13
-45.0	-13.72	6.69	.125	5.06	4.46	6.74
-40.0	-12.19	6.33	.106	4.20	4.78	6.36
-35.0	-10.67	6.03	.076	3.46	4.95	6.04
-30.0	-9.14	5.84	.034	2.87	5.09	5.84
-25.0	-7.62	5.84	.016	2.40	5.32	5.84
-20.0	-6.10	6.07	.062	1.96	5.76	6.08
-15.0	-4.57	6.51	.097	1.32	6.41	6.54
-10.0	-3.05	6.98	.122	.87	6.98	7.03
-5.0	-1.52	7.12	.154	2.34	6.81	7.20
.0	.00	6.65	.200	3.79	5.62	6.78
5.0	1.52	5.81	.231	4.23	4.21	5.97
10.0	3.05	5.13	.188	4.14	3.17	5.22
15.0	4.57	4.70	.090	4.13	2.29	4.72
20.0	6.10	4.34	.003	4.10	1.43	4.34
25.0	7.62	3.95	.055	3.90	.69	3.96
30.0	9.14	3.54	.090	3.54	.32	3.56
35.0	10.67	3.15	.112	3.12	.56	3.17
40.0	12.19	2.78	.124	2.68	.82	2.80
45.0	13.72	2.45	.132	2.27	.98	2.47
50.0	15.24	2.16	.137	1.90	1.06	2.18
55.0	16.76	1.91	.139	1.59	1.09	1.93
60.0	18.29	1.69	.141	1.33	1.08	1.71
65.0	19.81	1.51	.142	1.10	1.05	1.52
70.0	21.34	1.35	.142	.92	1.01	1.36
75.0	22.86	1.21	.143	.77	.96	1.23

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*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
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BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	******	-83.95	******
2	AC	******	-86.17	******
3	AC	******	-81.00	******
4	AC	******	-81.91	******
5	AC	******	-86.35	******
6	AC	******	-82.70	******
7	AC	******	******	******
8	AC	******	******	******
9	AC	******	******	******
11	AC	-93.26	-66.67	-81.25
12	AC	-91.96	-65.87	-80.12

		H-GDDDCT		
13	AC	-95.06	-67.79	-82.82
14	AC	-95.06	-67.79	-82.82
15	AC	-91.84	-65.79	-80.02
16	AC	-93.39	-66.75	-81.37
10	Ground Wire	******	******	******
17	Ground Wire	******	******	******
18	Ground Wire	******	******	******

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*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
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<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-150.0	-45.72	13.1	39.7	25.1	23.7	31.6
-145.0	-44.20	13.3	39.9	25.3	23.9	31.7
-140.0	-42.67	13.5	40.1	25.5	24.1	31.9
-135.0	-41.15	13.6	40.2	25.6	24.2	32.1
-130.0	-39.62	13.8	40.4	25.8	24.4	32.3
-125.0	-38.10	14.0	40.6	26.0	24.6	32.4
-120.0	-36.58	14.1	40.8	26.1	24.7	32.6
-115.0	-35.05	14.3	40.9	26.3	24.9	32.8
-110.0	-33.53	14.4	41.1	26.4	25.1	32.9
-105.0	-32.00	14.6	41.2	26.6	25.2	33.0
-100.0	-30.48	14.7	41.3	26.7	25.3	33.2
-95.0	-28.96	14.8	41.5	26.8	25.4	33.3
-90.0	-27.43	14.9	41.5	26.9	25.5	33.4
-85.0	-25.91	15.0	41.6	27.0	25.6	33.4
-80.0	-24.38	15.0	41.7	27.0	25.6	33.5
-75.0	-22.86	15.1	41.7	27.1	25.7	33.5
-70.0	-21.34	15.1	41.7	27.1	25.7	33.5
-65.0	-19.81	15.1	41.7	27.1	25.7	33.5
-60.0	-18.29	15.0	41.7	27.0	25.6	33.5
-55.0	-16.76	15.0	41.7	27.0	25.6	33.4
-50.0	-15.24	14.9	41.6	26.9	25.5	33.4
-45.0	-13.72	14.8	41.5	26.8	25.4	33.3
-40.0	-12.19	14.7	41.4	26.7	25.3	33.2
-35.0	-10.67	14.6	41.3	26.6	25.2	33.0
-30.0	-9.14	14.5	41.2	26.5	25.1	32.9
-25.0	-7.62	14.3	41.1	26.3	24.9	32.8
-20.0	-6.10	14.2	40.9	26.2	24.7	32.6
-15.0	-4.57	14.0	40.8	26.0	24.6	32.4
-10.0	-3.05	13.8	40.6	25.9	24.4	32.3
-5.0	-1.52	13.7	40.5	25.7	24.2	32.1
.0	.00	13.5	40.3	25.5	24.1	31.9
5.0	1.52	13.3	40.2	25.4	23.9	31.7
10.0	3.05	13.1	40.0	25.2	23.7	31.6
15.0	4.57	13.0	39.8	25.0	23.5	31.4
20.0	6.10	12.8	39.6	24.8	23.4	31.2
25.0	7.62	12.6	39.4	24.6	23.2	31.0
30.0	9.14	12.4	39.2	24.5	23.0	30.9
35.0	10.67	12.3	39.1	24.3	22.8	30.7
40.0	12.19	12.1	38.9	24.1	22.7	30.5
45.0	13.72	11.9	38.7	24.0	22.5	30.4
50.0	15.24	11.8	38.5	23.8	22.3	30.2
55.0	16.76	11.6	38.4	23.6	22.2	30.0
60.0	18.29	11.4	38.2	23.5	22.0	29.9

65.0	19.81	11.3	38.0	23.3	21.9	29.7
70.0	21.34	11.1	37.9	23.2	21.7	29.6
75.0	22.86	11.0	37.7	23.0	21.6	29.4

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*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
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LATERAL DISTANCE (feet)	(meters)	<------ BPA METHOD -------> FAIR WEATHER dB(A)	L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	<- CRIEPI --> AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)
-150.0	-45.72	4.2	32.7	29.2	.0	.0	.0	41.2	39.0	.0
-145.0	-44.20	4.4	32.9	29.4	.0	.0	.0	41.3	39.2	.0
-140.0	-42.67	4.6	33.1	29.6	.0	.0	.0	41.5	39.3	.0
-135.0	-41.15	4.8	33.3	29.8	.0	.0	.0	41.6	39.5	.0
-130.0	-39.62	4.9	33.4	29.9	.0	.0	.0	41.8	39.6	.0
-125.0	-38.10	5.1	33.6	30.1	.0	.0	.0	41.9	39.8	.0
-120.0	-36.58	5.3	33.8	30.3	.0	.0	.0	42.1	39.9	.0
-115.0	-35.05	5.4	33.9	30.4	.0	.0	.0	42.2	40.1	.0
-110.0	-33.53	5.6	34.1	30.6	.0	.0	.0	42.4	40.2	.0
-105.0	-32.00	5.7	34.2	30.7	.0	.0	.0	42.5	40.3	.0
-100.0	-30.48	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-95.0	-28.96	6.0	34.5	31.0	.0	.0	.0	42.7	40.6	.0
-90.0	-27.43	6.1	34.6	31.1	.0	.0	.0	42.8	40.7	.0
-85.0	-25.91	6.2	34.7	31.2	.0	.0	.0	42.9	40.7	.0
-80.0	-24.38	6.2	34.7	31.2	.0	.0	.0	43.0	40.8	.0
-75.0	-22.86	6.3	34.8	31.3	.0	.0	.0	43.0	40.8	.0
-70.0	-21.34	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-65.0	-19.81	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-60.0	-18.29	6.3	34.8	31.3	.0	.0	.0	43.0	40.9	.0
-55.0	-16.76	6.3	34.8	31.3	.0	.0	.0	43.0	40.8	.0
-50.0	-15.24	6.2	34.7	31.2	.0	.0	.0	42.9	40.8	.0
-45.0	-13.72	6.1	34.6	31.1	.0	.0	.0	42.9	40.7	

-40.0	-12.19	6.1	34.6	31.1	.0	.0	.0	42.8	40.7	.0
-35.0	-10.67	6.0	34.5	31.0	.0	.0	.0	42.7	40.6	.0
-30.0	-9.14	5.9	34.4	30.9	.0	.0	.0	42.6	40.5	.0
-25.0	-7.62	5.8	34.3	30.8	.0	.0	.0	42.5	40.4	.0
-20.0	-6.10	5.7	34.2	30.7	.0	.0	.0	42.4	40.4	.0
-15.0	-4.57	5.6	34.1	30.6	.0	.0	.0	42.3	40.3	.0
-10.0	-3.05	5.5	34.0	30.5	.0	.0	.0	42.2	40.2	.0
-5.0	-1.52	5.3	33.8	30.3	.0	.0	.0	42.1	40.1	.0
.0	.00	5.2	33.7	30.2	.0	.0	.0	42.0	40.0	.0
5.0	1.52	5.0	33.5	30.0	.0	.0	.0	41.8	39.8	.0
10.0	3.05	4.9	33.4	29.9	.0	.0	.0	41.7	39.7	.0
15.0	4.57	4.7	33.2	29.7	.0	.0	.0	41.5	39.5	.0
20.0	6.10	4.5	33.0	29.5	.0	.0	.0	41.3	39.3	.0
25.0	7.62	4.3	32.8	29.3	.0	.0	.0	41.1	39.1	.0
30.0	9.14	4.1	32.6	29.1	.0	.0	.0	41.0	39.0	.0
35.0	10.67	3.9	32.4	28.9	.0	.0	.0	40.8	38.8	.0
40.0	12.19	3.7	32.2	28.7	.0	.0	.0	40.6	38.6	.0
45.0	13.72	3.5	32.0	28.5	.0	.0	.0	40.5	38.4	.0
50.0	15.24	3.3	31.8	28.3	.0	.0	.0	40.3	38.3	.0
55.0	16.76	3.1	31.6	28.1	.0	.0	.0	40.2	38.1	.0
60.0	18.29	3.0	31.5	28.0	.0	.0	.0	40.0	38.0	.0
65.0	19.81	2.8	31.3	27.8	.0	.0	.0	39.9	37.8	.0
70.0	21.34	2.6	31.1	27.6	.0	.0	.0	39.7	37.7	.0
75.0	22.86	2.5	31.0	27.5	.0	.0	.0	39.6	37.5	.0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

ATTACHMENT AA-1

Results of the EPRI EMF Workstation: ENVIRO Program for Double Circuit 115-kV Transmission Line with no Underbuild

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGH115P.I01

DATE: 6/18/2010 TIME: 13:49

Hughson-Grayson 115-kV DD Peak

BUNDLE INFORMATION

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	115.0	.0	734.0	.0	1	-4.0	39.0	A
2	1	115.0	240.0	734.0	120.0	1	-4.0	31.0	B
3	1	115.0	120.0	734.0	240.0	1	-4.0	23.0	C
4	2	115.0	.0	734.0	.0	1	4.0	23.0	A
5	2	115.0	240.0	734.0	120.0	1	4.0	31.0	B
6	2	115.0	120.0	734.0	240.0	1	4.0	39.0	C
7	3	.0	.0	.0	.0	1	.0	40.0	GND

MINIMUM GROUND CLEARANCE = 23.000 FT.

SUBCONDUCTOR INFORMATION - REGULAR BUNDLES

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	.000	.09750	.10100	.403000
2	1.124	.000	.09750	.10100	.403000
3	1.124	.000	.09750	.10100	.403000
4	1.124	.000	.09750	.10100	.403000
5	1.124	.000	.09750	.10100	.403000
6	1.124	.000	.09750	.10100	.403000
7	1.124	.000	.09750	.10100	.403000

MAXIMUM SURFACE GRADIENT (kV/cm)

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	9.45	13.37	-13.37
2	AC	8.83	12.49	-12.49
3	AC	9.38	13.27	-13.27
4	AC	9.38	13.27	-13.27
5	AC	8.83	12.49	-12.49
6	AC	9.45	13.37	-13.37
7	Ground Wire	.98	1.39	-1.39

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AC ELECTRIC FIELD PROFILE
at 3.28 feet above ground

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*                                    *
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LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.029	.014	.029	.001	.029
-70.0	-21.34	.031	.028	.031	.001	.031
-65.0	-19.81	.032	.051	.032	.002	.032
-60.0	-18.29	.033	.090	.033	.003	.032
-55.0	-16.76	.033	.154	.033	.005	.033
-50.0	-15.24	.036	.228	.036	.009	.036
-45.0	-13.72	.047	.231	.045	.015	.047
-40.0	-12.19	.072	.150	.068	.025	.071
-35.0	-10.67	.119	.071	.112	.039	.116
-30.0	-9.14	.194	.017	.185	.060	.190
-25.0	-7.62	.308	.020	.296	.087	.302
-20.0	-6.10	.463	.052	.450	.112	.452
-15.0	-4.57	.638	.087	.630	.120	.622
-10.0	-3.05	.777	.144	.775	.125	.754
-5.0	-1.52	.813	.241	.813	.196	.788
.0	.00	.792	.317	.792	.251	.773
5.0	1.52	.813	.241	.813	.196	.788
10.0	3.05	.777	.144	.775	.125	.754
15.0	4.57	.638	.087	.630	.120	.622
20.0	6.10	.463	.052	.450	.112	.452
25.0	7.62	.308	.020	.296	.087	.302
30.0	9.14	.194	.017	.185	.060	.190
35.0	10.67	.119	.071	.112	.039	.116
40.0	12.19	.072	.150	.068	.025	.071
45.0	13.72	.047	.231	.045	.015	.047
50.0	15.24	.036	.228	.036	.009	.036
55.0	16.76	.033	.154	.033	.005	.033
60.0	18.29	.033	.090	.033	.003	.032
65.0	19.81	.032	.051	.032	.002	.032
70.0	21.34	.031	.028	.031	.001	.031
75.0	22.86	.029	.014	.029	.001	.029

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  AC CURRENTS IN EACH BUNDLE:
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BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	734.00	.00	734.00	-4.00	39.00
2	-367.00	635.66	734.00	-4.00	31.00
3	-367.00	-635.66	734.00	-4.00	23.00
4	734.00	.00	734.00	4.00	23.00
5	-367.00	635.66	734.00	4.00	31.00
6	-367.00	-635.66	734.00	4.00	39.00
7	-11.84	15.13	19.21	.00	40.00

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**************************************
*                                    *
*       MAGNETIC FIELD PROFILE       *
*     at   3.28 feet  above ground   *
*                                    *
**************************************
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<----------- AC MAGNETIC FIELD ------------>

HUGH115P

LATERAL DISTANCE (feet)	(meters)	MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	2.87	.627	2.77	1.96	3.39
-70.0	-21.34	3.25	.651	3.15	2.28	3.88
-65.0	-19.81	3.74	.670	3.63	2.67	4.50
-60.0	-18.29	4.37	.681	4.25	3.15	5.29
-55.0	-16.76	5.20	.684	5.05	3.75	6.30
-50.0	-15.24	6.29	.678	6.10	4.54	7.60
-45.0	-13.72	7.76	.666	7.45	5.60	9.33
-40.0	-12.19	9.75	.647	9.18	7.12	11.62
-35.0	-10.67	12.47	.624	11.29	9.41	14.70
-30.0	-9.14	16.18	.598	13.66	12.99	18.85
-25.0	-7.62	21.23	.568	15.82	18.61	24.42
-20.0	-6.10	27.98	.534	16.96	26.80	31.71
-15.0	-4.57	36.46	.496	18.10	36.46	40.70
-10.0	-3.05	45.81	.460	27.65	42.16	50.42
-5.0	-1.52	53.62	.432	46.42	35.44	58.40
.0	.00	56.59	.422	56.59	23.92	61.43
5.0	1.52	53.16	.436	46.54	34.58	57.99
10.0	3.05	45.04	.468	27.83	41.20	49.72
15.0	4.57	35.55	.509	18.10	35.54	39.89
20.0	6.10	27.06	.552	16.72	25.99	30.90
25.0	7.62	20.37	.592	15.43	17.96	23.68
30.0	9.14	15.40	.631	13.21	12.52	18.20
35.0	10.67	11.77	.667	10.82	9.12	14.15
40.0	12.19	9.13	.701	8.70	6.98	11.16
45.0	13.72	7.21	.733	6.99	5.57	8.94
50.0	15.24	5.81	.758	5.67	4.58	7.29
55.0	16.76	4.77	.774	4.65	3.84	6.03
60.0	18.29	4.01	.775	3.89	3.26	5.07
65.0	19.81	3.44	.763	3.30	2.80	4.33
70.0	21.34	3.01	.739	2.86	2.41	3.74
75.0	22.86	2.67	.708	2.51	2.10	3.27

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*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer	Fair	L5 RAIN	L50 RAIN
1	AC	******		-81.90	******
2	AC	******		-86.84	******
3	AC	******		-82.41	******
4	AC	******		-82.41	******
5	AC	******		-86.84	******
6	AC	******		-81.90	******
7	Ground Wire	******		******	******

♀

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*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
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<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	24.5	3.9	.0	.0
-70.0	-21.34	.0	24.8	4.2	.0	.0
-65.0	-19.81	.0	25.1	4.5	.0	.0
-60.0	-18.29	.0	25.4	4.8	.0	.0
-55.0	-16.76	.0	25.8	5.2	.0	.0
-50.0	-15.24	.0	26.1	5.5	.0	.0
-45.0	-13.72	.0	26.5	5.9	.0	.0
-40.0	-12.19	.0	26.9	6.3	.0	.0
-35.0	-10.67	.0	27.3	6.7	.0	.0
-30.0	-9.14	.0	27.8	7.2	.0	.0
-25.0	-7.62	.0	28.3	7.6	.0	.0
-20.0	-6.10	.0	28.7	8.1	.0	.0
-15.0	-4.57	.0	29.2	8.5	.0	.0
-10.0	-3.05	.0	29.6	8.9	.0	.0
-5.0	-1.52	.0	29.8	9.2	.0	.0
.0	.00	.0	29.9	9.3	.0	.0
5.0	1.52	.0	29.8	9.2	.0	.0
10.0	3.05	.0	29.6	8.9	.0	.0
15.0	4.57	.0	29.2	8.5	.0	.0
20.0	6.10	.0	28.7	8.1	.0	.0
25.0	7.62	.0	28.3	7.6	.0	.0
30.0	9.14	.0	27.8	7.2	.0	.0
35.0	10.67	.0	27.3	6.7	.0	.0
40.0	12.19	.0	26.9	6.3	.0	.0
45.0	13.72	.0	26.5	5.9	.0	.0
50.0	15.24	.0	26.1	5.5	.0	.0
55.0	16.76	.0	25.8	5.2	.0	.0
60.0	18.29	.0	25.4	4.8	.0	.0
65.0	19.81	.0	25.1	4.5	.0	.0
70.0	21.34	.0	24.8	4.2	.0	.0
75.0	22.86	.0	24.5	3.9	.0	.0

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*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
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LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	<------ BPA METHOD -------> L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	<- CRIEPI --> AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 dB(A)
-75.0	-22.86	.0	21.3	17.8	.0	.0	.0	29.3	28.6	.0
-70.0	-21.34	.0	21.6	18.1	.0	.0	.0	29.6	28.8	.0
-65.0	-19.81	.0	21.9	18.4	.0	.0	.0	29.9	29.1	.0
-60.0	-18.29	.0	22.2	18.7	.0	.0	.0	30.2	29.4	.0
-55.0	-16.76	.0	22.6	19.1	.0	.0	.0	30.5	29.7	.0
-50.0	-15.24	.0	23.0	19.5	.0	.0	.0	30.8	30.1	

.0										
	-45.0	-13.72	.0	23.4	19.9	.0	.0	.0	31.2	30.4
.0										
	-40.0	-12.19	.0	23.8	20.3	.0	.0	.0	31.5	30.8
.0										
	-35.0	-10.67	.0	24.3	20.8	.0	.0	.0	31.9	31.2
.0										
	-30.0	-9.14	.0	24.8	21.3	.0	.0	.0	32.3	31.6
.0										
	-25.0	-7.62	.0	25.3	21.8	.0	.0	.0	32.8	32.1
.0										
	-20.0	-6.10	.0	25.8	22.3	.0	.0	.0	33.2	32.5
.0										
	-15.0	-4.57	.0	26.3	22.8	.0	.0	.0	33.7	32.9
.0										
	-10.0	-3.05	.0	26.7	23.2	.0	.0	.0	34.0	33.3
.0										
	-5.0	-1.52	.0	27.0	23.5	.0	.0	.0	34.3	33.6
.0										
	.0	.00	.0	27.1	23.6	.0	.0	.0	34.4	33.7
.0										
	5.0	1.52	.0	27.0	23.5	.0	.0	.0	34.3	33.6
.0										
	10.0	3.05	.0	26.7	23.2	.0	.0	.0	34.0	33.3
.0										
	15.0	4.57	.0	26.3	22.8	.0	.0	.0	33.7	32.9
.0										
	20.0	6.10	.0	25.8	22.3	.0	.0	.0	33.2	32.5
.0										
	25.0	7.62	.0	25.3	21.8	.0	.0	.0	32.8	32.1
.0										
	30.0	9.14	.0	24.8	21.3	.0	.0	.0	32.3	31.6
.0										
	35.0	10.67	.0	24.3	20.8	.0	.0	.0	31.9	31.2
.0										
	40.0	12.19	.0	23.8	20.3	.0	.0	.0	31.5	30.8
.0										
	45.0	13.72	.0	23.4	19.9	.0	.0	.0	31.2	30.4
.0										
	50.0	15.24	.0	23.0	19.5	.0	.0	.0	30.8	30.1
.0										
	55.0	16.76	.0	22.6	19.1	.0	.0	.0	30.5	29.7
.0										
	60.0	18.29	.0	22.2	18.7	.0	.0	.0	30.2	29.4
.0										
	65.0	19.81	.0	21.9	18.4	.0	.0	.0	29.9	29.1
.0										
	70.0	21.34	.0	21.6	18.1	.0	.0	.0	29.6	28.8
.0										
	75.0	22.86	.0	21.3	17.8	.0	.0	.0	29.3	28.6
.0										

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: G:\HUGH115T.I01

DATE: 6/18/2010 TIME: 13:45

Hughson-Grayson 115-kV DD Typi

****
* BUNDLE INFORMATION *
****

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	115.0	.0	50.0	.0	1	-4.0	39.0	A
2	1	115.0	240.0	50.0	120.0	1	-4.0	31.0	B
3	1	115.0	120.0	50.0	240.0	1	-4.0	23.0	C
4	2	115.0	.0	120.0	.0	1	4.0	23.0	A
5	2	115.0	240.0	120.0	120.0	1	4.0	31.0	B
6	2	115.0	120.0	120.0	240.0	1	4.0	39.0	C
7	3	.0	.0	.0	.0	1	.0	40.0	GND

* MINIMUM GROUND CLEARANCE = 23.000 FT. *

****
* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *
****

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	1.124	.000	.09750	.10100	.403000
2	1.124	.000	.09750	.10100	.403000
3	1.124	.000	.09750	.10100	.403000
4	1.124	.000	.09750	.10100	.403000
5	1.124	.000	.09750	.10100	.403000
6	1.124	.000	.09750	.10100	.403000
7	1.124	.000	.09750	.10100	.403000

****
*
* MAXIMUM SURFACE GRADIENT (kV/cm) *
*
****

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	9.45	13.37	-13.37
2	AC	8.83	12.49	-12.49
3	AC	9.38	13.27	-13.27
4	AC	9.38	13.27	-13.27
5	AC	8.83	12.49	-12.49
6	AC	9.45	13.37	-13.37
7	Ground Wire	.98	1.39	-1.39

♀

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*
* AC ELECTRIC FIELD PROFILE *
* at 3.28 feet above ground *

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*                                      *
****************************************
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LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.029	.014	.029	.001	.029
-70.0	-21.34	.031	.028	.031	.001	.031
-65.0	-19.81	.032	.051	.032	.002	.032
-60.0	-18.29	.033	.090	.033	.003	.032
-55.0	-16.76	.033	.154	.033	.005	.033
-50.0	-15.24	.036	.228	.036	.009	.036
-45.0	-13.72	.047	.231	.045	.015	.047
-40.0	-12.19	.072	.150	.068	.025	.071
-35.0	-10.67	.119	.071	.112	.039	.116
-30.0	-9.14	.194	.017	.185	.060	.190
-25.0	-7.62	.308	.020	.296	.087	.302
-20.0	-6.10	.463	.052	.450	.112	.452
-15.0	-4.57	.638	.087	.630	.120	.622
-10.0	-3.05	.777	.144	.775	.125	.754
-5.0	-1.52	.813	.241	.813	.196	.788
.0	.00	.792	.317	.792	.251	.773
5.0	1.52	.813	.241	.813	.196	.788
10.0	3.05	.777	.144	.775	.125	.754
15.0	4.57	.638	.087	.630	.120	.622
20.0	6.10	.463	.052	.450	.112	.452
25.0	7.62	.308	.020	.296	.087	.302
30.0	9.14	.194	.017	.185	.060	.190
35.0	10.67	.119	.071	.112	.039	.116
40.0	12.19	.072	.150	.068	.025	.071
45.0	13.72	.047	.231	.045	.015	.047
50.0	15.24	.036	.228	.036	.009	.036
55.0	16.76	.033	.154	.033	.005	.033
60.0	18.29	.033	.090	.033	.003	.032
65.0	19.81	.032	.051	.032	.002	.032
70.0	21.34	.031	.028	.031	.001	.031
75.0	22.86	.029	.014	.029	.001	.029

♀

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-------------------------------
  AC CURRENTS IN EACH BUNDLE:
-------------------------------
```

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	50.00	.00	50.00	-4.00	39.00
2	-25.00	43.30	50.00	-4.00	31.00
3	-25.00	-43.30	50.00	-4.00	23.00
4	120.00	.00	120.00	4.00	23.00
5	-60.00	103.92	120.00	4.00	31.00
6	-60.00	-103.92	120.00	4.00	39.00
7	4.69	6.52	8.03	.00	40.00

♀

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****************************************
*                                      *
*       MAGNETIC FIELD PROFILE         *
*     at   3.28 feet  above ground     *
*                                      *
****************************************
```

<----------- AC MAGNETIC FIELD ------------>

HUGH115T

LATERAL DISTANCE (feet)	(meters)	MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	1.04	.321	1.00	.45	1.10
-70.0	-21.34	1.14	.331	1.09	.49	1.20
-65.0	-19.81	1.25	.342	1.20	.55	1.32
-60.0	-18.29	1.37	.354	1.32	.61	1.46
-55.0	-16.76	1.52	.367	1.47	.69	1.62
-50.0	-15.24	1.70	.380	1.65	.78	1.82
-45.0	-13.72	1.92	.391	1.86	.89	2.06
-40.0	-12.19	2.20	.395	2.13	1.02	2.36
-35.0	-10.67	2.56	.386	2.48	1.17	2.74
-30.0	-9.14	3.06	.353	2.97	1.30	3.25
-25.0	-7.62	3.77	.292	3.69	1.34	3.93
-20.0	-6.10	4.79	.208	4.76	1.14	4.89
-15.0	-4.57	6.22	.113	6.21	.75	6.26
-10.0	-3.05	8.09	.029	7.78	2.26	8.10
-5.0	-1.52	10.20	.032	8.41	5.78	10.21
.0	.00	11.96	.074	6.58	10.03	11.99
5.0	1.52	12.66	.107	2.37	12.51	12.73
10.0	3.05	12.08	.138	3.43	11.71	12.20
15.0	4.57	10.67	.166	6.29	8.80	10.81
20.0	6.10	9.00	.187	7.16	5.70	9.15
25.0	7.62	7.44	.202	6.80	3.37	7.59
30.0	9.14	6.11	.212	5.95	1.92	6.25
35.0	10.67	5.04	.219	5.03	1.19	5.16
40.0	12.19	4.19	.224	4.19	.94	4.30
45.0	13.72	3.52	.227	3.50	.90	3.61
50.0	15.24	2.99	.230	2.93	.89	3.06
55.0	16.76	2.56	.232	2.48	.87	2.63
60.0	18.29	2.21	.234	2.12	.83	2.27
65.0	19.81	1.93	.237	1.83	.78	1.98
70.0	21.34	1.70	.239	1.59	.72	1.75
75.0	22.86	1.51	.241	1.40	.67	1.55

```
*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer	Fair	L5 RAIN	L50 RAIN
1	AC	******		-81.90	******
2	AC	******		-86.84	******
3	AC	******		-82.41	******
4	AC	******		-82.41	******
5	AC	******		-86.84	******
6	AC	******		-81.90	******
7	Ground Wire	******		******	******

♀

```
*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
*****************************************
```

<---------- HVTRC CALCULATION METHOD ---------->

HUGH115T

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	24.5	3.9	.0	.0
-70.0	-21.34	.0	24.8	4.2	.0	.0
-65.0	-19.81	.0	25.1	4.5	.0	.0
-60.0	-18.29	.0	25.4	4.8	.0	.0
-55.0	-16.76	.0	25.8	5.2	.0	.0
-50.0	-15.24	.0	26.1	5.5	.0	.0
-45.0	-13.72	.0	26.5	5.9	.0	.0
-40.0	-12.19	.0	26.9	6.3	.0	.0
-35.0	-10.67	.0	27.3	6.7	.0	.0
-30.0	-9.14	.0	27.8	7.2	.0	.0
-25.0	-7.62	.0	28.3	7.6	.0	.0
-20.0	-6.10	.0	28.7	8.1	.0	.0
-15.0	-4.57	.0	29.2	8.5	.0	.0
-10.0	-3.05	.0	29.6	8.9	.0	.0
-5.0	-1.52	.0	29.8	9.2	.0	.0
.0	.00	.0	29.9	9.3	.0	.0
5.0	1.52	.0	29.8	9.2	.0	.0
10.0	3.05	.0	29.6	8.9	.0	.0
15.0	4.57	.0	29.2	8.5	.0	.0
20.0	6.10	.0	28.7	8.1	.0	.0
25.0	7.62	.0	28.3	7.6	.0	.0
30.0	9.14	.0	27.8	7.2	.0	.0
35.0	10.67	.0	27.3	6.7	.0	.0
40.0	12.19	.0	26.9	6.3	.0	.0
45.0	13.72	.0	26.5	5.9	.0	.0
50.0	15.24	.0	26.1	5.5	.0	.0
55.0	16.76	.0	25.8	5.2	.0	.0
60.0	18.29	.0	25.4	4.8	.0	.0
65.0	19.81	.0	25.1	4.5	.0	.0
70.0	21.34	.0	24.8	4.2	.0	.0
75.0	22.86	.0	24.5	3.9	.0	.0

```
*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
```

LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	<------ BPA METHOD -------> L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	<- CRIEPI --> AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 dB(A)
-75.0	-22.86	.0	21.3	17.8	.0	.0	.0	29.3	28.6	.0
-70.0	-21.34	.0	21.6	18.1	.0	.0	.0	29.6	28.8	.0
-65.0	-19.81	.0	21.9	18.4	.0	.0	.0	29.9	29.1	.0
-60.0	-18.29	.0	22.2	18.7	.0	.0	.0	30.2	29.4	.0
-55.0	-16.76	.0	22.6	19.1	.0	.0	.0	30.5	29.7	.0
-50.0	-15.24	.0	23.0	19.5	.0	.0	.0	30.8	30.1	

.0										
	-45.0	-13.72	.0	23.4	19.9	.0	.0	.0	31.2	30.4
.0										
	-40.0	-12.19	.0	23.8	20.3	.0	.0	.0	31.5	30.8
.0										
	-35.0	-10.67	.0	24.3	20.8	.0	.0	.0	31.9	31.2
.0										
	-30.0	-9.14	.0	24.8	21.3	.0	.0	.0	32.3	31.6
.0										
	-25.0	-7.62	.0	25.3	21.8	.0	.0	.0	32.8	32.1
.0										
	-20.0	-6.10	.0	25.8	22.3	.0	.0	.0	33.2	32.5
.0										
	-15.0	-4.57	.0	26.3	22.8	.0	.0	.0	33.7	32.9
.0										
	-10.0	-3.05	.0	26.7	23.2	.0	.0	.0	34.0	33.3
.0										
	-5.0	-1.52	.0	27.0	23.5	.0	.0	.0	34.3	33.6
.0										
	.0	.00	.0	27.1	23.6	.0	.0	.0	34.4	33.7
.0										
	5.0	1.52	.0	27.0	23.5	.0	.0	.0	34.3	33.6
.0										
	10.0	3.05	.0	26.7	23.2	.0	.0	.0	34.0	33.3
.0										
	15.0	4.57	.0	26.3	22.8	.0	.0	.0	33.7	32.9
.0										
	20.0	6.10	.0	25.8	22.3	.0	.0	.0	33.2	32.5
.0										
	25.0	7.62	.0	25.3	21.8	.0	.0	.0	32.8	32.1
.0										
	30.0	9.14	.0	24.8	21.3	.0	.0	.0	32.3	31.6
.0										
	35.0	10.67	.0	24.3	20.8	.0	.0	.0	31.9	31.2
.0										
	40.0	12.19	.0	23.8	20.3	.0	.0	.0	31.5	30.8
.0										
	45.0	13.72	.0	23.4	19.9	.0	.0	.0	31.2	30.4
.0										
	50.0	15.24	.0	23.0	19.5	.0	.0	.0	30.8	30.1
.0										
	55.0	16.76	.0	22.6	19.1	.0	.0	.0	30.5	29.7
.0										
	60.0	18.29	.0	22.2	18.7	.0	.0	.0	30.2	29.4
.0										
	65.0	19.81	.0	21.9	18.4	.0	.0	.0	29.9	29.1
.0										
	70.0	21.34	.0	21.6	18.1	.0	.0	.0	29.6	28.8
.0										
	75.0	22.86	.0	21.3	17.8	.0	.0	.0	29.3	28.6
.0										

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

ATTACHMENT AA-5

Results of the EPRI EMF Workstation: ENVIRO Program for Single Circuit 69-kV Transmission Line

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGH69SP.I01

DATE: 6/18/2010 TIME: 14:54

Hughson-Grayson 69-kV SC Peak

****
* BUNDLE INFORMATION *
****

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	69.0	.0	572.0	.0	1	4.0	39.0	A
2	1	69.0	240.0	572.0	120.0	1	-4.0	31.0	B
3	1	69.0	120.0	572.0	240.0	1	4.0	23.0	C
4	3	.0	.0	.0	.0	1	.0	40.0	GND

****
* MINIMUM GROUND CLEARANCE = 23.000 FT. *
****

****
* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *
****

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	.918	.000	.14640	.14900	.428000
2	.918	.000	.14640	.14900	.428000
3	.918	.000	.14640	.14900	.428000
4	.918	.000	.14640	.14900	.428000

****
*
* MAXIMUM SURFACE GRADIENT (kV/cm) *
*
****

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	6.12	8.65	-8.65
2	AC	6.04	8.54	-8.54
3	AC	5.90	8.34	-8.34
4	Ground Wire	1.22	1.73	-1.73

♀

****
*
* AC ELECTRIC FIELD PROFILE *
* at 3.28 feet above ground *
*
****

LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.048	.042	.048	.005	.048
-70.0	-21.34	.055	.045	.055	.006	.055

-65.0	-19.81	.063	.049	.063	.007	.063
-60.0	-18.29	.074	.052	.074	.009	.074
-55.0	-16.76	.087	.056	.087	.011	.087
-50.0	-15.24	.104	.060	.103	.014	.104
-45.0	-13.72	.125	.066	.124	.017	.125
-40.0	-12.19	.152	.073	.151	.022	.151
-35.0	-10.67	.185	.084	.183	.028	.184
-30.0	-9.14	.225	.100	.223	.036	.223
-25.0	-7.62	.273	.125	.271	.048	.271
-20.0	-6.10	.331	.159	.329	.067	.328
-15.0	-4.57	.409	.190	.405	.098	.405
-10.0	-3.05	.524	.190	.517	.133	.516
-5.0	-1.52	.684	.152	.675	.151	.670
.0	.00	.841	.106	.837	.120	.821
5.0	1.52	.908	.074	.908	.067	.887
10.0	3.05	.841	.060	.837	.094	.823
15.0	4.57	.682	.062	.672	.121	.669
20.0	6.10	.506	.075	.495	.113	.498
25.0	7.62	.358	.095	.349	.089	.353
30.0	9.14	.251	.118	.245	.064	.249
35.0	10.67	.180	.136	.177	.044	.179
40.0	12.19	.136	.141	.134	.030	.135
45.0	13.72	.108	.133	.107	.020	.108
50.0	15.24	.090	.115	.090	.014	.090
55.0	16.76	.078	.095	.078	.010	.078
60.0	18.29	.069	.077	.069	.007	.069
65.0	19.81	.061	.062	.061	.006	.061
70.0	21.34	.055	.051	.055	.005	.055
75.0	22.86	.050	.042	.050	.004	.050

♀

AC CURRENTS IN EACH BUNDLE:

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	572.00	.00	572.00	4.00	39.00
2	-286.00	495.37	572.00	-4.00	31.00
3	-286.00	-495.37	572.00	4.00	23.00
4	-51.85	-33.98	61.99	.00	40.00

♀

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*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
*************************************
```

LATERAL DISTANCE (feet)	(meters)	<---------- AC MAGNETIC FIELD ----------> MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	9.89	.415	9.62	4.72	10.71
-70.0	-21.34	10.92	.437	10.66	5.34	11.92
-65.0	-19.81	12.13	.461	11.88	6.08	13.35
-60.0	-18.29	13.55	.485	13.34	7.00	15.06
-55.0	-16.76	15.26	.511	15.08	8.13	17.14
-50.0	-15.24	17.31	.538	17.18	9.55	19.66
-45.0	-13.72	19.81	.565	19.73	11.35	22.76
-40.0	-12.19	22.88	.592	22.84	13.62	26.59

-35.0	-10.67	26.70	.617	26.69	16.48	31.37
-30.0	-9.14	31.52	.635	31.52	20.01	37.33
-25.0	-7.62	37.68	.640	37.61	24.23	44.74
-20.0	-6.10	45.56	.627	45.18	29.17	53.78
-15.0	-4.57	55.39	.593	53.74	35.50	64.41
-10.0	-3.05	66.79	.543	60.75	45.66	76.00
-5.0	-1.52	78.15	.485	60.66	62.16	86.86
.0	.00	86.42	.430	48.76	80.45	94.08
5.0	1.52	88.34	.385	34.18	88.29	94.68
10.0	3.05	83.11	.355	38.93	79.13	88.19
15.0	4.57	73.24	.337	49.00	59.78	77.29
20.0	6.10	62.07	.330	51.34	40.44	65.35
25.0	7.62	51.69	.328	47.74	26.11	54.41
30.0	9.14	42.89	.331	41.76	17.24	45.18
35.0	10.67	35.73	.335	35.54	12.49	37.67
40.0	12.19	29.99	.339	29.99	10.15	31.66
45.0	13.72	25.41	.342	25.33	8.93	26.85
50.0	15.24	21.74	.345	21.52	8.10	22.99
55.0	16.76	18.78	.346	18.44	7.41	19.88
60.0	18.29	16.39	.347	15.96	6.79	17.34
65.0	19.81	14.42	.346	13.94	6.20	15.26
70.0	21.34	12.79	.344	12.29	5.65	13.53
75.0	22.86	11.44	.341	10.93	5.15	12.09

```
*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	******	******	******
2	AC	******	******	******
3	AC	******	******	******
4	Ground Wire	******	******	******

♀

```
*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
*****************************************
```

<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	.0	.0	.0	.0
-70.0	-21.34	.0	.0	.0	.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0
-60.0	-18.29	.0	.0	.0	.0	.0
-55.0	-16.76	.0	.0	.0	.0	.0
-50.0	-15.24	.0	.0	.0	.0	.0
-45.0	-13.72	.0	.0	.0	.0	.0
-40.0	-12.19	.0	.0	.0	.0	.0
-35.0	-10.67	.0	.0	.0	.0	.0
-30.0	-9.14	.0	.0	.0	.0	.0
-25.0	-7.62	.0	.0	.0	.0	.0

-20.0	-6.10	.0	.0	.0	.0	.0
-15.0	-4.57	.0	.0	.0	.0	.0
-10.0	-3.05	.0	.0	.0	.0	.0
-5.0	-1.52	.0	.0	.0	.0	.0
.0	.00	.0	.0	.0	.0	.0
5.0	1.52	.0	.0	.0	.0	.0
10.0	3.05	.0	.0	.0	.0	.0
15.0	4.57	.0	.0	.0	.0	.0
20.0	6.10	.0	.0	.0	.0	.0
25.0	7.62	.0	.0	.0	.0	.0
30.0	9.14	.0	.0	.0	.0	.0
35.0	10.67	.0	.0	.0	.0	.0
40.0	12.19	.0	.0	.0	.0	.0
45.0	13.72	.0	.0	.0	.0	.0
50.0	15.24	.0	.0	.0	.0	.0
55.0	16.76	.0	.0	.0	.0	.0
60.0	18.29	.0	.0	.0	.0	.0
65.0	19.81	.0	.0	.0	.0	.0
70.0	21.34	.0	.0	.0	.0	.0
75.0	22.86	.0	.0	.0	.0	.0

♀

```
*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
```

LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	BPA METHOD L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	CRIEPI AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)
-75.0	-22.86	.0	.0	.0	.0	.0	.0	10.6	5.7	.0
-70.0	-21.34	.0	.0	.0	.0	.0	.0	10.9	5.9	.0
-65.0	-19.81	.0	.0	.0	.0	.0	.0	11.1	6.2	.0
-60.0	-18.29	.0	.0	.0	.0	.0	.0	11.4	6.5	.0
-55.0	-16.76	.0	.0	.0	.0	.0	.0	11.7	6.8	.0
-50.0	-15.24	.0	.0	.0	.0	.0	.0	12.1	7.1	.0
-45.0	-13.72	.0	.0	.0	.0	.0	.0	12.4	7.5	.0
-40.0	-12.19	.0	.0	.0	.0	.0	.0	12.8	7.9	.0
-35.0	-10.67	.0	.0	.0	.0	.0	.0	13.2	8.2	.0
-30.0	-9.14	.0	.0	.0	.0	.0	.0	13.6	8.6	.0
-25.0	-7.62	.0	.0	.0	.0	.0	.0	14.0	9.1	.0
-20.0	-6.10	.0	.0	.0	.0	.0	.0	14.4	9.5	.0
-15.0	-4.57	.0	.0	.0	.0	.0	.0	14.8	9.9	.0

-10.0	-3.05	.0	.0	.0	.0	.0	.0	15.2	10.2
.0									
-5.0	-1.52	.0	.0	.0	.0	.0	.0	15.5	10.5
.0									
.0	.00	.0	.0	.0	.0	.0	.0	15.6	10.7
.0									
5.0	1.52	.0	.0	.0	.0	.0	.0	15.6	10.7
.0									
10.0	3.05	.0	.0	.0	.0	.0	.0	15.4	10.5
.0									
15.0	4.57	.0	.0	.0	.0	.0	.0	15.1	10.1
.0									
20.0	6.10	.0	.0	.0	.0	.0	.0	14.7	9.7
.0									
25.0	7.62	.0	.0	.0	.0	.0	.0	14.2	9.3
.0									
30.0	9.14	.0	.0	.0	.0	.0	.0	13.8	8.9
.0									
35.0	10.67	.0	.0	.0	.0	.0	.0	13.4	8.4
.0									
40.0	12.19	.0	.0	.0	.0	.0	.0	13.0	8.0
.0									
45.0	13.72	.0	.0	.0	.0	.0	.0	12.6	7.7
.0									
50.0	15.24	.0	.0	.0	.0	.0	.0	12.2	7.3
.0									
55.0	16.76	.0	.0	.0	.0	.0	.0	11.9	7.0
.0									
60.0	18.29	.0	.0	.0	.0	.0	.0	11.6	6.7
.0									
65.0	19.81	.0	.0	.0	.0	.0	.0	11.3	6.4
.0									
70.0	21.34	.0	.0	.0	.0	.0	.0	11.0	6.1
.0									
75.0	22.86	.0	.0	.0	.0	.0	.0	10.7	5.8
.0									

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\PROGRA~1\EPRI\EMFW_251\ENVIRO\HUGH69ST.I01

DATE: 6/18/2010 TIME: 14:54

Hughson-Grayson 69-kV SC Typic

****
* BUNDLE INFORMATION *

BNDL #	CIRC #	VOLTAGE (kV)	VOLTAGE ANGLE (DEG)	LOAD (AMPS)	CURRENT ANGLE (DEG)	# OF COND	COORDINATES X (FT)	Y (FT)	PHASE
1	1	69.0	.0	150.0	.0	1	4.0	39.0	A
2	1	69.0	240.0	150.0	120.0	1	-4.0	31.0	B
3	1	69.0	120.0	150.0	240.0	1	4.0	23.0	C
4	3	.0	.0	.0	.0	1	.0	40.0	GND

* MINIMUM GROUND CLEARANCE = 23.000 FT. *

****
* SUBCONDUCTOR INFORMATION - REGULAR BUNDLES *

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI)	AC RESIST. (OHMS/MI)	AC REACT. (OHMS/MI)
1	.918	.000	.14640	.14900	.428000
2	.918	.000	.14640	.14900	.428000
3	.918	.000	.14640	.14900	.428000
4	.918	.000	.14640	.14900	.428000

****
* MAXIMUM SURFACE GRADIENT (kV/cm) *
****

BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
1	AC	6.12	8.65	-8.65
2	AC	6.04	8.54	-8.54
3	AC	5.90	8.34	-8.34
4	Ground Wire	1.22	1.73	-1.73

♀

****
* AC ELECTRIC FIELD PROFILE *
* at 3.28 feet above ground *
****

LATERAL DISTANCE (feet)	(meters)	MAXIMUM FIELD (kV/m)	MINOR/MAJOR ELLIPSE AXES (ratio)	VERTICAL (kV/m)	HORIZONTAL (kV/m)	SPACE POTENTIAL (kV)
-75.0	-22.86	.048	.042	.048	.005	.048
-70.0	-21.34	.055	.045	.055	.006	.055

-65.0	-19.81	.063	.049	.063	.007	.063
-60.0	-18.29	.074	.052	.074	.009	.074
-55.0	-16.76	.087	.056	.087	.011	.087
-50.0	-15.24	.104	.060	.103	.014	.104
-45.0	-13.72	.125	.066	.124	.017	.125
-40.0	-12.19	.152	.073	.151	.022	.151
-35.0	-10.67	.185	.084	.183	.028	.184
-30.0	-9.14	.225	.100	.223	.036	.223
-25.0	-7.62	.273	.125	.271	.048	.271
-20.0	-6.10	.331	.159	.329	.067	.328
-15.0	-4.57	.409	.190	.405	.098	.405
-10.0	-3.05	.524	.190	.517	.133	.516
-5.0	-1.52	.684	.152	.675	.151	.670
.0	.00	.841	.106	.837	.120	.821
5.0	1.52	.908	.074	.908	.067	.887
10.0	3.05	.841	.060	.837	.094	.823
15.0	4.57	.682	.062	.672	.121	.669
20.0	6.10	.506	.075	.495	.113	.498
25.0	7.62	.358	.095	.349	.089	.353
30.0	9.14	.251	.118	.245	.064	.249
35.0	10.67	.180	.136	.177	.044	.179
40.0	12.19	.136	.141	.134	.030	.135
45.0	13.72	.108	.133	.107	.020	.108
50.0	15.24	.090	.115	.090	.014	.090
55.0	16.76	.078	.095	.078	.010	.078
60.0	18.29	.069	.077	.069	.007	.069
65.0	19.81	.061	.062	.061	.006	.061
70.0	21.34	.055	.051	.055	.005	.055
75.0	22.86	.050	.042	.050	.004	.050

♀

AC CURRENTS IN EACH BUNDLE:

BNDL #	----- AC CURRENTS (Amperes) ----- REAL	IMAGINARY	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
1	150.00	.00	150.00	4.00	39.00
2	-75.00	129.90	150.00	-4.00	31.00
3	-75.00	-129.90	150.00	4.00	23.00
4	-13.60	-8.91	16.26	.00	40.00

♀

```
*************************************
*                                   *
*       MAGNETIC FIELD PROFILE      *
*     at   3.28 feet  above ground  *
*                                   *
*************************************
```

LATERAL DISTANCE (feet)	(meters)	<---------- AC MAGNETIC FIELD ----------> MAJOR AXIS (mG)	MINOR/ MAJOR (RATIO)	VERTICAL COMP (mG)	HORIZONTAL COMP (mG)	RMS RESULTANT (mG)
-75.0	-22.86	2.59	.415	2.52	1.24	2.81
-70.0	-21.34	2.86	.437	2.79	1.40	3.13
-65.0	-19.81	3.18	.461	3.12	1.60	3.50
-60.0	-18.29	3.55	.485	3.50	1.84	3.95
-55.0	-16.76	4.00	.511	3.96	2.13	4.49
-50.0	-15.24	4.54	.538	4.51	2.50	5.15
-45.0	-13.72	5.19	.565	5.17	2.98	5.97
-40.0	-12.19	6.00	.592	5.99	3.57	6.97

-35.0	-10.67	7.00	.617	7.00	4.32	8.23
-30.0	-9.14	8.27	.635	8.27	5.25	9.79
-25.0	-7.62	9.88	.640	9.86	6.35	11.73
-20.0	-6.10	11.95	.627	11.85	7.65	14.10
-15.0	-4.57	14.52	.593	14.09	9.31	16.89
-10.0	-3.05	17.51	.543	15.93	11.98	19.93
-5.0	-1.52	20.49	.485	15.91	16.30	22.78
.0	.00	22.66	.430	12.79	21.10	24.67
5.0	1.52	23.17	.385	8.96	23.15	24.83
10.0	3.05	21.79	.355	10.21	20.75	23.13
15.0	4.57	19.21	.337	12.85	15.68	20.27
20.0	6.10	16.28	.330	13.46	10.60	17.14
25.0	7.62	13.56	.328	12.52	6.85	14.27
30.0	9.14	11.25	.331	10.95	4.52	11.85
35.0	10.67	9.37	.335	9.32	3.27	9.88
40.0	12.19	7.86	.339	7.86	2.66	8.30
45.0	13.72	6.66	.342	6.64	2.34	7.04
50.0	15.24	5.70	.345	5.64	2.12	6.03
55.0	16.76	4.93	.346	4.84	1.94	5.21
60.0	18.29	4.30	.347	4.18	1.78	4.55
65.0	19.81	3.78	.346	3.66	1.63	4.00
70.0	21.34	3.35	.344	3.22	1.48	3.55
75.0	22.86	3.00	.341	2.87	1.35	3.17

```
*********************************
*                               *
*         AUDIBLE NOISE         *
*   GENERATED ACOUSTIC POWER    *
*       (dB above 1uW/m)        *
*                               *
*********************************
```

BNDL #	Type	Summer Fair	L5 RAIN	L50 RAIN
1	AC	******	******	******
2	AC	******	******	******
3	AC	******	******	******
4	Ground Wire	******	******	******

♀

```
*****************************************
*                                       *
*              AUDIBLE NOISE            *
*                                       *
* Microphone is   5.00 feet  above ground *
*          Altitude      103. ft        *
*                                       *
*****************************************
```

<---------- HVTRC CALCULATION METHOD ---------->

LATERAL DISTANCE (feet)	(meters)	L50 FAIR (dB(A))	L5 RAIN (dB(A))	L50 RAIN (dB(A))	Leq(24) (dB(A))	Ldn (dB(A))
-75.0	-22.86	.0	.0	.0	.0	.0
-70.0	-21.34	.0	.0	.0	.0	.0
-65.0	-19.81	.0	.0	.0	.0	.0
-60.0	-18.29	.0	.0	.0	.0	.0
-55.0	-16.76	.0	.0	.0	.0	.0
-50.0	-15.24	.0	.0	.0	.0	.0
-45.0	-13.72	.0	.0	.0	.0	.0
-40.0	-12.19	.0	.0	.0	.0	.0
-35.0	-10.67	.0	.0	.0	.0	.0
-30.0	-9.14	.0	.0	.0	.0	.0
-25.0	-7.62	.0	.0	.0	.0	.0

-20.0	-6.10	.0	.0	.0	.0	.0
-15.0	-4.57	.0	.0	.0	.0	.0
-10.0	-3.05	.0	.0	.0	.0	.0
-5.0	-1.52	.0	.0	.0	.0	.0
.0	.00	.0	.0	.0	.0	.0
5.0	1.52	.0	.0	.0	.0	.0
10.0	3.05	.0	.0	.0	.0	.0
15.0	4.57	.0	.0	.0	.0	.0
20.0	6.10	.0	.0	.0	.0	.0
25.0	7.62	.0	.0	.0	.0	.0
30.0	9.14	.0	.0	.0	.0	.0
35.0	10.67	.0	.0	.0	.0	.0
40.0	12.19	.0	.0	.0	.0	.0
45.0	13.72	.0	.0	.0	.0	.0
50.0	15.24	.0	.0	.0	.0	.0
55.0	16.76	.0	.0	.0	.0	.0
60.0	18.29	.0	.0	.0	.0	.0
65.0	19.81	.0	.0	.0	.0	.0
70.0	21.34	.0	.0	.0	.0	.0
75.0	22.86	.0	.0	.0	.0	.0

♀

```
*************************
*                       *
*     AUDIBLE NOISE     *
*    (other methods)    *
*                       *
* Altitude      103. ft *
*                       *
*************************
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LATERAL DISTANCE (feet)	(meters)	FAIR WEATHER dB(A)	BPA METHOD L5 RAIN dB(A)	L50 RAIN dB(A)	Ldn dB(A)	CRIEPI AVERAGE FAIR dB(A)	L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)
-75.0	-22.86	.0	.0	.0	.0	.0	.0	10.6	5.7	.0
-70.0	-21.34	.0	.0	.0	.0	.0	.0	10.9	5.9	.0
-65.0	-19.81	.0	.0	.0	.0	.0	.0	11.1	6.2	.0
-60.0	-18.29	.0	.0	.0	.0	.0	.0	11.4	6.5	.0
-55.0	-16.76	.0	.0	.0	.0	.0	.0	11.7	6.8	.0
-50.0	-15.24	.0	.0	.0	.0	.0	.0	12.1	7.1	.0
-45.0	-13.72	.0	.0	.0	.0	.0	.0	12.4	7.5	.0
-40.0	-12.19	.0	.0	.0	.0	.0	.0	12.8	7.9	.0
-35.0	-10.67	.0	.0	.0	.0	.0	.0	13.2	8.2	.0
-30.0	-9.14	.0	.0	.0	.0	.0	.0	13.6	8.6	.0
-25.0	-7.62	.0	.0	.0	.0	.0	.0	14.0	9.1	.0
-20.0	-6.10	.0	.0	.0	.0	.0	.0	14.4	9.5	.0
-15.0	-4.57	.0	.0	.0	.0	.0	.0	14.8	9.9	.0

-10.0	-3.05	.0	.0	.0	.0	.0	.0	15.2	10.2
.0									
-5.0	-1.52	.0	.0	.0	.0	.0	.0	15.5	10.5
.0									
.0	.00	.0	.0	.0	.0	.0	.0	15.6	10.7
.0									
5.0	1.52	.0	.0	.0	.0	.0	.0	15.6	10.7
.0									
10.0	3.05	.0	.0	.0	.0	.0	.0	15.4	10.5
.0									
15.0	4.57	.0	.0	.0	.0	.0	.0	15.1	10.1
.0									
20.0	6.10	.0	.0	.0	.0	.0	.0	14.7	9.7
.0									
25.0	7.62	.0	.0	.0	.0	.0	.0	14.2	9.3
.0									
30.0	9.14	.0	.0	.0	.0	.0	.0	13.8	8.9
.0									
35.0	10.67	.0	.0	.0	.0	.0	.0	13.4	8.4
.0									
40.0	12.19	.0	.0	.0	.0	.0	.0	13.0	8.0
.0									
45.0	13.72	.0	.0	.0	.0	.0	.0	12.6	7.7
.0									
50.0	15.24	.0	.0	.0	.0	.0	.0	12.2	7.3
.0									
55.0	16.76	.0	.0	.0	.0	.0	.0	11.9	7.0
.0									
60.0	18.29	.0	.0	.0	.0	.0	.0	11.6	6.7
.0									
65.0	19.81	.0	.0	.0	.0	.0	.0	11.3	6.4
.0									
70.0	21.34	.0	.0	.0	.0	.0	.0	11.0	6.1
.0									
75.0	22.86	.0	.0	.0	.0	.0	.0	10.7	5.8
.0									

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions. If a prediction method does not apply, the appropriate output data column will be zeros.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE TID ALMOND 2 *POWER PLANT PROJECT*

Docket No. 09-AFC-2

PROOF OF SERVICE
(Revised 7/30/10)

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*indicates change

DECLARATION OF SERVICE

I, Sarah Madams, declare that on September 29, 2010, I served and filed copies of the attached, Hughson-Grayson 115kV Transmission Line and Substation Project, Revised Draft Environmental Impact Report, dated, July 23, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/almond].**

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

_____ sent electronically to all email addresses on the Proof of Service list;

___x___ by personal delivery or by depositing in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

___x___ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-2
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Sarah Madams