Le Grand-Athlone
WATER DISTRICT

Merced Irrigation District Canal Intertie Project

Draft Initial Study / Mitigated Negative Declaration

May 2022

Prepared for:
Le Grand-Athlone Water District
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Chowchilla, CA, 93610

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Acronyms and Abbreviations

AB	Agriculture
A-1	General Agriculture
A-2	Exclusive Agriculture
AB	Assembly Bill
APE	Area of Potential Effect
ARA	Aggreagte Resource Area
BMP	Best Management Practices
BPS	Best Performance Standards
CARB	California Air Resources Board
CNAGPRA	California Native American Graves Protection and Repatriation Act
CCAA	California Clean Air Act
CCIC	Central California Information Center
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH4	Methane
CHRIS	California Historical Resources Information System
CL III	Class 3
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO2	Carbon Dioxide
County	Merced County
CRHR	California Register of Historic Places
dBA	decibels
District	Le Grand-Athlone Water District
DOC	California Department of Conservation
DTSC	(California) Department of Toxic Substances Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
F	Fahrenheit
FEMA	Federal Emergency Management Agency

FMMP	Farmland Mapping and Monitoring Program
FP	Foothill Pasture
GCP	California General Construction Permit
GHG	Greenhouse Gas
GIS	Geographic Information System
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWP	Global Warming Position
HFCs	Hydrofluorocarbons
HUC	Hydrologic Unit Code
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
km	kilometers
lbs.	Pounds
Ldn	Day/Night Average Sound Level
LGAWD	Le Grand-Athlone Water District
LSA	Lake or Streambed Alteration
MID	Merced Irrigation District
MMRP	Mitigation Monitoring and Reporting Program
MND	Mitigated Negative Declaration
MTCO2e	Metric tons of carbon dioxide equivalent
N2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
ND	Negative Declaration
NOx	Nitrogen Oxides
NO2	Nitrogen Dioxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O3	Ozone
Pb	Lead
PFCs	Perfluorocarbons
PM10	particulate matter 10 microns in size
PM2.5	particulate matter 2.5 microns in size

ppb	parts per billion
ppm	parts per million
Project	Merced Irrigation District Canal Intertie Project
QSD	Qualified Sediment Developer
QSP	Qualified Sediment Practitioner
RGRCP	Rubber Gasket Reinforced Concrete Pipe
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SacMetro Model	Sacramento Metropolitan Air Quality Management District Road Construction Emissions
SF6	Sulfur Hexafluoride
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO2	Sulfur Dioxide
SOx	Sulfur Oxide
SRA	State Responsibility Area
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
Tons/Year	Tons per Year
TPY	Tons Per Year
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Story
UST	Underground Storage Tank
VMT	Vehicle Miles Traveled
WEAP	Worker Environmental Awareness Program
µg/m3	micrograms per cubic meter

Chapter 1 Introduction

Provost & Pritchard Consulting Group (Provost & Pritchard) has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) on behalf of Le Grand-Athlone Water District (LGAWD) to address the environmental effects of the proposed Merced Irrigation District (MID) Canal Intertie Project (Project). This document has been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 *et seq*.) The LGAWD is the CEQA lead agency for this Project.

The term "project" refers to the whole of an action and to the underlying physical activity being approved, not to each government approval (CEQA Guidelines Section 15378(c)). Thus, even if the Lead Agency needs to grant more than one approval for a project, only one CEQA document should be prepared. Similarly, if more than one government agency must grant an approval, only one CEQA document should be prepared. This approach ensures that responsible agencies granting later approvals can rely on the lead agency's single CEQA document. Activities or facilities necessary for the operation of a project, or necessary to achieve the project objectives, or a reasonably foreseeable consequence of approving the project, then it should be considered an integral project component that should be analyzed within the environmental analysis. The project description should include all project components, including those that will have to be approved by responsible agencies. When future phases of a project are possible, but too speculative to be evaluated, the CEQA document should still mention that future phases may occur, provide as much information as is available about these future phases, and indicate that they would be subject to future CEQA review. Therefore, this CEQA document analyzes and maps all resources within a greater canal boundary, as well as discusses specific known project activities that are currently funded by the lead agency.

The site and the Project are described in detail in **Chapter 2 Project Description**.

1.1 Regulatory Information

An Initial Study (IS) is a document prepared by a lead agency to determine whether a project may have a significant effect on the environment. In accordance with California Code of Regulations Title 14 (Chapter 3, Section 15000, *et seq*.) - also known as the CEQA Guidelines - Section 15064 (a)(1) states that an environmental impact report (EIR) must be prepared if there is substantial evidence in light of the whole record that the proposed Project under review may have a significant effect on the environment and should be further analyzed to determine mitigation measures or project alternatives that might avoid or reduce project impacts to less than significant levels. A negative declaration (ND) may be prepared instead if the lead agency finds that there is ***no*** substantial evidence in light of the whole record that the project may have a significant effect on the environment. An ND is a written statement describing the reasons why a proposed Project, not otherwise exempt from CEQA, would not have a significant effect on the environment and, therefore, why it would not require the preparation of an EIR (CEQA Guidelines Section 15371). According to CEQA Guidelines Section 15070, a ND or *mitigated* ND shall be prepared for a project subject to CEQA when either:

a. The IS shows there is no substantial evidence, in light of the whole record before the agency, that the proposed Project may have a significant effect on the environment, or

b. The IS identified potentially significant effects, but:

    1. Revisions in the project plans or proposals made by or agreed to by the applicant before the proposed MND and IS is released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur is prepared, and

    2. There is no substantial evidence, in light of the whole record before the agency, that the proposed Project *as revised* may have a significant effect on the environment.

1.2 Document Format

This IS/MND contains four chapters and four appendices, **Chapter 1 Introduction**, provides an overview of the Project and the CEQA process. **Chapter 2 Project Description**, provides a detailed description of Project components and objectives. **Chapter 3 Impact Analysis**, presents the CEQA checklist and environmental analysis for all impact areas, mandatory findings of significance, and feasible mitigation measures. If the Project does not have the potential to significantly impact a given issue area, the relevant section provides a brief discussion of the reasons why no impacts are expected. If the Project could have a potentially significant impact on a resource, the issue area discussion provides a description of potential impacts, and appropriate mitigation measures and/or permit requirements that would reduce those impacts to a less than significant level. **Chapter 3** concludes with the Lead Agency's determination based upon this initial evaluation. **Chapter 4 Mitigation Monitoring and Reporting Program** (MMRP) provides the mitigation measures, implementation timelines, and the entity/agency responsible for ensuring implementation. Technical documents that support the analysis are provided at the end of this document. **Appendix A** provides SacMetro Output Files that contain air quality and greenhouse gas analysis, **Appendix B** is the Biological Evaluation Report, **Appendix C** provides Cultural Resources Report for the Project.

Chapter 2 Project Description

2.1 Project Background and Objectives

2.1.1 Project Title

Le Grand-Athlone Water District Merced Irrigation District Canal Intertie Project.

2.1.2 Lead Agency Name and Address

Le Grand-Athlone Water District
216 Robertson Boulevard
Chowchilla, California, 93610

2.1.3 Contact Person and Phone Number

Lead Agency Contact
Phil Janzen
President
(559) 665-4803

CEQA Consultant
Provost & Pritchard Consulting Group
Dena Giacomini, Principal Planner, Project Manager
(661) 616-5900

2.1.4 Project Location

The Project is located within Merced County, California, approximately 110 miles southeast of Sacramento from its northern most point and 35 miles northwest of Fresno from its southern most point (see **Figure 2-1** and **Figure 2-2**). This is a linear Project starting at the existing MID canal facilities approximately 1.8 miles northeast of the Town of Planada and continues south approximately 14.5-miles through agricultural, grazing, and open lands, ending approximately one mile north of the Chowchilla River as shown in **Figure 2-3**. **Table 2-1** below identifies the Assessor's Parcel Numbers (APNs) associated with properties involved with this Project.

Table 2-1. APNs within Project APE

Project Associated APN Parcels				
068190005000	068030028000	053290018000	068010012000	068230057000
068200001000	068030090000	053290024000	068010010000	068030095000
068130041000	068030026000	053250014000	068010025000	068122009000
068130040000	068030089000	053150038000	068030024000	068122008000
068130006000	068010028000	053150040000	068030063000	068290020000
068130023000	068010016000	053150010000	068030086000	068290017000
068130005000	068010014000	053150009000	053100020000	068290011000
068030087000	068010027000	053150007000	053100038000	068290010000
068030069000	068010020000	053250003000	053100065000	068290009000

Project Associated APN Parcels				
068030070000	068010026000	053100039000	053250002000	068290006000
068030051000	053290022000	053100030000	053250013000	068290013000
068030082000	053290016000	053100047000	053290017000	
068030083000	053290021000	067010030000	053290020000	
068030047000	053290019000	068010001000	067010033000	

2.1.5 Latitude and Longitude

- Northernmost point: 37° *18' 55" N and 120° 18' 15" W*
- Southernmost point: 37° *10' 27" N and 120° 13' 13" W*

2.1.6 General Plan Designation & Zoning

The Project is located in a rural part of Merced County and designated for the following land uses:

A – Agriculture
FP – Foothill Pasture

In addition, the Project is zoned for the following:

A-1 – General Agriculture
A-2 – Exclusive Agriculture

See **Figure 2-4** and **Figure 2-5** for the general plan designations and zoning, respectively.

2.1.7 Description of Project

LGAWD Board of Directors in a joint effort with MID proposes to construct the Project. MID's canal system provides the primary conveyance of surface water in the Merced Subbasin and is the Project's water source. The Project will construct a critical piece of infrastructure to help LGAWD, and the larger Merced Groundwater Subbasin, become more sustainable through reduced reliance on groundwater pumping. The Project includes improvements, rehabilitation, and expansion of the existing MID canal capacity for approximately 9.8 miles and constructing approximately 4.9 miles of new canal and pipeline infrastructure from MID Booster Lateral #3 to LGAWD. The total Project Area of Potential Effect (APE) is approximately 320 acres.

The Project would be completed in three phases. Phase 1 would result in the construction of a new intertie canal from Mariposa Creek to Dutchman Creek. Phase 2 would result in the expansion of existing canal facilities from a point of the MID Le Grand Canal approximately 1.8 miles northeast of Planada and run 9.8 miles south to the MID Booster Lateral #3 at Mariposa Creek. Phase 3 would result in the construction of a new LGAWD pump station immediately south of Dutchman Creek and a new buried pipeline that would cross under the Sante Fe Railroad continuing on private property until it reaches the end of Earl Road. At this point, an open canal would connect to the pipeline and run to a point approximately one mile north of the Chowchilla River, completing the Project. Phases 1 and 3 would result in approximately 4.9 miles of new canal/pipeline facilities. The new canal would create a way for flood flows to be captured, recharged, or used for agricultural demands in LGAWD that would otherwise be lost, introducing a new surface water supply source. The Project would cross Owens, Mariposa, Little Deadman, Deadman, and Dutchman Creeks. To cross these creeks, the Project would result in the construction of multiple new canal siphon structures. Crossing Owens Creek, the Project would use existing infrastructure. In addition, the Project would construct numerous new culverts under existing roadways that the Project would cross, as well as jack and bore activities to install steel casing under the Sante Fe Railroad. Where the Project would cross roadways, a partial lane-split road closure would be used to maintain through traffic during construction.

The Merced Subbasin is considered to be in critical overdraft and the Project would decrease reliance on groundwater pumping, energy consumption, and subsidence in the southern Merced Subbasin, while creating a new surface water supply, optimizing recharge, and also providing direct benefits to underrepresented Communities in the Le Grand-Athlone area and the southern Merced Subbasin. Construction of Phases 1 and 3 would last approximately 18 months and have a crew of 8-10 workers, while Phase 2 would last approximately 18 months with a crew of 4-10 workers. Outlined within the figures and overall analyses discussion (found within **Chapter 3** of this document) include known funded activities, in addition to future potential Project activities. Known Project activities are summarized below:

Phase 1 and 3:

- *Construction of new lined canal*
- *Construction of new earth canal*
- *Installation of new 63" Cement Mortar Lined and Coated Steel Pipe*
- *Construction of new canal inverts*
- *Construction of new canal banks*
- *Installation of new 84" CL III Rubber Gasketed Reinforced Concrete Pipe (RGRCP)*
- *Installation of new 72" CL III RGRCP*
- *Installation of new 84" RGRCP Siphons*
- *Installation of new 72" RGRCP Siphons*
- *Construction of a new LGAWD turnout*
- *Construction of a new spill structures with Creek turnouts*
- *Construction of a new pump station*
- *Jack and bore activities, installing steel casing beneath Sante Fe Railroad*
- *Installation of air vents*
- *Installation of air release valves*
- *Construction of new canal drop structure*

Phase 2:

- *Replacement of Booster Pump #3 Station*
- *Jack and bore activities, installing steel casing beneath Sante Fe Railroad*
- *Enlargement of earth lined canal*
- *Construction of new canal inverts*
- *Removal of 72" Corrugated Metal Pipe, replaced with 84" CL III RGRCP*
- *Enlargement of concrete lined canal, removal and replacement activities*
- *Enlargement of concrete lined earth canal*
- *Installation of new inverts*
- *Installation of new 72" CL III RGRCP*
- *Removal of culverts*
- *Installation of new 60" CL III RGRCP*
- *Installation of new 36" canal turnouts*
- *Excavation and re-sloping of canal bank slopes for canal enlargement*
- *Removal and replacement of farm bridges*

2.1.8 Site and Surrounding Land Uses and Setting

The Project located in the northern San Joaquin Valley section of the Central Valley and is bounded by Sierra Mountain Range and foothills to the east, Coastal Mountains to the west, Highway 140 to the north, with some smaller towns and the City of Fresno to the south. The Project runs parallel, east of Highway 99. The Project is characterized by gently rolling terrain and flat areas. There are a number of creeks that run near or through the area, including Owens, Mariposa, Little Deadman, Deadman, and Dutchman Creeks. The Project area is dominated by agriculture uses such as row crops and orchards, as well as grazing lands with minor, rural, single-family residences surrounding the Project.

2.1.9 Other Public Agencies Whose Approval May Be Required

- *California Department of Fish and Wildlife – CDFW*
- *California Department of Water Resources – DWR*
- *California Regional Water Quality Control Board – RWQCB*
- *California State Water Resources Control Board – SWRCB*
- *Merced County*
- *Merced Irrigation District – MID*
- *United States Army Corps of Engineers – USACE*

2.1.10 Consultation with California Native American Tribes

Public Resources Code Section 21080.3.1, *et seq. ((codification of Assembly Bill (AB) 52, 2013-14)*) requires that a lead agency, within 14 days of determining that it will undertake a project, must notify in writing any California Native American Tribe traditionally and culturally affiliated with the geographic area of the project if that Tribe has previously requested notification about projects in that geographic area. The notice must briefly describe the project and inquire whether the Tribe wishes to initiate request formal consultation. Tribes have 30 days from receipt of notification to request formal consultation. The lead agency then has 30 days to initiate the consultation, which then continues until the parties come to an agreement regarding necessary mitigation or agree that no mitigation is needed, or one or both parties determine that negotiation occurred in good faith, but no agreement will be made.

LGAWD has not received any written correspondence from Tribes pursuant to Public Resources Code Section 21080.3.1 requesting notification of Project.

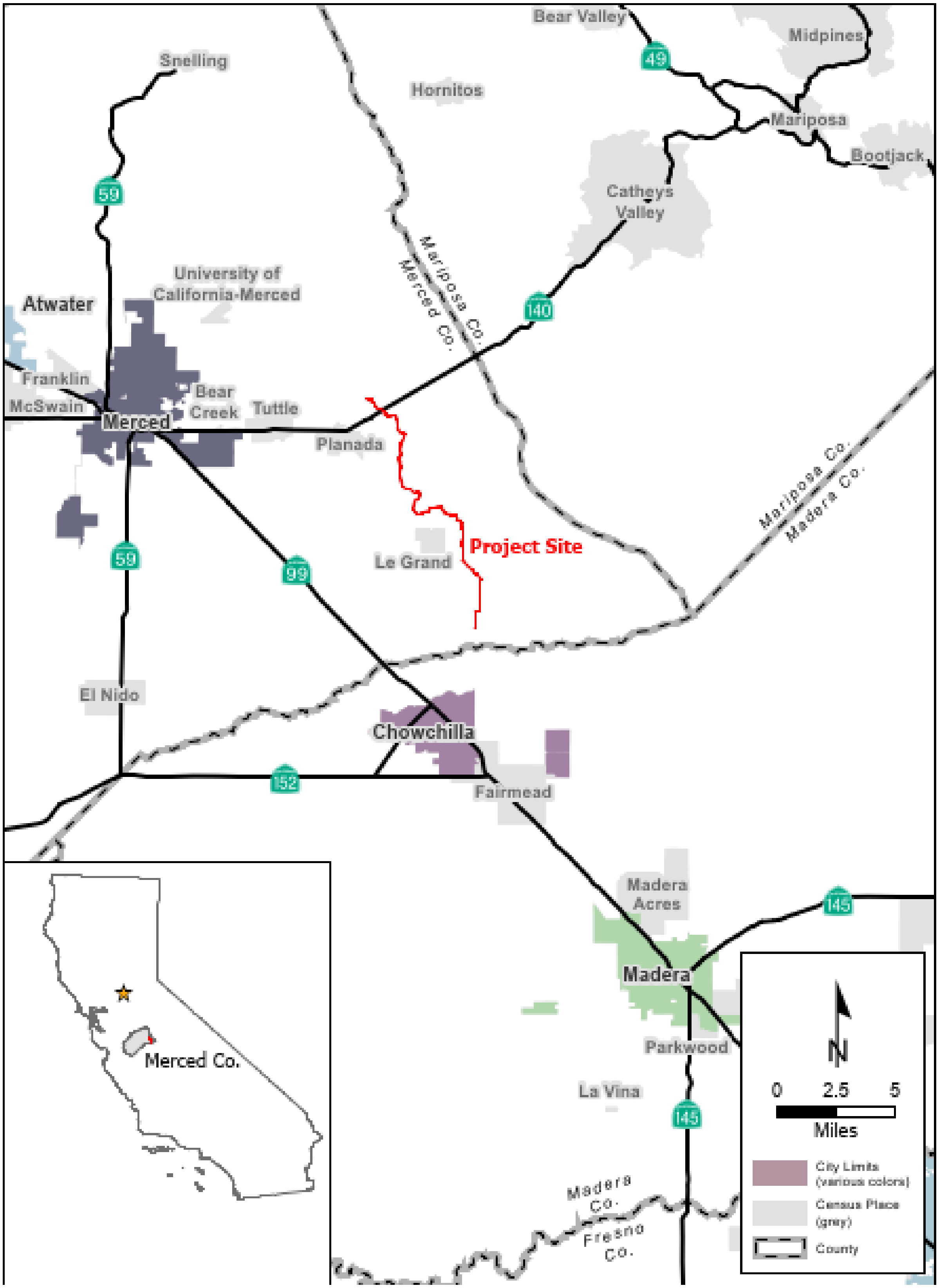

Figure 2-1. Regional Location Map

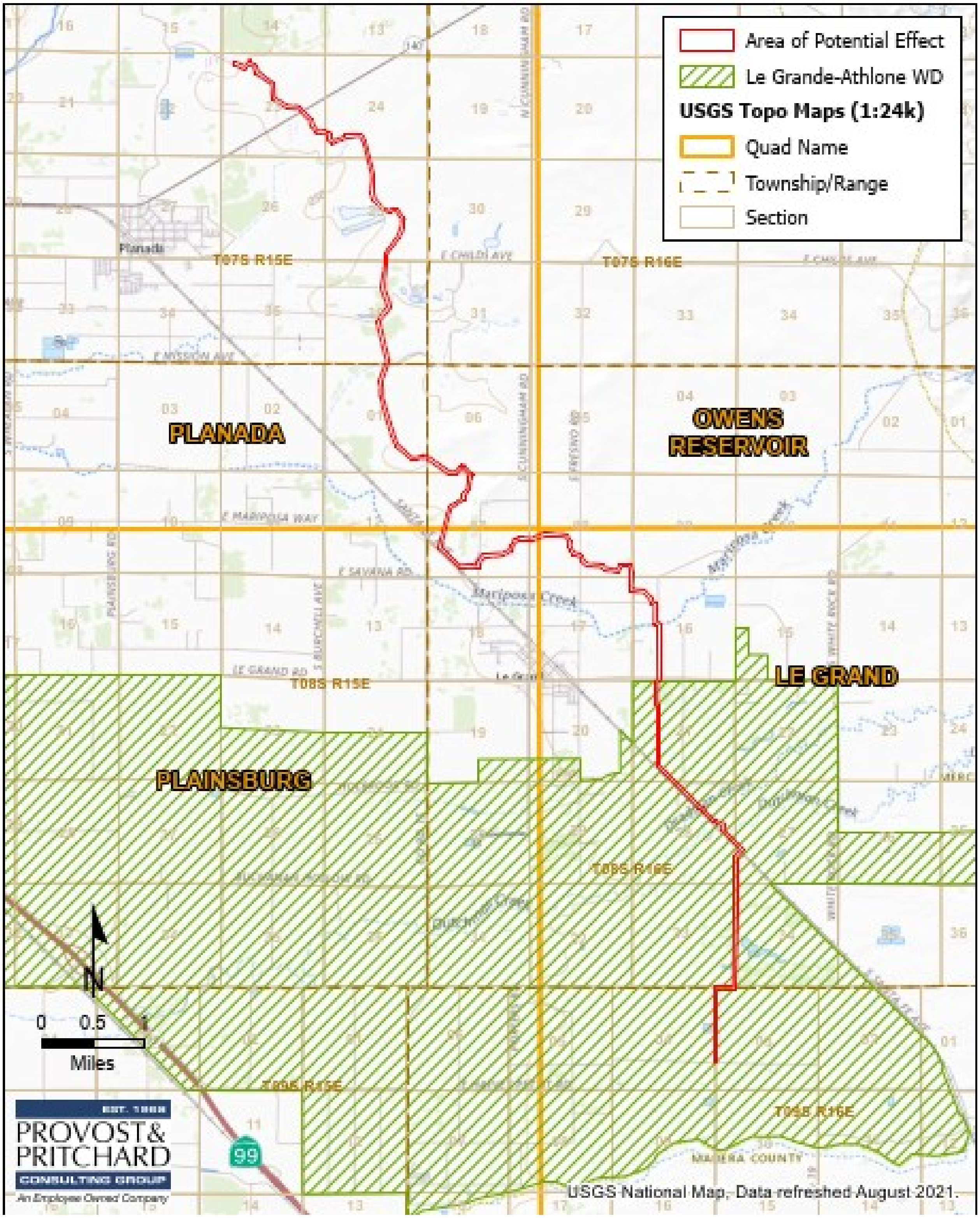

Figure 2-2. Topographic Quadrangle Map

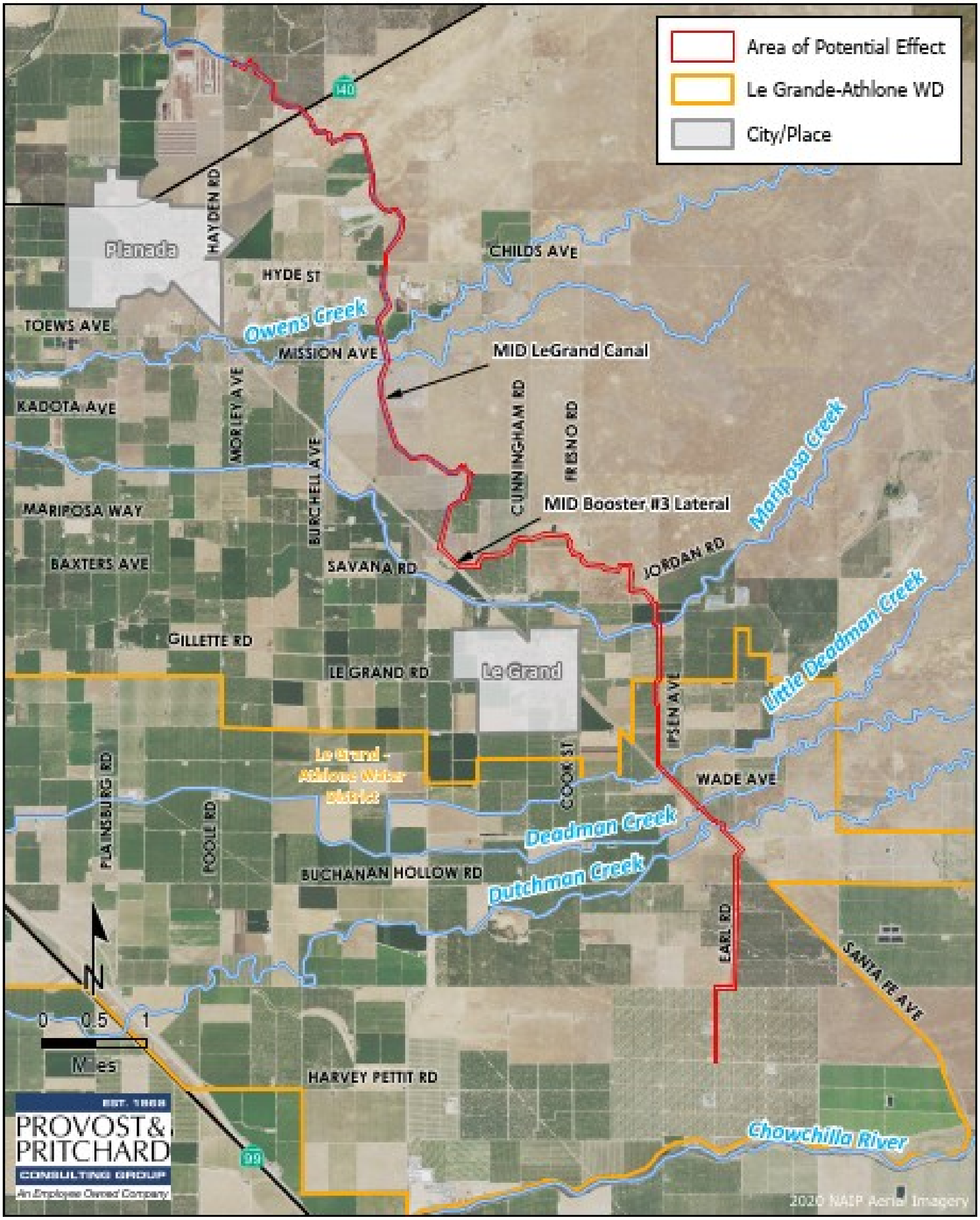

Figure 2-3. Area of Potential Effect Map

Figure 2-4. General Plan Land Use Designation Map

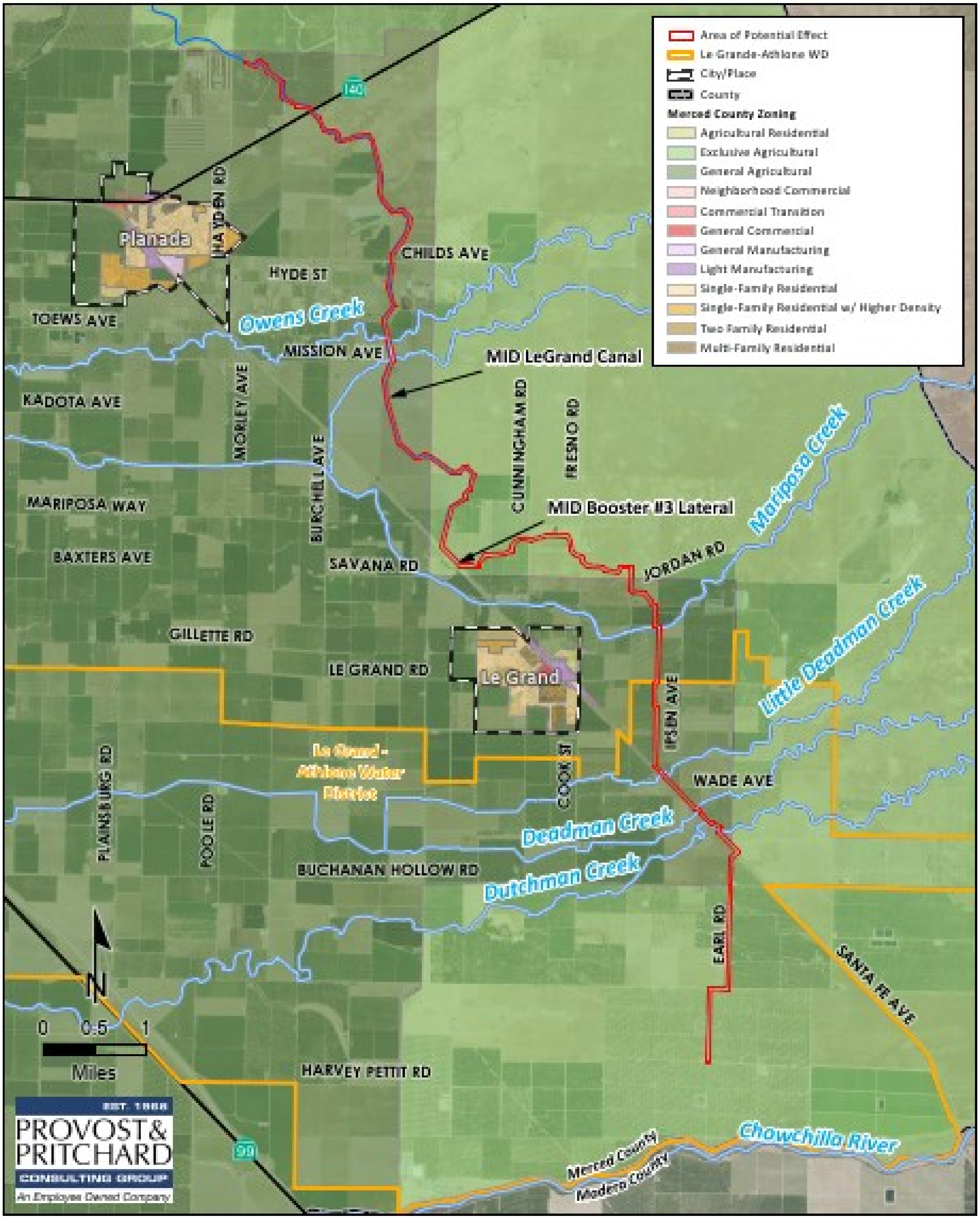

Figure 2-5. Zoning Map

Chapter 3 Impact Analysis

3.1 Environmental Factors Potentially Affected

As indicated by the discussions of existing and baseline conditions, and impact analyses that follow in this Chapter, environmental factors not checked below would have no impacts or less than significant impacts resulting from the project. Environmental factors that are checked below would have potentially significant impacts resulting from the project. Mitigation measures are recommended for each of the potentially significant impacts that would reduce the impact to less than significant.

☒ Aesthetics	☐ Agriculture & Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☒ Geology/Soils	☐ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☒ Wildfire	☒ Mandatory Findings of Significance

The analyses of environmental impacts here in **Chapter 4 Mitigation Monitoring and Reporting Program** are separated into the following categories:

Potentially Significant Impact. This category is applicable if there is substantial evidence that an effect may be significant, and no feasible mitigation measures can be identified to reduce impacts to a less than significant level. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

Less than Significant with Mitigation Incorporated. This category applies where the incorporation of mitigation measures would reduce an effect from a "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measure(s), and briefly explain how they would reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced).

Less than Significant Impact. This category is identified when the proposed Project would result in impacts below the threshold of significance, and no mitigation measures are required.

No Impact. This category applies when a project would not create an impact in the specific environmental issue area. "No Impact" answers do not require a detailed explanation if they are adequately supported by the information sources cited by the lead agency, which show that the impact does not apply to the specific project (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

3.2 Aesthetics

Table 3-1. Aesthetics Impacts

Aesthetics Impacts				
Except as provided in Public Resources Code Section 21099, would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

3.2.1 Environmental Baseline Conditions

Aesthetics and visual resources are natural and cultural landscape features that people see and that contribute to the public's appreciative enjoyment of the environment. Aesthetic and visual resource impacts are generally defined in terms of the extent to which the project's physical characteristics and potential visibility would change the perceived visual character and visual quality of the viewed landscape. The visual character of the areas surrounding the Project currently consists of a rural, agricultural environment. The existing Le Grand Canal runs north to south and is located within the San Joaquin Valley, located west of the Sierra Nevada Mountain Range and is surrounded by active farmland to the north, west and south. Many creeks and streams run near or through the existing and proposed canal segments, including the Dutchman Creek, Deadman Creek, Little Deadman Creek, Mariposa Creek, Owens Creek, Bear Creek, Burns Creek, and Black Rascal Creek. The agricultural areas consist of grazing lands, orchards, and row crops.

The County considers its rural and agricultural landscapes to be the primary scenic resources and identifies its streams and river corridors as important established scenic vistas[1]. A large portion of the Project is located within or adjacent to agricultural grazing lands and orchards. The Merced County General Plan has also designated the Sierra Nevada Mountain Ranges, as scenic vistas for the County.[2] The Merced County General Plan also lists State Route 152 and Interstate 5, in the western portion of the County, as the only designated scenic highways within the County.

The California Department of Transportation (Caltrans) has a California State Scenic Highway System map and program[3] that establishes transportation areas as scenic through Senate Bill 1467. The closest officially

[1] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 12/13/21.
[2] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/16/21.
[3] California State Scenic Highway. Website: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed on 12/13/21.

designated scenic highway is located northeast of the Le Grand Canal in Mariposa County on Highway 140. There is segment of State Route 152 and Route 49 that is eligible for placement as scenic highways, but have not been officially designated at this time.

Rural areas within Merced County experience lower amounts of lighting and glare than urban areas. The primary source of lighting and glare within rural areas is generated from rural residential homes. In addition, waterways within the areas, such as canals and laterals, reflect natural light during nighttime. During the night, traffic on surrounding roadways may cause lighting and glare as well.

3.2.2 Impact Assessment

a) Would the project have a substantial adverse effect on a scenic vista?

Less than Significant Impact. The Project would result in construction activities within agricultural areas of eastern Merced County. Activities would include the alteration of farmland, through the removal of vegetation and trees and construction of a new canal segment. While the Merced County General Plan lists agricultural areas as a scenic resource, the alteration and removal of farmland for the placement of a canal segment would not result in the significant impact to a scenic vista because the County considers canals an agriculture use. The Project would alter and remove one agricultural use and replace it with another. Therefore, impacts would be less than significant.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact. The Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. The Project includes agricultural areas that could be considered scenic resources. These areas would experience a loss of trees and other vegetation; however, the Project is not located within the vicinity of any state scenic highway. In addition, the Project would remove one agricultural use and replace it with another. Therefore, impacts would be less than significant.

c) In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public view are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less than Significant Impact. The Project would not, in a non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings. The Project would be located in a rural area of Merced County. The Project would result in the expansion of existing MID canal facilities and construct a new intertie segment of canal to the southeast of the Le Grand Canal. The improvements and construction of a canal would serve to better supply water to farms in the vicinity of the Project. The new segment of canal would not interfere or block existing views and vistas. Overall, canals and irrigation conveyance systems are typical visual aspects within rural, agricultural lands, and found throughout the San Joaquin Valley and serve to assist agricultural farmers in the area with irrigation needs. Therefore, impacts would be less than significant.

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant with Mitigation Incorporated. Construction activities would temporarily increase daytime glare, resulting from reflections off the windows of construction vehicles, vehicle lights, and backup lights on equipment for a period of approximately 36 months. Construction glare would be nominal compared to existing conditions and would not increase the level of glare. If nighttime construction activities occur, lighting equipment could create light and glare that could affect sensitive viewers and adjacent rural residents. Therefore, light and glare impacts from construction would result in a potentially significant impact. The Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. The Project would expand existing MID canal facilities to expand the canal south. Although water is reflective and can reflect sun or moonlight at times, it would not be constant and would function the same as the existing canal segments. However, the Project would not result in the introduction of new building or structures that would present the opportunity for permanent glare or new light in the area. With the implementation of mitigation measures **AES-1**, **AES-2**, and **AQ-1** impacts would be reduced to less than significant impact.

Mitigation Measures:

AES-1 (Construction Hours): Limit construction near residences to daylight hours. Construction activities scheduled to occur between 7 a.m. and 6 p.m. near residential areas within 0.25 mile of construction sites will not take place before or past daylight hours, which vary according to season. This will reduce the amount of construction experienced by viewer groups because most construction activities would occur during business hours when most viewer groups are likely to be at work and eliminate the need to introduce high-wattage lighting sources that would operate near residences.

AES-2 (Fugitive Light): Minimize fugitive light from portable sources used for construction. Any nighttime lighting used for nighttime construction will be evaluated for its ability to safely light the construction work area while reducing light spill and glare. At a minimum, the construction contractor will minimize Project-related light and glare to the maximum extent feasible, given safety considerations, for all viewer groups. Color-corrected halide lights or balloon lights, if suitable for construction of the Project, will be used. Portable lights will be operated at the lowest allowable wattage and height and raised to a height no greater than 20 feet. All lights will be screened and directed downward toward work activities and away from the night sky and nearby residential areas to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.

AQ-1 (Dust Control): Implement fugitive dust controls during construction. Refer to measure description under Section 3.4 **Air Quality**, impact B.

3.3 Agriculture and Forestry Resources

Table 3-2. Agriculture and Forest Impacts

Agriculture and Forest Impacts				
Would the project:	**Potentially Significant Impact**	**Less than Significant With Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

3.3.1 Environmental Baseline Conditions

The Project is surrounded by agricultural land on all sides, with grazing lands to the east leading into the Sierra Nevada foothills. Farmland in the area includes row crops including corn fields and almond orchards. This includes multiple areas that are under Williamson Act contracts. While the Merced County Rules of Procedure do not list canals as an allowed use in an agricultural zone, the Merced County Zoning Code allows for "Accessory Agricultural Structures" within areas zoned for agriculture.[4] [5] This allows for canals to serve as an agricultural use. Water supply and reliability are vital to the success of the agriculture production in the San Joaquin Valley that make it one of the largest crop producers in the world.

Farmland Mapping and Monitoring Program (FMMP): The FMMP produces maps and statistical data used for analyzing impacts to California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status; the best quality land is called Prime Farmland. The maps are updated every two years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance.

[4] County of Merced. Rules of Procedure to Implement the California Land Conservation Act of 1965. Website: https://co.merced.ca.us/DocumentCenter/View/3035/Rules-and-Procedures?bidId=. Accessed 6/17/21.
[5] QCODE. Merced County Code. Website: http://www.qcode.us/codes/mercedcounty/. Accessed 6/17/21.

The California Department of Conservation's (DOC) 2016FMMP is a non-regulatory program that produces "Important Farmland" maps and statistical data used for analyzing impacts on California's agricultural resources. The Important Farmland maps identify eight land use categories, five of which are agriculture related: prime farmland, farmland of statewide importance, unique farmland, farmland of local importance, and grazing land – rated according to soil quality and irrigation status. Each is summarized below:

- *PRIME FARMLAND (P): Farmland with the best combination of physical and chemical features able* to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields.

  Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- FARMLAND OF STATEWIDE IMPORTANCE (S): Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.

  Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- UNIQUE FARMLAND (U): Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years prior to the mapping date.
- FARMLAND OF LOCAL IMPORTANCE (L): Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- GRAZING LAND (G): Land on which the existing vegetation is suited to the grazing of livestock. The minimum mapping unit for Grazing Land is 40 acres.
- URBAN AND BUILT-UP LAND (D): Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- OTHER LAND (X): Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
- WATER (W): Perennial water bodies with an extent of at least 40 acres.
- Williamson Act: There are several properties located within five miles of the Project that are designated as Williamson Act properties. According to the DOC Williamson Act program lands are agreements between landowners and local governments to specify lands for agricultural or open space use over a length of time. [6] The agreement locks land use for the length of the contract and landowners receives property tax assessments that are much lower because they agree to use the space for uses below market value. The Project would use multiple properties under a Williamson Act Contract for construction of the new intertie canal.

[6] California Department of Conservation. Website: https://www.conservation.ca.gov/dlrp/lca. Accessed 5/5/21.

3.3.2 Impact Assessment

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Less than Significant Impact. The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. While the Project would alter land that contains Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, the construction of a new canal would be considered an agricultural use by the County of Merced. The expansion of existing canal facilities and the construction of a new intertie canal would improve water supply reliability used for irrigation of farmland surrounding the Project. Therefore, impacts would be less than significant.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Less than Significant Impact. The Project would use land currently under a Williamson Act contract for the construction of the new intertie canal. Williamson Act parcels preserve parcels of land for agricultural use or open space through tax incentives for the property owners. However, canals are considered to be a compatible use for agriculture according to the County of Merced. The expansion of existing canal facilities and the construction of a new intertie canal would improve water supply reliability used for irrigation of farmland surrounding the Project. As a result, the Project would not convert a Williamson Act parcel to a non-agricultural use. Therefore, impacts would be less than significant.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The Project would not conflict with existing zoning for, or cause rezoning of, forest land timberland, or timberland zoned for Timberland Production. According to the California Department of Fish and Wildlife (CDFW), the Project is not located on or in the vicinity of land that is designated as a forest, timberland, or land used for timberland production.[7] The County of Merced General Plan has designated the Project and surrounding area as land planned and zoned for agricultural activities.[8] Therefore, there would be no impact.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The Project would not result in the loss of forest land or conversion of forest land to a non-forest use. According to the United States Forest Service, the Project is not located on or in the vicinity of land that is designated as a forest.[9] The County of Merced General Plan has designated the Project and surrounding area as land planned and zoned for agricultural activities. Therefore, there would be no impact.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Less than Significant impact. The Project would not involve other changes in the existing environment, which due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use. The Project would not be located on or near any lands designated as forest land. The Project would construct a new intertie canal on land used for agriculture, however, the construction of a new canal would be a compatible use for agriculture as determined by the County of Merced. Therefore, impacts would be less than significant.

[7] California Department of Fish and Wildlife. Timberland Conservation Program. Website: https://wildlife.ca.gov/Conservation/Timber. Accessed 6/17/21.
[8] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/17/21.
[9] United States Department of Agriculture Forest Service. National Overview Maps. Website: https://www.fs.fed.us/ivm/. Accessed 6/17/21.

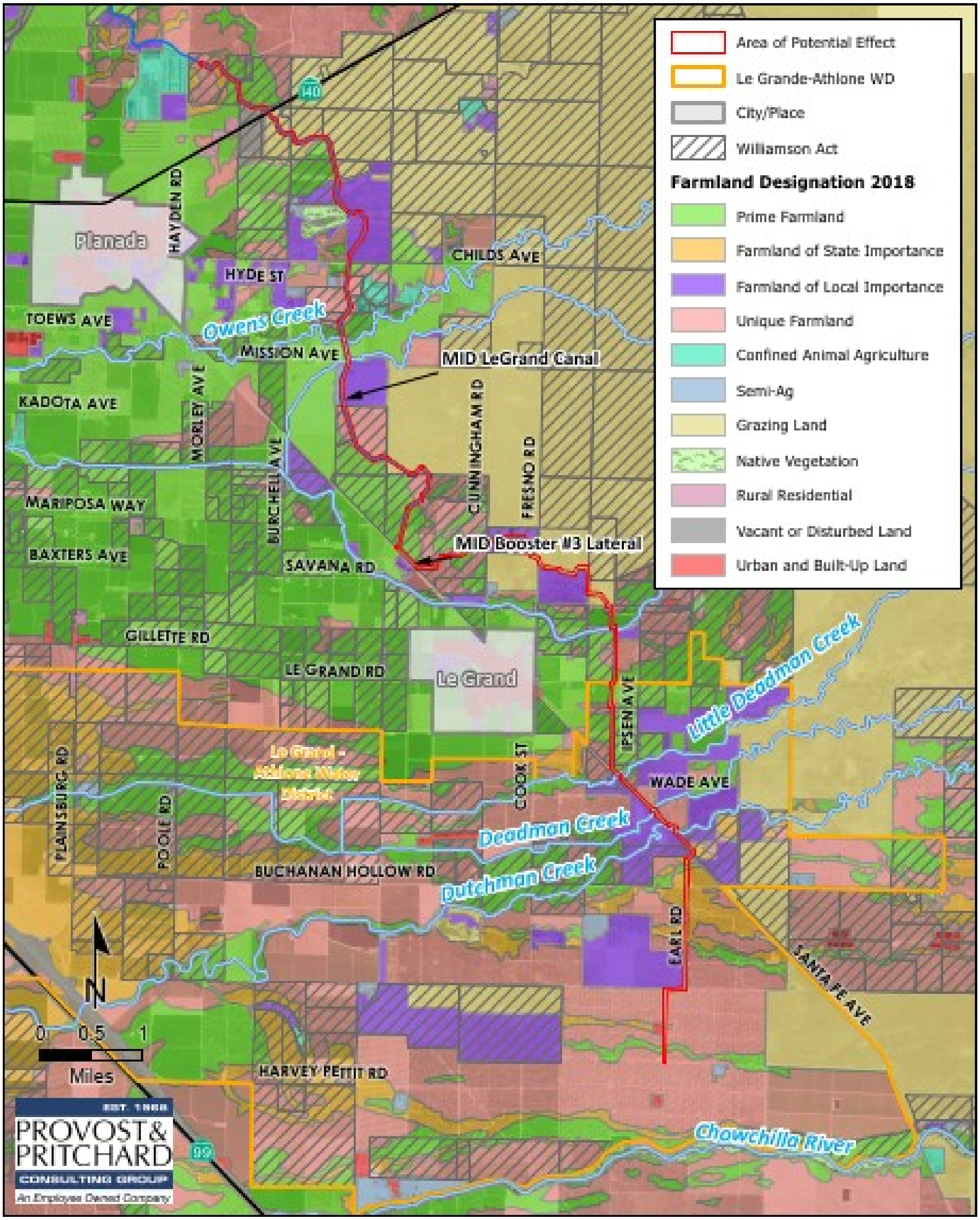

Figure 3-1. Farmland Designation Map

3.4 Air Quality

Table 3-3. Air Quality Impacts

Air Quality Impacts					
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d)	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

3.4.1 Environmental Baseline Conditions

The Project would be located in southeastern Merced County within the boundaries of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the San Joaquin Valley Air Basin (SJVAB). The SJVAB is positioned within the San Joaquin Valley of California. The San Joaquin Valley is bounded by the Sierra Nevada Mountain Range to the east and the Coastal Mountain Range to the west. Wind within the SJVAB typically channels south-southwest during the summer months, while wind flows to the north-northwest during the winter months. Wind velocity for the region is considered low for an area of such size.[10] Due to a lack of strong wind and the natural confinement of the mountain ranges surrounding the SJVAB, the region experiences some of the worst air quality in the world.

3.4.1.1 Regulatory Attainment Designations

Under the California Clean Air Act (CCAA), the California Air Resources Board (CARB) is required to designate areas of the State as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The United States Environmental Protection Agency (USEPA) designates areas for ozone, CO, and NO_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO_2,

[10] San Joaquin Valley Air Pollution Control District. Air Quality Plans. Website: http://valleyair.org/Air_Quality_Plans/air-quality-plans.htm. Accessed 6/24/21.

areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used. The USEPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, USEPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

The state and national attainment status designations pertaining to the SJVAB are summarized in **Appendix A**. The SJVAB is currently designated as a nonattainment area with respect to the State PM_{10} standard, ozone, and $PM_{2.5}$ standards. The SJVAB is designated nonattainment for the National Ambient Air Quality Standard (NAAQS) 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the EPA re-designated the San Joaquin Valley to attainment status for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan.

Table 3-4. Summary of Ambient Air Quality Standards and Attainment Designation

Pollutant	Averaging Time	California Standards*		National Standards*	
		Concentration*	Attainment Status	Primary	Attainment Status
Ozone (O_3)	1-hour	0.09 ppm	Nonattainment/ Severe	–	No Federal Standard
	8-hour	0.070 ppm	Nonattainment	0.075 ppm	Nonattainment (Extreme)**
Particulate Matter (PM_{10})	AAM	20 µg/m^3	Nonattainment	–	Attainment
	24-hour	50 µg/m^3		150 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	Nonattainment	12 µg/m^3	Nonattainment
	24-hour	No Standard		35 µg/m^3	
Carbon Monoxide (CO)	1-hour	20 ppm	Attainment/ Unclassified	35 ppm	Attainment/ Unclassified
	8-hour	9 ppm		9 ppm	
	8-hour (Lake Tahoe)	6 ppm		–	
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	Attainment	53 ppb	Attainment/ Unclassified
	1-hour	0.18 ppm		100 ppb	
Sulfur Dioxide (SO_2)	AAM	–	Attainment	--	Attainment/ Unclassified
	24-hour	0.04 ppm		--	
	3-hour	–		0.5 ppm	
	1-hour	0.25 ppm		75 ppb	
Lead (Pb)	30-day Average	1.5 µg/m^3	Attainment	–	No Designation/ Classification
	Calendar Quarter	–		--	
	Rolling 3-Month Average	–		0.15 µg/m^3	
Sulfates (SO_4)	24-hour	25 µg/m^3	Attainment	No Federal Standards	
Hydrogen Sulfide (H_2S)	1-hour	0.03 ppm (42 µg/m^3)	Unclassified		
Vinyl Chloride (C_2H_3Cl)	24-hour	0.01 ppm (26 µg/m^3)	Attainment		

Pollutant	Averaging Time	California Standards*		National Standards*	
		Concentration*	Attainment Status	Primary	Attainment Status
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/km-visibility of 10 miles or more due to particles when the relative humidity is less than 70%.	Unclassified		

* For more information on standards visit: https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf
** No Federal 1-hour standard. Reclassified extreme nonattainment for the Federal 8-hour standard 9/2/21.
***Secondary Standard
Source: CARB 2015; SJVAPCD 2015

3.4.2 Impact Assessment

An Air Quality and Greenhouse Gas Emissions Evaluation Report (**Appendix A**) was prepared using SacMetro Road Construction Emissions Model, Version 9.0.0 for the Project in August 2021. The sections below detail the methodology of the air quality and greenhouse gas emissions report and its conclusions.

3.4.2.1 Construction-Generated Emissions

Construction of the three Phases would occur over approximately 36 months. Emissions associated with the Project were calculated using SacMetro, Version 9.0.0. The emissions modeling includes emissions generated by off-road equipment, haul trucks, and worker commute trips. Emissions were quantified based on anticipated construction schedules and construction equipment requirements provided by the District. All remaining assumptions were based on the default parameters contained in the model. Localized air quality impacts associated with the Project would be minor and were qualitatively assessed. Modeling assumptions and output files are included in **Appendix A**.

3.4.2.2 Thresholds of Significance

To assist local jurisdictions in the evaluation of air quality impacts, the SJVAPCD has published the *Guide for Assessing and Mitigating Air Quality Impacts*. This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the Project would result in a significant air quality impact. Projects that exceed these recommended thresholds would be considered to have a potentially significant impact to human health and welfare. The thresholds of significance are summarized below.

Short-Term Emissions of Particulate Matter (PM_{10}): Construction impacts associated with the Project would be considered significant if the feasible control measures for construction in compliance with Regulation VIII as listed in the SJVAPCD guidelines are not incorporated or implemented, or if project-generated emissions would exceed 15 tons per year (TPY).

Short-Term Emissions of Ozone Precursors (ROG and NOX): Construction impacts associated with the Project would be considered significant if the project generates emissions of Reactive Organic Gases (ROG) or NO_X that exceeds 10 TPY.

Long-Term Emissions of Particulate Matter (PM_{10}): Operational impacts associated with the Project would be considered significant if the project generates emissions of PM_{10} that exceed 15 TPY.

Long-Term Emissions of Ozone Precursors (ROG and NOX): Operational impacts associated with the Project would be considered significant if the project generates emissions of ROG or NOX that exceeds 10 TPY.

Conflict with or Obstruct Implementation of Applicable Air Quality Plan: Due to the region's nonattainment status for ozone, $PM_{2.5}$, and PM_{10}, if the project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO_x) or PM_{10} would exceed the SJVAPCD's significance thresholds, then the project would be considered to conflict with the attainment plans. In addition, if the project would result in a change in land use and corresponding increases in vehicle miles traveled, the project may result in an increase in vehicle miles traveled that is unaccounted for in regional emissions inventories contained in regional air quality control plans.

Local Mobile-Source CO Concentrations: Local mobile source impacts associated with the Project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the California Ambient Air Quality Standard (i.e., 9.0 ppm for 8 hours or 20 ppm for 1 hour). Exposure to toxic air contaminants would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 10 in 1 million or would result in a Hazard Index greater than 1.

Odor impacts associated with the Project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

Table 3-5. SacMetro Modeling System Emission Estimates

Source	Annual Emissions (Tons/Year) [1]					
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$	SO_x
Grubbing/Land Clearing	0.13	0.85	2.20	1.52	0.33	0.01
Grading/Excavation	0.11	0.76	2.17	1.52	0.33	0.01
Drainage/Utilities/Sub-Grade	0.11	0.71	2.16	1.52	0.33	0.01
Paving	0.11	0.71	2.15	0.03	0.02	0.01
Maximum (tons per phase)	0.13	0.85	2.20	1.52	0.33	0.01
Total (tons per construction project)	0.46	3.03	8.68	4.58	1.01	0.02
SJVAPCD Significance Thresholds:	*10*	*10*	*100*	*15*	*15*	*27*
Exceed SJVAPCD Thresholds?	*No*	*No*	*No*	*No*	*No*	*No*

1. Emissions were quantified using the SacMetro Modeling System. Refer to Appendix A for modeling results and assumptions. Totals may not sum due to rounding.

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The Project would not conflict with or obstruct implementation of the applicable air quality plan. The Project would follow the standards and guidelines set by the SJVAPCD. Therefore, there would be no impacts.

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less than Significant Impact with Mitigation Incorporated. The Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. As seen in **Table 3-5. SacMetro Modeling System Emission Estimates**, the Project would not be in exceedance of an emission threshold for any pollutant identified by the SJVAPCD. In addition, the Project would be required by the SJVAPCD to complete a Dust

Control Plan prior to construction of the Project starting[11]. This would ensure that particulate emissions due to activities that would stir dirt and dust emissions would be limited to a less than significant level. The Project would be required to comply with all SJVAPCD rules for dust control.

Mitigation Measures

AQ-1 (Dust Control): The Project will maintain dust controls pursuant to the SJVAPCD standards on fugitive dust control.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. The Project would not expose sensitive receptors to substantial pollutant concentrations. Sensitive Receptors are groups that would be more affected by air, noise, and light pollution, pesticides, and other toxic chemicals than others. This includes infants, children under 16, elderly over 65, athletes, and people with cardiovascular and respiratory diseases. High concentrations of these groups would include, daycares, residential areas, hospitals, elder care facilities, schools and parks. The Project would be constructed within 100 feet of homes in some areas, exposing potential sensitive receptors to exhaust pollutants emitted by construction equipment. However, through the SJVAPCD's prioritization calculator, the Project is found to not pose a significant cancer risk to receptors within a 100-foot proximity. [12] Therefore, impacts would be less than significant.

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Impact. During construction activities, construction equipment exhaust and application of asphalt, structural coating and other construction applications would temporarily emit odors. Construction would be completed within rural areas of Merced County and would have an effect on some residences that would be located near the construction area of the Project. Construction of the Project would be temporary, and odors would not remain after Project completion. Therefore, impacts would be less than significant.

[11] San Joaquin Valley Air Pollution Control District. Controlling Fugitive Dust Emissions. Website: http://www.valleyair.org/busind/comply/pm10/compliance_pm10.htm. Accessed 10/15/21.
[12] San Joaquin Valley Air Pollution Control District. CEQA. Website: https://www.valleyair.org/transportation/ceqa_idx.htm. Accessed 9/2/21.

3.5 Biological Resources

Table 3-6. Biological Resources Impacts

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

3.5.1 Environmental Baseline Conditions

The Project is located in the County of Merced, between Planada and Chowchilla, California. This area is within the San Joaquin Valley and lies west of the foothills of the Sierra Nevada Mountain Range. Most of the San Joaquin Valley experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures range from 70 to 80 degrees Fahrenheit (°F), but often exceeds 90 °F. Winter minimum temperatures are near 30 °F. Near the Project, the average annual precipitation is approximately 13 inches, falling primarily from October to April. The Project's APE would include the existing and proposed canal, approximately 9.8 and 4.9 mile stretches respectively, as well as a 50-foot buffer on each side of the proposed construction limits around the Project as an additional biological study area.

Surface water features within the APE are influenced by rainfall events and do not flow every year. The APE contains multiple creeks and rivers of various width, depth, and flow rates, primarily stemming from Mariposa Creek and Owens Creek. Water entering the APE begins with rainfall events on western slopes of the Sierra Nevada Mountain Range, which flows westward into foothills, and continues to the valley floor where the APE lies. Water may travel through the APE and during wet years to its terminus as far as the San Joaquin River. The Project lies within the Middle San Joaquin-Lower Chowchilla watershed; Hydrologic Unit Code (HUC): 18040001 and eight subwatersheds: Lower Owens Creek subwatershed; HUC: 180400011703, the Miles Creek subwatershed; HUC: 180400011701, the Upper Owens Creek sub-watershed; HUC: 180400011702, the Mariposa Creek-Duck Slough subwatershed; HUC: 180400011504, the South Slough-Deadman Creek subwatershed; HUC: 180400011604, the Flat Top Mountain-Deadman Creek subwatershed; HUC: 180400011601, the Lower Dutchman Creek subwatershed; HUC: 180400010903, and the Raynor Creek-Chowchilla River subwatershed; HUC: 180400010703.

The APE is comprised of three major habitat types: ruderal/agricultural, riparian, and canal. The APE includes approximately 320 acres of ruderal and agricultural land spanning approximately 14.7 miles from Planada to approximately 1 mile north of the Chowchilla River. The APE is primarily surrounded by expansive tracts of agriculture in the form of almond orchards, corn fields, and grazing lands. Small residential towns including Planada, Plainsburg, Le Grand, and Chowchilla are located west of the APE.

Riparian habitat within the APE is primarily concentrated around Mariposa Creek, Deadman Creek, and Dutchman Creek. The other ephemeral creek (Little Deadman Creek) within the APE lacks riparian corridors due to agricultural maintenance activities. All natural waterbodies within the APE were dry at the time of the field survey, although the MID Le Grand Canal contained water throughout the APE. The Mariposa Creek channel was composed of sand, cobbles, and gravel. The banks of the channel were moderately high and covered in dry herbaceous vegetation.

The APE also contains the MID Booster Lateral #3 Canal. At the time of the survey, vegetation within most of the canal was absent or confined to the water's edge. Biomes surrounding the APE varied throughout the alignment. Highly disturbed portions included grazing lands with cattle access to the canal. Other areas contained dense stands of rushes and riparian trees, providing suitable habitat for shorebirds. Water was present throughout the canal, flowing slowly in some sections while stagnant in others. Habitats throughout the APE hold variable value to wildlife. While highly maintained agricultural lands are less than suitable for sensitive species, riparian habitat and wetlands could be critical to certain species in a region that is otherwise highly disturbed.

3.5.2 Methodology

A reconnaissance-level field survey of the Project and surrounding areas was conducted on August 19 and 20, 2021 (Appendix B). The survey was performed to identify and note plant and animal species encountered, biological habitats and communities, and land uses. The site and surrounding areas were also assessed for suitable habitats of various wildlife species.

The biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the APE. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database; United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System and Information for Planning and Consultation system; the NatureServe Explorer online database; the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Plants Database; CDFW California Wildlife Habitat Relationships database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the San Joaquin Valley region.

The field investigation did not include focused surveys for special status species. The field survey conducted included the appropriate level of detail to assess the significance of potential impacts to sensitive biological resources resulting from the Project. The field investigation included an aquatic resources delineation and results are discussed further below. Furthermore, the field survey was sufficient to generally describe those features of the Project that could be subject to the jurisdiction of federal and/or State agencies, such as the United States Army Corps of Engineers (USACE), CDFW, Regional Water Quality Control Board (RWQCB) and SWRCB and used to support CEQA documents.

A thorough search of CNDDB for published accounts of special status plant and animal species was conducted for the *Planada* and *Le Grand* 7.5-minute quadrangles, which contains the entire Project, and for the twelve surrounding quadrangles: *Yosemite Lake, Haystack Mountain, Indian Gulch, Cathey's Valley, Merced, Owens Reservoir, Illinois Hill, El Nido, Plainsburg, Raynor Creek, Bliss Ranch, Chowchilla, Berenda*, and *Kismet*. These species, and their potential to occur within the APE, are listed in **Table 3-7** and **Table 3-8** on the following pages.

Table 3-7. List of Special Status Animals with Potential to Occur Onsite and/or in the Vicinity

Species	*Status*	*Habitat*	*Occurrence on Project Site*
American badger (*Taxidea taxus*)	CSC	Grasslands, savannas, and mountain meadows near timberline are preferred. Most abundant in drier open spaces of shrub and grassland. Burrows in soil.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The APE is dominated by agriculture and ruderal land. Grasslands present within the APE are heavily disturbed by grazing, and therefore unsuitable for this species. This species was last observed five miles west of APE in 2018.
Bald Eagle (*Haliaeetus leucocephalus*)	CE, CFP	Resides in old growth forests as well as lower montane coniferous forests. Nests are generally found in large, old-growth trees within a mile of water. Nests and winters along ocean shores, lake margins, and rivers.	**Possible.** The disturbed habitats of the APE are generally unsuitable for this species. The APE intermittently provides large Fremont cottonwood trees that could support nesting of large birds, like Bald Eagle. An individual flying over the APE is possible and was last observed four miles east of APE in 2001.
Burrowing Owl (*Athene cunicularia*)	CSC	Resides in open, dry annual or perennial grasslands, deserts, and scrublands with low growing vegetation. Nests underground in existing burrows created by mammals, most often ground squirrels.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Raptors were observed multiple times during the survey, the presence of which would discourage burrowing owls from nesting in the area. This species was observed three miles northwest of the APE in 2018, however habitat suitable for foraging is unavailable. Further, no dens or indicators of this species were documented during the survey.
California tiger salamander (*Ambystoma californiense*)	FT, CT, CWL	Requires vernal pools or seasonal ponds for breeding and small mammal burrows for aestivation. Generally found in grassland and oak savannah plant communities in central California from sea level to 1500 feet in elevation.	**Possible.** The disturbed habitats of the APE are generally unsuitable for this species. There are several recent observations of this species near the APE, but the agricultural canals do not provide suitable aquatic habitat to support this species. The only potential suitable breeding habitat identified near the APE included the northern wetland adjacent to the Le Grand canal. While cattle have access to this pond, this species is known to utilize stock ponds when higher quality habitat is unavailable. However, aerial imagery reveals that this pond is present year-round, allowing aquatic predators, such as American bullfrogs (*Lithobates catesbeianus*), to utilize the habitat making it unsuitable for this species. Additionally, the recent observations of this species have occurred in high quality vernal pool habitat northwest of the site, removed from agricultural activities. Critical habitat for this species has been mapped within the Phase 2 alignment. Therefore, the potential for this species to occur within

Species	*Status*	*Habitat*	*Occurrence on Project Site*
			the APE exists despite the lack of suitable habitat.
Conservancy fairy shrimp (*Branchinecta conservatio*)	FE	Endemic to the grasslands of the northern two-thirds of the Central Valley. Found in large, turbid pools.	**Unlikely.** Vernal pool habitat required by this species is absent from the APE. Vernal pool habitats are present regionally, however the cattle pond and wetland area studied in the ARD do not meet the definition of vernal pools. This species was last observed in the region in 2016, 4 miles northwest of the APE in vernal pool grassland habitat. Portions of the Phase 2 alignment run through critical habitat mapped for this species, however this portion of the project includes improvements to the existing canal, therefore habitat for this species will not be impacted. Agricultural canals do not contain the primary constituent elements for this species.
Crotch bumble bee (*Bombus crotchii*)	CCE	Occurs throughout coastal California, as well as east to the Sierra-Cascade crest, and south in to Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia*, and *Eriogonum*.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. This species was last observed in the Sierra Nevada foothills in 2020, 13 miles north of the APE. However, no regional recorded observations of this species have occurred on the valley floor and the APE does not provide suitable vegetation for this species.
Ferruginous Hawk (*Buteo regalis*)	CWL	Inhabits open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats. Preys on lagomorphs, ground squirrels and mice.	**Absent.** The preferred vegetation required for this species is not present within the APE and the disturbed habitats are less than suitable for this species. This species has not been observed in the region in over 20 years.
Foothill yellow-legged frog (*Rana boylii*)	CCT, CSC	Frequents rocky streams and rivers with rocky substrate and open, sunny banks in forests, chaparral, and woodlands. Occasionally found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	**Absent.** The disturbed habitats of the APE are generally unsuitable for this species. The canals and wetland areas do not provide suitable aquatic habitat to support this species due to degraded water quality and disturbance from grazing cattle. Suitable aquatic habitat is located in the Sierra Nevada foothills, making it unlikely that an individual would pass through the area during dispersal. This species has not been observed in the region in over 50 years.
Giant gartersnake (*Thamnophis gigas*)	FT, CT	Occurs in marshes, sloughs, drainage canals, irrigation ditches, rice fields, and adjacent uplands. Prefers locations with emergent vegetation for cover and open areas for basking. This species uses small mammal burrows adjacent to aquatic habitats for hibernation in the winter and to escape from excessive heat in the summer.	**Possible.** The canal and wetland habitats of the APE are highly disturbed and lack appropriate aquatic vegetation but could potentially support this species. This species has not been observed in the region in over 100 years.

Species	Status	Habitat	Occurrence on Project Site
Hardhead (*Mylopharodon conocephalus*)	CSC	Occurs in low- to mid-elevation streams in the Sacramento-San Joaquin drainage. Clear, deep pools with sand-gravel-boulder bottoms and slow-moving water is required. This species is often sympatric with Sacramento pikeminnow and Sacramento sucker. Hardhead are typically absent form streams occupied by centrarchids and from heavily altered habitats.	**Absent.** This species was last observed in the region in 2007, never occurring within a canal. The Le Grand canal does not provide suitable perennial aquatic habitat for this species.
Merlin (*Falco columbarius*)	CWL	Found throughout North America in habitats ranging from tidal estuaries to open woodlands and valley grasslands. Generally, roosts in clumps of trees or windbreaks.	**Possible.** The disturbed habitats of the APE are unsuitable for this species. The APE intermittently provides large Fremont cottonwood trees that could support nesting. An individual flying over the APE is possible, although this species has not been observed in the region in over 20 years.
Mountain Plover (*Charadrius montanus*)	CSC	Breeds on open plains at moderate elevations. Winters in short-grass plains and fields, plowed or fallow fields, and sandy deserts. Prefers flat, bare ground with burrowing rodents.	**Possible.** The disturbed habitats of the APE could potentially provide winter foraging habitat for this species. Further, many egrets were observed flying and foraging throughout the APE. The APE provides flat, bare ground however, this species has not been observed in the region in over 20 years.
Northern Harrier (*Circus hudsonius*)	CSC	Nests and forges in various grasslands, including salt grass in desert sinks, riparian scrub, and wetland edges. Nests constructed on the ground from sticks in wet areas, usually on the edge of marshes.	**Possible.** The wetland edge habitats of the APE are potentially suitable for this species. Nesting habitat is scarce, but present in the form of intermittent Fremont cottonwood trees. There has been one observation of this species in the region in 2015.
Pallid bat (*Antrozous pallidus*)	CSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods, and occasionally takes insects in flight. Prefers to roost in rock crevices, but may also use tree cavities, caves, bridges, and other man-made structures.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting and foraging habitat are not present for this species. This species has not been observed in the region in over 20 years.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Underground dens with multiple entrances in alkali sink, valley grassland, and woodland in valleys and adjacent foothills.	**Possible.** No dens or signs of this species were observed during the survey, however grassland habitat in the area likely supports prey species. This species could potentially forage within the APE and surrounding lands. This species was last observed four miles from APE in 2001.
Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus pop.11*)	FT	This winter-run fish begins migration to fresh water during peak flows during December and February. Spawning season is typically from February to April. After hatching, fry move to deeper, mid-channel habitats in late	**Absent.** This species was last observed in the region in 2013, never occurring within a canal. The Le Grand canal does not provide suitable perennial aquatic habitat for this species.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
		summer and fall. In general, both juveniles and adults prefer complex habitat boulders, submerged clay and undercut banks, and large woody debris.	
Swainson's Hawk (*Buteo swainsoni*)	CT	Nests in large trees in open areas adjacent to grasslands, grain or alfalfa fields, or livestock pastures suitable for supporting rodent populations.	**Possible.** The APE intermittently provides large Fremont cottonwood trees that could support nesting of large birds. An individual flying over the APE is possible. There have been over 20 observations of this species in the region in the last 20 years.
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Nests colonially near fresh water in dense cattails or tules, or in thickets of riparian shrubs. Forages in grassland and cropland. Large colonies are often found on dairy farm forage fields.	**Possible.** The APE provides pockets of cattail habitat within intermittently flooded canals and creeks. Croplands surrounding the APE could possibly support foraging. This species was observed within one mile of APE in 2015.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of the Central Valley and foothills. Adults are active March to June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. No elderberry bushes were observed during the field survey. Both regional observations of this species occurred in woodland and forest habitats, both of which are absent from the APE.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occupies vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Unlikely**. Although this species was observed within one mile of APE in 1993, the APE does not provide suitable vernal pool habitat. The wetlands onsite do not meet the definition of vernal pools and are highly disturbed by cattle grazing. Regionally, vernal pools exist northeast of the site in ungrazed areas. While critical habitat for this species has been mapped within Phase 2 of the Project, this section of the alignment will be undergoing improvements which will have no impact on habitats suitable for this species. Agricultural canals do not contain the primary constituent elements for this species.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Unlikely**. Over 150 observations of this species have occurred in the region. The last was recorded in 2017, within three miles of APE. While the habitats onsite appear unsuitable or this species, critical habitat has been mapped within the Phase 2 and Phase 3 alignments. Phase 3 of the project involves significant ground disturbance through the creation of a new canal alignment through land that currently functions as an orchard. However, it is highly unlikely that any individuals of this species currently exist

Species	*Status*	*Habitat*	*Occurrence on Project Site*
			in the soils of the APE. The land within Phase 3 is visible in historical aerial imagery and has been under agricultural production for more than 17 years. Orchards are visible in imagery from 12 years ago. This level of disturbance has created unsuitable conditions for the survival of this species.
Western mastiff bat (*Eumops perotis californicus*)	CSC	Found in open, arid to semi-arid habitats, including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces but may also use high buildings and tunnels.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting habitat is not present and foraging habitat is marginal for this species. This species has not been observed in the region in over 20 years.
Western pond turtle (*Emys marmorata*)	CSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The canals and wetlands do not provide suitable aquatic habitat to support this species. Disturbance from cattle grazing makes the site unsuitable for nesting, and poor water quality would deter this species from basking or foraging within the APE. This species has not been observed in the region in over 20 years.
Western red bat (*Lasiurus blossevillii*)	CSC	Roosts primarily in trees, 2–40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting habitat is not present and foraging habitat is marginal for this species. This species has not been observed in the region in over 20 years.
Western spadefoot (*Spea hammondii*)	CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal pools or temporary wetlands, lasting a minimum of three weeks, which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Possible.** The disturbed habitats of the APE are likely unsuitable for this species. However, the canals do provide marginal aquatic habitat to support this species. There have been over 40 observations in the region, as recent as 2019, within one mile of the APE.

Table 3-8. List of Special Status Plants with Potential to Occur Onsite and/or in the Vicinity

Species	*Status*	*Habitat*	*Occurrence on Project Site*
Alkali-sink goldfields (*Lasthenia chrysantha*)	CNPS 1B	Found in vernal pool and wet saline flat habitats. Occurrences documented in the San Joaquin and Sacramento Valleys at elevations below 656 feet. Blooms February - April.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable vernal pools are absent from the APE. This species has not been observed in the region in over 80 years.
Beaked clarkia (*Clarkia rostrata*)	CNPS 1B	Found in woodlands and valley foothill grasslands on the west slope of the Sierra Nevada range, around 1,640 feet in elevation. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 20 years.
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)	CE, CNPS 1B	Found in freshwater marshes, swamps, and vernal pools in clay soils at elevations below 5250 feet. Blooms April – September.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable freshwater habitat is absent from the APE. There is only one recorded observation of this species in the region, three miles north of the APE in 2002.
California alkali grass (*Puccinellia simplex*)	CNPS 1B	Found in the San Joaquin Valley and other parts of California in saline flats and mineral springs within valley grassland and wetland-riparian communities at elevations below 3000 feet. Blooms March–May.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although few small wetland areas exist within the APE, there is only one recorded observation of this species in the region from a historical collection dated 1935.
Colusa grass (*Neostapfia colusana*)	FT, CE, CNPS 1B	Found in vernal pools in the San Joaquin Valley at elevations below 410 feet. Blooms May – August.	**Unlikely.** The APE does not support any vernal pool habitat to host this species. However, there have been over 25 observations of this species in the region.
Dwarf downingia (*Downingia pusilla*)	CNPS 2B	Found in vernal pools in valley and foothill grassland communities at elevations below 1600 feet. Blooms March – May.	**Absent.** The APE does not support any vernal pools or foothill grasslands to host this species. This species has not been observed in the region over 20 years.
Forked hare-leaf (*Lagophylla dichotoma*)	CNPS 1B	Found in cismontane woodland, and valley and foothill grassland communities at elevations between 600 feet and 1100 feet.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 100 years.
Greene's tuctoria (*Tuctoria greenei*)	FE, CR, CNPS 1B	Found in the San Joaquin Valley and other parts of California in vernal pools within valley grassland, wetland, and riparian communities at elevations below 3500 feet. Blooms May – September.	**Possible.** The APE does not support any vernal pools or riparian communities to host this species. However, there have been 15 observations of this species in the region, one occurring within two miles of the APE in 2011. Also, critical habitat for this species has been mapped within Phase 2 of the Project.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
Hairy Orcutt grass (*Orcuttia pilosa*)	FE, CE, CNPS 1B	Found in vernal pools in valley grassland, wetland, and riparian communities at elevations below 650 feet. Blooms May – September.	**Absent.** The APE does not support any vernal pools, and grassland habitat within the APE are too disturbed from cattle grazing to host this species. This species has not been historically observed in the region in over 50 years.
Hartweg's golden sunburst (*Pseudobahia bahifolia*)	FE, CE, CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities in clay soils that are often acidic. Occurs predominantly on northern slopes, but also along shady creeks and near vernal pools at elevations between 300 feet and 650 feet. Blooms March – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE does not host habitat to support this species. This species was last observed in the region in 2010, eight miles north of the APE.
Heartscale (*Atriplex cordulata var. cordulata*)	CNPS 1B	Found in the San Joaquin Valley and Sacramento Valley in saline or alkaline soils within shadescale scrub, valley grassland, and wetland-riparian communities at elevations below 230 feet. Blooms June–July.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although few small wetland areas exist within the APE, this species has not been observed in the region in over 30 years.
Henderson's bent grass (*Agrostis hendersonii*)	CNPS 3.2	Found in valley and foothill grassland, and vernal pools in the San Joaquin Valley, Sacramento Valley, Sierra Nevada foothills, and Cascade Range foothills. Grows in moist places in grassland or vernal pool habitat at elevations below 3,380 feet. Blooms May – July.	**Absent.** The APE does not support any vernal pools or grasslands to host this species. This species has not been observed in the region in over 20 years.
Hoover's calycadenia (*Calycadenia hooveri*)	CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities on exposed, rocky, barren soil at elevations between 300 feet and 1300 feet. Blooms June – September.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although rocky, barren soils exist within the APE, this species has not been observed in the region in over 20 years.
Hoover's cryptantha (*Cryptantha hooveri*)	CNPS 1A	Presumed extirpated in California. Found in valley and foothill grassland and inland dunes in coarse sand at elevations below 250 feet. Blooms Mar – May.	**Absent.** Suitable habitat required by this species is absent from the APE and surrounding lands. This species is assumed extirpated from California
Keck's checkerbloom (*Sidalcea keckii*)	FE, CNPS 1B	Occurs in cismontane woodland, valley and foothill grassland, typically on grassy slopes in clay soils at elevations between 275 feet – 1650 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE does not host habitat to support this species. This species was last observed in the region in 2016.
Lesser saltscale (*Atriplex minuscula*)	CNPS 1B	Found in the San Joaquin Valley in sandy, alkaline soils in alkali scrub, valley and foothill grassland, and alkali sink communities at elevations below 750 feet. Blooms April–October.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although sandy soils exist within the APE, this species has not been observed in the region in over 20 years.
Madera leptosiphon (*Leptosiphon serrulatus*)	CNPS 1B	Found in openings in foothill woodland, often yellow-pine forest, and chaparral at elevations between 1000 feet and 4300 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 60 years.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
Mariposa cryptantha (*Cryptantha mariposae*)	CNPS 1B.3	Grows on serpentine outcrops in chaparral habitat. Found in the Sierra Nevada foothills at elevations between 295 – 2,700 feet. Blooms April – June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks required habitat and is outside of the species elevational range. This species has not been observed in the region in over 80 years.
Merced phacelia (*Phacelia ciliata var. opaca*)	CNPS 3.2	Grows in heavy clay soils in foothills and grasslands of the San Joaquin Valley. Found at elevations below 330 feet. Blooms February – May.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 50 years.
Munz's tidy-tips (*Layia munzii*)	CNPS 1B	Found in the San Joaquin Valley in alkaline clay soils; often along hillsides in alkali scrub and sometimes valley and foothill grassland. Occurs at elevations between 145 feet and 2625 feet Blooms March–April.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years.
Pincushion navarettia (*Navarretia myersii spp. myersii*)	CNPS 1B	Found in vernal pools in clay soils at elevations between 65-295 feet. Often associated with non-native grasslands. Blooms in May.	**Unlikely.** The APE does not support any vernal pools or grasslands to host this species. However, this species was last observed in the region in 2011.
Recurved larkspur (*Delphinium recurvatum*)	CNPS 1B	Occurs in poorly drained, fine, alkaline soils in grassland and alkali scrub communities at elevations between 100 feet and 2600 feet. Blooms March–June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	FT, CE, CNPS 1B	Found in the eastern San Joaquin Valley and the Sierra Nevada foothills in vernal pools within valley grassland, freshwater wetland, and wetland-riparian communities at elevations below 2600 feet. Blooms April – September.	**Possible.** The APE does not support any vernal pools to host this species. However, this species has over 20 observations, with the most recent in 2017 within one mile of the APE. Also, critical habitat for this species has been mapped within Phase 3 of the project.
Sanford's arrowhead (*Sagittaria sanfordii*)	CNPS 1B	Found in the San Joaquin Valley and other parts of California in freshwater-marsh, primarily ponds and ditches, at elevations below 1000 feet. Blooms May–October.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although canals exist within the APE, they are unlikely to host this species. This species was last observed in the region in 2012.
Shaggyhair lupine (*Lupinus spectabilis*)	CNPS 1B	Grows in chaparral and cismontane woodland on open rocky slopes of serpentine soils. Endemic to the Sierra Nevada foothills at 655 – 2,700 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 80 years
Shining navarretia (*Navarretia nigelliformis ssp. radians*)	CNPS 1B	Found in cismontane woodland and valley and foothill grassland communities, sometimes in vernal pools. Occurs at elevations between 200 feet and 3200 feet. Blooms May – July.	**Unlikely.** The APE does not support woodlands, vernal pools, or grasslands to host this species. However, this species has over 35 observations and in 2011 was recorded within one mile of the APE.

Species	Status	Habitat	Occurrence on Project Site
Spiny-sepaled button-celery (*Eryngium spinosepalum*)	CNPS 1B	Found in the Sierra Nevada Foothills and the San Joaquin Valley. Occurs in vernal pools, swales, and roadside ditches. Often associated with clay soils in vernal pools within grassland communities. Occurs at elevations between 50 feet and 4160 feet. Blooms April–July.	**Unlikely.** The APE does not support any vernal pools or grasslands to host this species. However, this species has over 30 observations, with the most recent in 2009.
Subtle orache (*Atriplex subtilis*)	CNPS 1B	Found in the San Joaquin Valley in saline depressions in alkaline soils within valley and foothill grassland communities at elevations below 330 feet. Blooms June–October.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years
Succulent owl's-clover (*Castilleja campestris var. succulenta*)	FT, CE, CNPS 1B	Found in vernal pools, often in acidic soils at elevations below 2500 feet. Blooms April – July.	**Possible.** The APE does not support any vernal pools to host this species. However, this species has over 60 observations, with the most recent in 2019. Also, critical habitat for this species is mapped within Phase 2 of the project.
Vernal pool smallscale (*Atriplex persistens*)	CNPS 1B	Occurs in the San Joaquin Valley and Sacramento Valley in alkaline vernal pools at elevations below 375 feet. Blooms June–September.	**Unlikely.** The APE does not support any vernal pools to host this species. However, this species has over ten observations, with the most recent in 2017.
Watershield (*Brasenia schreberi*)	CNPS 2B	Found in marshes and swamps, as well as near artificial waterbodies at elevations below 2200 feet. Blooms April – October.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 100 years

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present:	Species observed on the site at time of field surveys or during recent past.
Likely:	Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible:	Species not observed on the site, but it could occur there from time to time.
Unlikely:	Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent:	Species not observed on the site, and precluded from occurring there due to absence of suitable habitat.

STATUS CODES

FE	Federally Endangered
FT	Federally Threatened
FPE	Federally Endangered (Proposed)
FPT	Federally Threatened (Proposed)
FC	Federal Candidate
CE	California Endangered
CT	California Threatened
CCT	California Threatened (Candidate)
CFP	California Fully Protected
CSC	California Species of Special Concern
CWL	California Watch List
CCE	California Endangered (Candidate)
CR	California Rare

CNPS LISTING

1A	Plants Presumed Extinct in California.
1B	Plants Rare, Threatened, or Endangered in California and elsewhere.
2	Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

Merced County General Plan

The Merced County General Plan set a goal to preserve and protect the biological resources of the County from "Significant Impact", through coordination with the public and private sectors. Policies within the Natural Resources Element of the General Plan supporting this goal are listed below.

Policy NR-1.1:

Habitat Protection. Identify areas that have significant long-term habitat and wetland values including riparian corridors, wetlands, grasslands, rivers and waterways, oak woodlands, vernal pools, and wildlife movement and migration corridors, and provide information to landowners.

Policy NR-1.2:

Protected Natural Lands. Identify and support methods to increase the acreage of protected natural lands and special habitats, including but not limited to, wetlands, grasslands, vernal pools, and wildlife movement and migration corridors, potentially through the use of conservation easements.

Policy NR-1.4:

Important Vegetative Resource Protection. Minimize the removal of vegetative resources which stabilize slopes, reduce surface water runoff, erosion, and sedimentation.

Policy NR-1.5:

Wetland and Riparian Habitat Buffer. Identify wetlands and riparian habitat areas and designate a buffer zone around each area sufficient to protect them from degradation, encroachment, or loss.

Policy NR-1.6:

Terrestrial Wildlife Mobility. Encourage property owners within or adjacent to designated habitat connectivity corridors that have been mapped or otherwise identified by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service to manage their lands in accordance with such mapping programs. In the planning and development of public works projects that could physically interfere with wildlife mobility, the County shall consult with the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service to determine the potential for such effects and implement any feasible mitigation measures.

Policy NR-1.10:

Aquatic and Waterfowl Habitat Protection. Cooperate with local, State, and Federal water agencies in their efforts to protect significant aquatic and waterfowl habitats against excessive water withdrawals or other activities that would endanger or interrupt normal migratory patterns or aquatic habitats.

Policy NR-1.12:

Wetland Avoidance. Avoid or minimize loss of existing wetland resources by careful placement and construction of any necessary new public utilities and facilities, including roads, railroads, high speed rail, sewage disposal ponds, gas lines, electrical lines, and water/wastewater systems.

Policy NR-1.13:

Wetland Setbacks. Require an appropriate setback, to be determined during the development review process, for developed and agricultural uses from the delineated edges of wetlands.

Policy NR-1.21:

Special Status Species Surveys and Mitigation. Incorporate the survey standards and mitigation requirements of state and federal resource management agencies for use in the County's review processes for both private and public projects.

3.5.3 Impact Assessment

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less than Significant Impact with Mitigation Incorporated. The Project is located in a region containing numerous observations of special status species. Vernal pool complexes exist to the east and west of the APE, riparian habitat is present along the banks of Mariposa, Deadman, and Dutchman creeks, and non-native grasslands used primarily for grazing can be found directly adjacent to the canal alignments. Due to the abundance and variety of habitats available, multiple special status species can be expected to occur near or within the APE. The mitigation measures listed below have been included to reduce any impacts to special status species to a less than significant level under CEQA.

Project-Related Mortality and/or Disturbance of Nesting Raptors, Migratory Birds, and Special Status Birds

The APE contains some suitable nesting and/or foraging habitat for avian species. Ground nesting birds, such as Killdeer, could potentially nest on the bare ground or compacted dirt roads onsite; however, no nests were observed at the time of survey. Large, riparian trees within and near the APE could potentially host nests of raptors, woodpeckers, and perching birds. The APE largely provides marginal nesting habitat for Bald Eagle, Northern Harrier, and Swainson's Hawk, in the form of intermittent large Fremont cottonwood trees. It is possible these species are observed flying over the APE or using adjacent habitat for foraging. Birds nesting within the Project area during construction have the potential to be injured or killed by Project-related activities. In addition to the direct "take" of nesting birds, nesting birds within the Project or adjacent areas could be disturbed by Project-related activities resulting in nest abandonment. Projects that adversely affect the nesting success of raptors and migratory birds or result in the mortality of individual birds is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Nesting bird season is generally accepted as February 1 through August 31; however, Swainson's Hawk nesting season is generally accepted as March 1 through September 15. For simplicity, these timeframes have been combined.

Implementation of the following measures would reduce potential impacts to nesting raptors, migratory birds, and special status birds, including Merlin, Mountain Plover, Northern Harrier, Swainson's Hawk, and Tricolored Blackbird to a less than significant level under CEQA, and would ensure compliance with State and federal laws protecting these avian species.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-1a (Avoidance):*** The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.
>
> ***Mitigation Measure BIO-1b (Pre-construction Surveys):*** If construction activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for Merlin, Mountain Plover, Northern Harrier, Swainson's Hawk, and Tricolored Blackbird nests onsite and within a 0.5-mile radius. These surveys will be conducted in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's hawk Technical Advisory Committee, 2000) and current guidance for the remaining species. In addition to the focused Swainson's Hawk survey, a qualified biologist will conduct a pre-construction survey for all other nesting birds within 10 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. All raptor nests will be considered "active" upon the nest-building stage.

Mitigation Measure BIO-1c (Establish Buffers): On discovery of any active nests near work areas, the biologist will determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged and are no longer dependent on the nest.

Mitigation Measure BIO-1d (WEAP Training): All personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, prior to initiating construction activities (including staging and mobilization). The specifics of this program will include identification of the special status species and suitable habitats, a description of the regulatory status and general ecological characteristics of the species, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. A fact sheet conveying this information, along with photographs or illustrations of the special status species, will also be prepared for distribution to all contractors, their employees, and all other personnel involved with construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.

Mitigation Measure BIO-1e (Minimization): The Project will observe all minimization and protective measures from the Construction and On-Going Operational Requirements including, but not limited to: construction speed limits, covering of pipes, installation of escape structures, restriction of herbicide and rodenticide use, proper disposal of food items and trash, prohibition of pets and firearms, and completion of an employee education program.

Implementation of Mitigation Measures **BIO-1a** through **BIO-1e** will reduce potential impacts to nesting birds and any other special status avian species to a less than significant level and will ensure compliance with State and federal laws protecting these resources.

Project-Related Mortality and/or Disturbance of Bald Eagles

Bald eagles are documented as recently occurring within the Project's vicinity. The bald eagle is protected under the California Endangered Species Act as well as fully protected by the federal Bald and Golden Eagle Protection Act in addition to the Migratory Bird Treaty Act and the California Fish and Game Code. The Bald and Golden Eagle Protection Act prohibits take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, or export/import of any eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. The term "take" includes to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

Project-related activities that result in injury, mortality, or disturbance to nesting, foraging, or roosting bald eagles would violate state and federal laws protecting these species and would be considered a significant impact under CEQA and the NEPA (National Environmental Policy Act).

In order to avoid and minimize potential Project-related impacts to Bald and Golden Eagles, the Project proponent will implement protective measures. Implementation of general mitigation measure BIO-1a (WEAP) listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of bald eagles, laws protecting the species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take." In addition to the mandatory training, the Project proponent will ensure implementation of the following measures in all work areas:

Mitigation Measure BIO-2a (Pre-construction Survey): If activities must occur within breeding season (February 1 to August 31), a qualified biologist will conduct pre-construction surveys for eagle nests within 30 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within one mile. Eagle nests are considered "active" upon the nest-building stage.

Mitigation Measure BIO-2b (Establish Buffers): On discovery of an active eagle nest near work areas, the following no-disturbance buffers will be maintained around each nest: Bald Eagle: 660-foot no-disturbance buffer. If a 600-foot buffer zone is infeasible, the Project proponent will contact CDFW for guidance on how to proceed.

Mitigation Measure BIO-2c (Reporting): All detected eagle nests will be reported to CDFW and USFWS immediately. This includes any nest that has been used by a bald eagle in the past or is being used currently as a primary or alternate nest site. The discovery of any bald eagle carcasses and any non-lethal or lethal incidental "take" of these species will be reported to CDFW and USFWS immediately.

Implementation of mitigation measures **BIO-2a** through **BIO-2c** and mitigation measures **BIO-1a**, **BIO-1c,** and **BIO-1e** listed above, will avoid and minimize the Project's potential impacts to Bald Eagles to a less than significant level under CEQA and NEPA and will ensure compliance with state and federal laws protecting these species.

Project-Related Mortality and/or Disturbance of Special Status Mammals

San Joaquin kit foxes have been documented near the Project vicinity. Although frequent disturbance may deter this species, the species could still potentially forage or pass through the APE. If a San Joaquin kit fox were present onsite during ground-disturbance, it could be injured or killed by construction activities. Projects that result in the mortality of special status species are considered a violation of state and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will further reduce potential impacts to the San Joaquin kit fox to a less than significant level under CEQA and will ensure compliance with state and federal laws protecting this species.

Mitigation. The following mitigation are derived from the *USFWS 2011 Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance*. The following measures will be implemented**:**

Mitigation Measure BIO-3a (Pre-construction Survey): Within 30 days prior to the start of construction, a pre-construction survey for San Joaquin kit fox will be conducted on and within 200 feet of proposed work areas. If a potential San Joaquin kit fox den is detected within 200 feet or of construction activities, a Focused Survey will be performed in accordance with the *USFWS 2011 Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* by a qualified biologist to determine if the den is active or inactive and appropriate buffer zones will be placed to protect the dens, if found active. If the active dens cannot be avoided, CDFW and/or USFWS will be contacted to determine next steps.

Mitigation Measure BIO-3b (Mortality Reporting): The Sacramento Field Office of USFWS and the Fresno Field Office of CDFW will be notified in writing within three working days in the case of the accidental death or injury to a San Joaquin kit fox during construction. Notification must include the date, time, and location of the incident and any other pertinent information.

Implementation of the above measures will reduce potential impacts to San Joaquin kit fox to a less than significant level and will ensure compliance with state and federal laws protecting this species.

Project-Related Mortality and/or Disturbance of Special Status Reptiles and Amphibians

Project construction activities will result in temporary disturbance to potential suitable and/or occupied habitat for giant garter snake and western spadefoot. Construction activities occurring within occupied habitat could result in injury, mortality, displacement, disturbance, or inhibit the movement of these species. Implementation of mitigation measure ***BIO-1d*** listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of special status reptiles with potential to occur onsite, laws protecting these species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take" or other significant impacts.

In addition to ***BIO-1d***, the Project proponent will ensure implementation of the following measures in to avoid and minimize potential individual impacts to special status amphibians during construction:

> ***Mitigation Measure BIO-4a (Pre-construction Survey):*** Within 10 days prior to the onset of construction activities, a qualified biologist will conduct pre-construction surveys for western spadefoot and giant garter snake individuals and suitable habitats within the proposed work area and surrounding lands within 50 feet of canals and wetlands. If no individuals, active burrows, or suitable habits are observed during the preconstruction survey, then construction activities may begin. If construction is delayed or halted for more than 30 days, another pre-construction survey for western spadefoot and giant garter snake will be conducted. If the survey results in the identification of a western spadefoot or giant garter snake, the qualified biologist will determine if appropriate buffers can be implemented to avoid impacts to the individual(s).

> ***Mitigation Measure BIO-4b (Biological Monitoring)***: If suitable habitat for western spadefoot and/or giant garter snake are identified during the pre-construction survey, a biological monitor will be required to oversee construction actives within the areas identified.

Implementation of mitigation measures **BIO-1d**, **BIO-4a,** and **BIO-4b** will avoid and minimize the Project's potential impacts to western spadefoot and giant garter snake to a less than significant level under CEQA.

Project-Related Mortality and/or Disturbance of California Tiger Salamander

Project construction activities will result in temporary disturbance to potential designated critical and/or sensitive habitat for California tiger salamander. Construction activities occurring within sensitive habitat could result in injury, mortality, displacement, disturbance, or inhibit the movement of this species. Implementation of mitigation measure **BIO-1d** listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of special status reptiles with potential to occur onsite, laws protecting these species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take" or other significant impacts.

In addition to **BIO-1d**, the Project proponent will ensure implementation of the following measures in to avoid and minimize potential individual impacts to special status amphibians during construction:

> ***Mitigation Measure BIO-5a (Avoidance):*** The Project's construction activities will occur, if feasible, between May 1 and September 30 (outside of wet season) in an effort to avoid impacts to California tiger salamander.

> ***Mitigation Measure BIO-5b (Pre-construction Survey):*** If activities must occur within the wet season (October 1 to April 30), a qualified biologist will conduct pre-construction surveys for California tiger salamanders within 30 days prior to the start of construction. The survey will be conducted within the sensitive habitat areas as identified in Appendix B.

> ***Mitigation Measure BIO-5c (Exclusion fencing):*** The Project will install exclusion fencing around active construction to ensure California tiger salamanders do not enter the site during construction.

Fencing will be installed as directed by a qualified biologist prior to ground disturbing activities in areas deemed sensitive habitat for California tiger salamander (See Appendix B).

Mitigation Measure BIO-5d (Equipment and materials): The Project will check all equipment and materials for California tiger salamanders, daily, prior to the beginning of construction activities. Further, any trenches with walls too steep for a salamander to exit, will be completely covered at the end of each day.

Mitigation Measure BIO-5e (Formal Consultation): If any California tiger salamanders are observed during construction, work will stop immediately. A qualified wildlife biologist, approved to handle and remove California tiger salamander will be called to identify and remove the species. If take of any individual California tiger salamanders occurs, work will stop, and USFWS will be notified immediately, before more construction proceeds.

Project-Related Impacts to Special Status Plant Species

In reviewing the CNDDB and IPaC, the special status plant species Greene's tuctoria, San Joaquin Valley orcutt grass, and succulent owl's-clover, were identified to occur within or adjacent to the APE and/or have designated critical habitat within the APE. The APE survey was conducted outside the blooming season for these plants. It is recommended a more detailed survey be conducted inside the blooming season.

Projects that adversely affect special status plants or result in the mortality of special status plants is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will reduce potential impacts to special status plants to a less than significant level under CEQA and will ensure compliance with state and federal laws protecting these plant species.

Mitigation. The following measures will be implemented prior to the start of construction:

Mitigation Measure BIO-6a (Pre-Construction Survey): A qualified botanist/biologist will conduct focused botanical surveys for the three special status plants listed above, according to CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018).

Mitigation Measure BIO-6b (Avoidance): If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.

Mitigation Measure BIO-6c (Formal Consultation): If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, the Project proponent will initiate consultation with CDFW and/or USFWS. If CDFW and/or USFWS determines that "take" cannot be avoided, the Project proponent may be required to obtain an Incidental Take Permit.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant. Portions of riparian habitat were identified during the survey, specifically surrounding the Mariposa, Deadman, and Dutchman creeks. Riparian habitats fall under the jurisdiction of CDFW and therefore any work occurring within these areas will require regulatory permitting through this agency.

c) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant Impact with Mitigation Incorporated. The Project involves open cut trenches across ephemeral creeks. Mariposa Creek and Dutchman Creek are both ephemeral creeks with downstream connections to the San Joaquin River, a Water of the United States. Therefore, it is reasonable to assume that USACE would claim jurisdiction over these four waterways. Under the most recent updates to Waters of the United States rules, Deadman and Little Deadman creeks are also protected despite no connections to jurisdictional water bodies. An Aquatic Resources Delineation was conducted on August 20, 2021, to evaluate the site for potential Waters of the United States and delineate potential jurisdictional boundaries of these features. The investigation and delineation were conducted in accordance with the 1987 *Corps of Engineers Wetland Delineation Manual*, and the *Arid West Regional Supplement*. The field work revealed two areas which met all three criteria of a wetland: hydric soils, hydrophytic vegetation, and wetland hydrology. These areas included two isolated wetlands adjacent to the MID Le Grand Canal. **Mitigation Measure BIO-8a** below addresses mitigation to avoid impacts to these wetlands. Hydrologic indicators of ordinary high-water mark such as knickpoints, vegetation, gravel sheets, and drift were used to map the limits of potential USACE jurisdiction.

The creeks within the APE, below the Ordinary High Water Mark, would fall under the jurisdiction of USACE and construction activities in this area would be subject to USACE permit requirements pursuant to Section 404 of the Clean Water Act. This Project may be authorized under a Nationwide Permit but could require an individual permit if Nationwide Permit limits are exceeded. In addition, a Section 401 Water Quality Certification from the RWQCB is required for dredge and fill of waters of the State and activities must meet state water quality standards. These permits and certifications are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values.

If the Project's construction work will result in impacts to Waters of the United States, the Project proponent will be required to secure permits from USACE and RWQCB. Compliance with each permit requires avoidance, minimization, and mitigation measures to ensure that Project-related impacts to these potentially jurisdictional waters are less-than-significant in nature or are fully mitigated.

The Project proponent is required to notify CDFW if the Project's activities have potential to impact rivers, streams, or the riparian corridor of any aquatic features onsite that may be beneficial to fish or wildlife resources. If CDFW determines that the Project could potentially adversely affect fish and wildlife resources and/or riparian habitat, a Lake or Streambed Alteration (LSA) Agreement will be issued prior to construction. LSA Agreements are typically issued with mandatory avoidance and minimization measures, protective measures for special status species, and required compensatory mitigation for removal of riparian trees, shrubs, and herbaceous cover along the banks. Compliance with measures of the LSA Agreement will ensure that the Project's impacts to aquatic features and riparian habitat within CDFW's jurisdiction remain less-than-significant or are fully mitigated.

There are no designated wild and scenic rivers within the Project area; therefore, the Project will not result in direct impacts to wild and scenic rivers. Compliance with USACE, RWQCB, and CDFW permits, certifications, and agreements will ensure there are no indirect downstream effects to water quality.

e) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant Impact with Mitigation Incorporated. Proximity to the Sierra Nevada foothills and other high quality grassland habitats makes it likely that a variety of wildlife migrate through the region. Dry streambeds and canal banks can function as passages through highly disturbed areas within the San Joaquin Valley. Agricultural activities would deter wildlife from using these corridors during the day, though these deterrents are absent at night. The following mitigation measures would reduce impacts to nocturnal wildlife movement to a less than significant level.

Mitigation. The following measures would be implemented during or prior to the start of construction:

> ***Mitigation Measure BIO-7a (Operational Hours):*** Construction activities will be limited to daylight hours to reduce potential impacts to wildlife movement corridors.
>
> ***Mitigation Measure BIO-7b (Wildlife Access):*** At no point will access along the MID canal be blocked on parallel sections of bank at the same time overnight. If construction is occurring on both banks during the day, a wildlife access route through the construction area will be identified before sunset.
>
> ***Mitigation Measure BIO-7c (Excavations)***: The ends of open Pipelines/culverts/siphons will be blocked each night to prevent wildlife from entering. Excavations shall be covered or sloped to prevent wildlife from falling in and becoming trapped or injured during migratory or dispersal movements. The existing canal is precluded from this mitigation since the banks are not steep enough to prevent wildlife from escaping.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less than Significant Impact with Mitigation Incorporated. The Project appears to be largely consistent with the goals and policies of the Merced County General Plan. The only trees identified for removal during the Project include a cluster of black walnuts (*Juglans nigra*) adjacent to the Deadman Creek crossing. Since this is not a native tree species, mitigation is not warranted beyond mitigation measures **BIO-1a**, **BIO-1b**, and **BIO-1c**. Protection of wildlife movement corridors is addressed in mitigation measures **BIO-7a, BIO-7b,** and **BIO-7c**. The two wetlands identified during the survey are not currently within the construction area, although the widening of portions of the MID canal could potentially impact these areas. In order to avoid potentially significant impacts to wetlands, the following mitigation measures will be implemented.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-8a (Avoidance):*** No construction activities will occur on the banks adjacent to the two wetlands (Wetland A and Wetland B) identified within the Aquatic Resources Delineation.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The Project is not within a designated Habitat Conservation Plan, Natural Conservation Plan, or any other State or local habitat conservation plan. There would be no impact.

3.6 Cultural Resources

Table 3-9. Cultural Resources Impacts

Cultural Resources Impacts					
Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5?	☐	☒	☐	☐
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c)	Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

3.6.1 Environmental Baseline Conditions

Merced County occupies an archeologically and historically rich part of the San Joaquin Valley. Archeological, historical, architectural, paleontological, and Native American cultural resources and values must be considered in all phases of planning and subsequent development projects, including design, permitting, construction, and long-term maintenance.[13]

Merced County was initially formed in 1855 from portions of Fresno County and Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century. The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land that comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874, much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching. (**Appendix C**)

3.6.1.1 Records Search

A records search from the Central California Information Center (CCIC) of the California Historical Resources Information System (CHRIS), located at California State University, Stanislaus was conducted in August 2021. The CCIC records search includes a review of all recorded archaeological and built-environment resources as well as a review of cultural resource reports on file. In addition, the California Points of Historical Interest, the California Historical Landmarks, the California Register of Historical Resources, the National Register of Historic Places (NRHP), and the California State Built Environment Resources Directory listings were reviewed for the above referenced APE and an additional ¼-mile radius. Due to the sensitive nature of cultural resources, archaeological site locations are not released. (**Appendix C**). Additional sources included the State Office of Historic Preservation Historic Properties Directory, Archaeological Determinations of Eligibility, and the California Inventory of Historic Resources.

Three previously recorded cultural resources on file with the CCIC were identified within the APE, see **Table 3-10** below. One additional previously recorded resource was located within a half mile of the APE, see **Table 3-11** below. Additionally, five previous cultural resources studies were identified within the APE and an additional four previous studies were identified within a half mile of the APE. Details of the cultural resource studies can be found in **Appendix C.**

[13] (County, Merced, 2030)

Table 3-10. Previously Recorded Cultural Resources within APE

Primary No.	Trinomial	Type	Description	Eligibility Status
P-24-000608	CA-MER-000635H	Historic	The Le Grand Canal	Not eligible (6Y)
P-24-001881	N/A	Historic	Burlington Northern/Santa Fe Railroad	Not eligible (6Y)
P-24-001909	N/A	Historic	Merced Irrigation District	Eligible, NRHP Criteria A, C, and D

Table 3-11. Previously Recorded Cultural Resources within 0.5-mile radius of APE

Primary No.	Trinomial	Type	Description	Eligibility Status
P-24-000610	CA-MER-367	Historic	Unnamed canal/irrigation ditch	Unknown

3.6.1.2 Native American Outreach

The Native American Heritage Commission (NAHC) in Sacramento was also contacted in August 2021. They were provided with a brief description of the Project and a map showing its location and requested that the NAHC perform a search of the Sacred Lands File to determine if any Native American resources have been recorded in the immediate APE. The NAHC identifies, catalogs, and protects Native American cultural resources -- ancient places of special religious or social significance to Native Americans and known ancient graves and cemeteries of Native Americans on private and public lands in California. The NAHC is also charged with ensuring California Native American tribes' accessibility to ancient Native American cultural resources on public lands, overseeing the treatment and disposition of inadvertently discovered Native American human remains and burial items, and administering the California Native American Graves Protection and Repatriation Act (CNAGPRA), among many other powers and duties. NAHC provide a current list of Native American Tribal contacts to notify of the project. The twelve tribal representatives identified by NAHC were contacted in writing via United States Postal Service in a letter mailed October 11, 2021, informing each Tribe of the Project. Further discussion can be found in **Section 3.19**.

1. Amah Mutsun Tribal Band, Valentin Lopez, Chairperson
2. Chicken Ranch Rancheria of Me-Wuk Indians, Lloyd Mathiesen, Chairperson
3. Dumna Wo-Wah Tribal Government, Robert Ledger Sr., Chairperson
4. Muwekma Ohlone Indian Tribe of the SF Bay Area, Monica Arellano, Vice Chairwoman
5. Nashville Enterprise Miwok-Maidu-Nishinam Tribe, Cosme A. Valdez, Chairperson
6. North Fork Rancheria of Mono Indians, Elaine Bethel Fink, Chairperson
7. North Valley Yokuts Tribe, Katherine Erolinda Perez, Chairperson
8. Picayune Rancheria of Chukchansi Indians, Claudia Gonzales, Chairwoman
9. Santa Rosa Rancheria Tachi Yokut Tribe, Leo Sisco, Chairperson
10. Southern Sierra Miwuk Nation, Sandra Chapman, Chairperson
11. Tule River Indian Tribe, Neil Peyron, Chairperson
12. Tuolumne Band of Me-Wuk Indians, Andrea Reich, Chairperson

3.6.1.3 Field Survey

Between September 20, 2021, and September 29, 2021, Kleinfelder completed an intensive pedestrian survey of the APE. The survey was completed using 5- to 15-meter-spaced transects. Close inspection was given to all exposed ground soils and cut banks for the presence of archaeological materials. In addition, built environment resources constructed in or before 1976 were documented. The APE was photographed using a high-resolution digital camera and field observations were captured in written notes. Locational data were collected with Environmental Systems Research Institute Arc Collector application on Apple devices (**Appendix C**). The APE was accessible by foot and 100 percent of the APE was surveyed. Ground visibility varied between zero and 100 percent. Kleinfelder identified three previously recorded cultural resources and 27 newly recorded cultural resources within the APE (**Appendix C**).

Table 3-12. Previously Recorded Resources Observed during Survey

Resource Number	Description	Individual Eligibility Recommendation
P-24-000608 (CA-MER-00365H)	This resource consists of the Le Grand Canal. Kleinfelder surveyed an unrecorded 9.8-mile-long segment of the Le Grand Canal located between 10N 4133265 mN, 738887 mE and 10N 4124688 mN, 745689 mE. The recorded segment of canal is primarily unlined with the exception of intermittent concrete lining and riprap. The recorded segment is generally approximately 50 feet wide. It features several related structures including pumping stations, weirs, sluice gates, culverts, and pipes. The canal and its associated features appear in good condition.	This resource was previously recommended as not eligible for the CRHR or the NRHP in 2000 (Larson and Cannon 2000). Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Le Grand Canal is not individually eligible for the NRHP or the CRHR under any criteria. Kleinfelder does, however, recommended the Le Grand Canal as a contributor to the Merced Irrigation District (P-24-001909).
P-24-001881	This resource consists of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad. Kleinfelder surveyed two unrecorded segments of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad between 10N 4125776 mN, 742271 mE and 10N 4125479 mN, 742577 mE. The recorded segment is comprised of a standard gauge single track line with wooden ties and crushed rock ballast. The alignment is approximately 20 feet wide. Associated features include a concrete single-span bridge located over a ditch. The historical material of the recorded segment has been largely replaced due to regular maintenance and repairs; however, the alignment appears to be unchanged.	This resource was previously recommended not eligible for the NRHP or the CRHR under any criteria (Lortie 2002). Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad is not eligible for the NRHP or the CRHR under any criteria.
P-24-001909	This resource consists of the Merced Irrigation District. The portion within the APE consists of the recorded portion of the Le Grand Canal, newly recorded resources LG-26, LG-27, LG-28, LG-29, LG-30, LG-31, LG-32, LG-33, LG-34, and LG-35 and their associated features including pumping stations, weirs, sluice gates, culverts, and pipes.	Several potential contributing resources are located within the APE: the Le Grand Canal, LG-26, LG-27, LG-28, LG-29, LG-30, LG-31, LG-32, LG-33, LG-34, and LG-35. These contributing resources are not individually eligible for the NRHP or the CRHR, but are contributors to the Merced Irrigation District.

Table 3-13. Newly Recorded Resources in the APE

Resource Number	Description	Individual Eligibility Recommendation
LG-01	This resource consists of a recorded segment of a graded dirt road constructed ca. 1922-1927. The road follows the course of the southwest bank of the Le Grand Canal between Hayden Road and California Highway 140. The recorded segment is approximately 15 feet wide and 4,970 feet long. LG-01 is visible on historic aerials form 1945 and appears essentially the same as it does today. The USGS map from 1948 identifies the road as an unimproved road (USGS 1948). The road is located adjacent to a pumping station associated with the Le Grand Canal and was likely constructed for the operation and maintenance of the pumping station.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-01 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-02	This resource consists of a two-lane asphalt-paved portion of California Highway 140 initially constructed in ca. 1922. The recorded segment is approximately 35 feet wide and has a northeast-southwest alignment. The highway crosses over the Le Grand Canal via a culvert. While the alignment appears to be unaltered from its historic path, the materials comprising the road are non-historic due to continued maintenance over time. California Highway 140, also known as the All-Year Highway, was constructed to provide access to Yosemite Valley year-round (National Park Service 2021). A highway map of the State of California in 1922 depicts the route as paved from Merced to the Mariposa County line, after which it is depicted as graded but not paved to Yosemite (California Highway Commission 1922). By 1934, the entire expanse from Merced to Yosemite was completely paved (California Department of Public Works, Division of Highways 1934). California Highway 140 is visible on the 1946 aerial and appears as a two-lane concrete roadway. By 1958, it appears that the road was widened and paved with asphalt (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	This resource does meet NRHP Criterion A or CRHR Criterion 1 at the national level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. California Highway 140 was constructed to provide better all-year access to Yosemite National Park. It is indicative of the growing interest in automobile leisure during the early- and mid-twentieth century and the increasing important of the National Parks. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because California Highway 140 does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-03	This resource consists of two interrelated features: a bridge spanning the Le Grand Canal (Feature 1) and a recorded	This resource does meet NRHP Criterion A or CRHR Criterion 1 at

Resource Number	Description	Individual Eligibility Recommendation
	segment of East Childs Avenue. The road alignment was constructed prior to 1918 and previously identified as "Merced Road" (USGS 1918b), however; the bridge was likely initially constructed concurrent to the Le Grand Canal ca. 1922-1927. The bridge is a single-span concrete bridge with non-historic metal railings that facilitates East Childs Avenue crossing the Le Grand Canal. The bridge is approximately 40 feet by 30 feet. A tag reading "09383 1 X 1 14" was observed on the bridge. East Childs Avenue is a two-lane asphalt road with an east-west orientation. The recorded segment is approximately 20 feet wide and 220 feet long. The road and bridge appear essentially the same in the historic aerials from 1945 as they do today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Planada and Merced. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because East Childs Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-04	This resource is an approximately 15-foot-wide graded dirt road constructed ca. 1922-1927 running roughly north-south on the west side of the Le Grand Canal. LG-04 was depicted as an unnamed, unfinished road on a historic topographic map from 1948 (USGS 1948) and is visible in the 1946 historic aerials (NETR 2021). The road was likely constructed concurrent with the Le Grand Canal, ca. 1922-1927.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-04 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-06	This resource consists of two features: Feature 1 is a bridge spanning the Le Grand Canal (P-24-000806) and Feature 2 is a segment of East Mission Avenue composed of dirt. The bridge is a single-span concrete bridge with metal guard rails constructed prior to 1946 (NETR 2021). It is approximately 25 feet wide and 45 feet long. The recorded segment of East Mission Avenue is composed of a graded dirt road approximately 20 feet wide that was constructed prior to 1918 (USGS 1918b). It has an east-west orientation and appears to have been constructed to provide access to local agricultural properties and homes.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-06 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-07	This resource consists of two features: Feature 1 is an approximately 12-foot-wide and 25-foot-long wooden bridge constructed ca. 1922-1927 spanning the Le Grand Canal. Feature 2 is a segment of Dump Yard Road which consists of a	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-07 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

Resource Number	Description	Individual Eligibility Recommendation
	graded dirt road with a north-south orientation constructed ca. 1919 (USGS 1919). The recorded segment is approximately 25 feet wide and 305 feet long. LG-07 is visible in the 1946 historic aerial and appears essentially the same as it does today, however the road is bisected immediately north of the recorded segment by a retention pond constructed between 1959 and 1998 (NETR 2021).	
LG-10	This resource consists of a segment of South Fresno Road constructed prior to 1918. The road is a graded gravel road with a north-south alignment. The recorded segment is approximately 25 feet wide and 456 feet long. The recorded segment spans the Le Grand Canal via a culvert which would have been constructed concurrent with the canal ca. 1922-1927. The road appears on the 1918 USGS map and is depicted as a light duty road (USGS 1918a).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-10 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-11	This resource consists of a recorded segment of Le Grand Road constructed prior to 1918 (USGS 1918). The recorded segment of Le Grand Road consists of a two-lane asphalt highway with an east-west alignment. The recorded segment is approximately 30 feet wide and 450 feet long. LG-11 is visible in the 1946 historic aerial as an unpaved road and appears to have been paved between 1946 and 1951 (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	This resource does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because Le Grand Road does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-12	This resource consists of a graded dirt and gravel road constructed prior to 1918 (USGS 1918a). The recorded segment is approximately six feet wide and 370 feet long. The 1918 USGS map depicts it as a light duty road, and it is visible on historic aerials from 1946 appearing essentially the same as it does today	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-12 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-15	This resource consists of a segment of South Ipsen Avenue constructed prior to 1946 (USGS 1946). The recorded segment of South Ipsen Avenue is comprised of a two-lane asphalt road	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-15 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

Resource Number	Description	Individual Eligibility Recommendation
	with a northeast-southwest alignment. It is approximately 15 feet wide and 230 feet long. The road is visible on historic aerials from 1946 and appears essentially the same as it does today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	
LG-16	This resource consists of a segment of South Santa Fe Avenue constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with a northwest-southeast orientation. The recorded segment is approximately 25 feet wide and 255 feet long. It was identified as "Sharon Road" on the 1918 USGS map and depicted as a light duty road (USGS 1918a). Between 1918 and 1946, the road was upgraded to a secondary highway (USGS 1946) and appears on historic aerials essential the same as it does today (NETR 2021). By 1961, the road had been relabeled as "Santa Fe Avenue" (USGS 1961). The road appears to have been initially constructed as a service road for the adjacent Santa Fe Railroad alignment. While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including paving between 1959 and 1998 (NETR 2021) and repaving resulting in the loss of historical materials.	This resource does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was a major route connecting the community of Le Grand with Planada, predating 1918, and followed the alignment of the Burlington Northern-Santa Fe Railroad. While the fact that it followed the railroad alignment is not significant, the road was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand and Planada. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because South Santa Fe Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-17	This resource consists of a recorded segment of Buchanan Road constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with an east-west alignment. The recorded segment is approximately 20 feet wide and 320 feet long. It was identified as "Athelone and Buchanan Road" on the 1918 USGS map and depicted as a light duty road (USGS 1918a). It is visible on the 1946 historic aerials and appears essentially the same as its current appearance (NETR 2021). By 1961, the road was renamed "Buchanan Road" (USGS 1961). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-17 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-18	This resource consists of a recorded segment of Earl Road constructed prior	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP.

Resource Number	Description	Individual Eligibility Recommendation
	to 1946 (USGS 1946). It is comprised of an approximately 15-foot-wide and 5,280-foot-long asphalt road with a north-south alignment. It is depicted on the 1946 USGS map as an unpaved road (USGS 1946) and appears as such in historical aerials from that time (NETR 2021). By 1961, it had likely been paved and was upgraded to a light duty road (USGS 1961). It appears today as it likely did in 1961; however, the asphalt has significantly deteriorated.	Therefore, LG-18 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-20	This resource consists of a recorded segment of an unnamed graded dirt road constructed prior to 1946 (USGS 1946). The road is approximately 20 feet wide and 4,845 feet long and has an east-west alignment. The road appears on the 1946 USGS map as an unimproved road (USGS 1946). Historic aerials form 1946 depict the road essentially the same as it appears today (NETR 2021).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-20 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-22	This resource consists of two features. Feature 1 is a concrete bridge spanning the Le Grand Canal constructed ca. 1922-1927 and Feature 2 is a recorded portion of Jordan Road constructed prior to 1918 (USGS 1918a). The bridge is single span and is constructed of concrete. It is approximately 23 feet wide and 20 feet long. The recoded section of Jordan Road is comprised of an asphalt roadway with an east-west orientation measuring approximately 15 feet wide and 490 feet long. The roadway is depicted in the 1918 USGS map as a light duty roadway (USGS 1918a). The bridge was constructed concurrent with the Le Grand Canal ca. 1922-1927. Both the road and the bridge appear in historic aerial images from 1946 and appear essentially the same as the way they appear today (NETR 2021).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-22 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-23	This resource consists of the recorded segment of an unnamed graded dirt road constructed prior to 1946 (NETR 2021). The recorded segment is approximately 15 feet wide and 5,280 feet long. The road generally has a north-south alignment which follows the contours of the Le Grand Canal located adjacent to the road to the east. The road first appears on USGS maps in 1961 and is depicted as an unimproved road (USGS 1961).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-23 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-24	This resource consists of the recorded segment of South Cunningham Road	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP.

Resource Number	Description	Individual Eligibility Recommendation
	constructed prior to 1946 (NETR 2021). The recorded segment of South Cunningham Road consists of a two-lane asphalt road with a north-south alignment. The recorded segment is approximately 24 feet wide and 270 feet long. The road is depicted on the 1947 USGS map as a secondary highway (USGS 1947). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.	Therefore, LG-24 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-26	This resource consists of the recorded segment of an unnamed ditch constructed between 1959 and 1998 (NETR 2021). The ditch is approximately 15 feet wide and 435 feet long. It has a northwest-southeast orientation before gradually curving to a northeast-southwest orientation. Based on its proximity to neighboring orchards, the ditch was likely constructed to support agriculture.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-25 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-27	This resource consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 14 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate. The canal has a north-south alignment before transitioning to a northeast-southwest alignment. This segment was observed on a historic topographic map from 1961 (USGS 1961).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-27 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-28	This resource consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 20 feet wide. The canal segment connects directly to the Le Grand Canal. The canal has an east-west alignment before transitioning into a north-south alignment where it transitions into an irregular alignment and feeds into additional irrigation canals. The canal segment is observed on a historic topographic map from 1948 (USGS 1948).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-28 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-29	This resource consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 12 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate and has a	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-29 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

Resource Number	Description	Individual Eligibility Recommendation
	north-south alignment. The canal was observed on a historic topographic map from 1961 (USGS 1961).	
LG-30	This resource consists of the recorded segment of a channelized section of Miles Creek constructed ca. 1946 (NETR 2021). The channel runs northeast to southwest and bisects the Le Grand Canal. It features a concrete weir flanked by rip rap where the channel meets the canal on the northeast bank.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-30 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-31	This resource consists of the recorded segment of the Ivett Lateral, an earthen irrigation lateral canal constructed prior to 1946 (NETR 2021). The recorded segment is approximately 35 feet wide and 95 feet long. It has an east-west alignment and joins the Le Grand Canal at a cement-lined sluice culvert inlet. A tag reading "089596 R 24 L 07 00 U" was observed on the sluice gate. The canal is flanked by dirt access roads. The lateral was observed on a historic topographic map from 1961 (USGS1961).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-31 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-32	This resource consists of a segment of earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The recorded section has an east-west alignment approximately 24 feet wide. The canal intersects with the La Grand canal by a wood sluice gate and culvert. The canal was observed on a historic topographic map from 1961 (USGS 1961).	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-32 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-33	This resource consists of a recorded portion of the Parker Lateral constructed prior to 1946. The recorded portion of the Parker Lateral is an earthen branch irrigation canal with an east-west orientation. The canal intersects with the Le Grand Canal via a metal sluice gate and concrete culvert on the west bank of the Le Grand Canal. The recorded section of the Parker Lateral is approximately 16 feet wide.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-33 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-34	This resource consists of a recoded segment of an earthen branch irrigation canal constructed prior to 1946. The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. It is observed in the historic topographic map from 1961.	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-34 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-35	This resource consists of a segment of earthen canal constructed ca. 1946. The recorded segment of the canal is approximately 20 feet wide and 200 feet	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-35 is not a historic property for

Resource Number	Description	Individual Eligibility Recommendation
	long. It has an east-west orientation and connects with the Le Grand Canal via wooden sluice on the west terminus. The canal first appears of the USGS map from 1946 (USGS 1946) and is visible on historic aerials from 1945 (NETR 2021)	the purposes of Section 106 or a historical resource for the purposes of CEQA.

3.6.2 Impact Assessment

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5?

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less than Significant Impact with Mitigation Incorporated. A CHRIS records search, from the CCIC, was conducted in August 2021. Three previously recorded cultural resources on file with the CCIC were identified within the APE (**Table 3-10**). One additional previously recorded resource was located within a half mile of the APE (**Table 3-11**). Five previous cultural resources studies were identified within the APE and an additional four previous studies were identified within a half mile of the APE (**Table 3-12)**.

During the pedestrian survey conducted in September 2021 by Kleinfelder, 27 new historic-era cultural and built environment resources were identified, and three previously recorded resource was updated within the APE. All resources were recorded on Department of Parks and Recreation (DPR) 523-series forms and evaluated for inclusion in National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). One cultural resource, the Merced Irrigation District (P-24-001909), which includes the Le Grand Canal, was identified as eligible for the NRHP and CRHR is a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA. The Project would result in physical changes to the Le Grand Canal, which would include widening and extending the existing canal. However, these actions would not result in a significant loss of historical material that would compromise the ability of the MID to convey its historic significance. There would be no significant change to the overall appearance, route, or function of the recorded portion of the Le Grand Canal or the larger MID boundary, despite the extension of the existing canal. As such, a finding of no adverse effect to historic properties pursuant to 36 CFR § 800.5 and no significant impact for the purposes of CEQA (**Appendix C**).

Based upon the background research and survey results, the APE is considered to have low sensitivity for cultural resources such as archaeological and historical resources, and the mitigation measures, as outlined below in **CUL-1** and **CUL-2** are recommended in the unlikely event that resources are uncovered and would reduce impacts to less than significant.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant Impact with Mitigation Incorporated. The Project proposes to expand the existing capacity of the MID Le Grand Canal and Booster Lateral #3 Canal and construct new canal and pipeline infrastructure from MID Booster Lateral #3 to LGAWD. There is no evidence or records that suggests the Project is within a known burial site or a site of buried human remains. In the unlikely event of such a discovery, mitigation will be implemented. With incorporation of mitigation measure **CUL-2** outlined below, impacts resulting from the discovery of remains interred on the Project would be less than significant.

Mitigation Measure

CUL-1 (Archaeological Remains): Should archaeological remains or artifacts be unearthed during any stage of Project activities, work in the area of discovery will cease until the area is evaluated by a qualified archaeologist. If discoveries are uncovered, the Project proponent will abide by recommendations of the archaeologist.

CUL-2 (Human Remains): In the event that any human remains are discovered within the Project site, the Merced County Coroner will be notified of the discovery (California Health and Safety Code, Section 7050.5) and all activities in the immediate area of the find or in any nearby area reasonably suspected to overlie adjacent human remains will cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner will notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit the NAHC to determine the most likely descendent of the deceased.

3.7 Energy

Table 3-14. Energy Impacts

Energy Impacts				
Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

3.7.1 Environmental Baseline Conditions

Merced County is served by Pacific Gas and Electric for its energy needs. The existing operation of the existing Le Grand and MID canal facilities uses energy to power pumps and gates used to transfer water through the area.

3.7.2 Impact Assessment

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than Significant Impact. The Project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation. The primary source of energy consumption that would result from this Project is through the consumption of fuel associated with construction equipment. California Code of Regulations Title 13, Motor Vehicles, Section 2449(d)(2), Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel because of unproductive idling of construction equipment. In addition, the energy consumption for construction activities would not be ongoing as they would be limited to the duration of Project construction, estimated at 36 months. Energy used during operation of the canal facility would not be substantial enough to create a significant environmental impact. The Project would employ the best management practices associated with the conservation of energy. Therefore, impacts would be less than significant.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. The Project would be required to comply with all applicable energy policies, rules, and regulations both locally and from the State. Therefore, there would be no impact.

3.8 Geology and Soils

Table 3-15. Geology and Soils Impacts

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

3.8.1 Environmental Baseline Conditions

3.8.1.1 Geology and Soils

The Project is located in the Central Valley of California in a relatively flat area that is comprised of rich soil used by residents and farmers for agriculture. The area is part of the Central Valley Geomorphic Region and is comprised of marine and non-marine sedimentary rocks[14]. According to the US Department of Agriculture, the main soil types found at the Project are shown in **Table 3-16.**

Table 3-16. Soils

Soil	Soil Map Unit	Percent of APE	Hydric Unit	Hydric Minor Units	Drainage	Permeability	Runoff
Alamo	Clay, 0 to 1 percent slopes	0.7%	Yes	No	Poorly drained	Very slow	Very high
Bear Creek	Loam, 0 to 3 percent slopes	< 0.1%	Yes	No	Moderately well drained	Slow	Low
Burchell	Silty clay loam, 0 to 1 percent slopes	0.6%	Yes	No	Somewhat poorly drained	Moderately slow	Low
Greenfield	Sandy loam, deep over hardpan, 0 to 3 percent slopes	0.7%	No	No	Well drained	Moderately rapid	Very low
	Sandy loam, moderately deep and deep over hardpan, 3 to 8 percent slopes	< 0.1%	No	No			
Hanford	Sandy loam, 0 to 1 percent	0.3%	No	No	Well drained	Moderately rapid	Very low
Honcut	Fine sandy loam, 0 to 1 percent slopes	0.8%	No	No	Well drained	Moderately rapid	Very low
	Silt loam, 0 to 1 percent slopes	0.9%	No	No			
Hopeton	Clay, 0 to 8 percent slopes	1.5%	No	No	Moderately well drained	Slow	High
	Clay loam, 0 to 3 percent slopes	0.4%	No	No			
Keyes	Gravelly clay loam, 0 to 8 percent slopes	1.2%	No	Yes	Moderately well drained	Very slow	Very high
	Gravelly loam, 0 to 8 percent slopes	1.4%	No	Yes	Moderately well drained		Very high
Keyes-Pentz	Gravelly loam, 0 to 8 percent slopes	6.8%	No	Yes	Moderately well drained	Moderately high	Very high
Madera	Fine sandy loam, 0 to 3 percent slopes	0.9%	No	No	Moderately well drained	Very slow	High
	Loam, 0 to 1 percent slopes	2.0%	No	Yes			
	Sandy loam, 0 to 3 percent slopes	0.3%	No	Yes			
	Sandy loam, 3 to 8 percent slopes	1.2%	No	Yes			
Marguerite	Loam, 0 to 1 percent slopes	1.0%	No	No	Well drained	Slow	Medium
	Silty clay loam, deep over hardpan 0 to 1 percent slopes	1.2%	No	No			
Pachappa	Fine sandy loam, 0 to 1 percent slopes	1.0%	No	No	Well drained	Moderate	Low
Pentz	Gravelly loam, 0 to 8 percent slopes	2.0%	No	No	Well drained	Moderately high	Low
Peters	Cobbly clay, 8 to 30 percent slopes	< 0.1%	No	No	Well drained	Moderately high	Very high

[14] California Department of Conservation. Geologic Map of California. Website: https://maps.conservation.ca.gov/cgs/gmc/. Accessed 9/2/21.

Soil	Soil Map Unit	Percent of APE	Hydric Unit	Hydric Minor Units	Drainage	Permeability	Runoff
Porterville	Clay, 0 to 3 percent slopes	11.7%	No	No	Well drained	Slow	High
	Clay, 3 to 8 percent slopes	0.2%	No	No			
Raynor	Clay, 0 to 3 percent slopes	11.2%	No	No	Well drained	Slow	High
	Clay, 3 to 8 percent slopes	0.2%	No	No			
	Cobbly clay, 0 to 3 percent slopes	6.7%	No	No			
	Cobbly clay, 3 to 8 percent slopes	2.8%	No	No			
Redding	Gravelly loam, 0 to 8 percent slopes, dry	7.7%	No	No	Moderately well drained	Slow to very slow	Low
Ryer	Silt loam, 0 to 3 percent slopes	0.4%	No	No	Well drained	Slow	Medium
San Joaquin	Sandy loam, 0 to 3 percent slopes	8.3%	No	Yes	Moderately well drained	Very slow	Very high
	Sandy loam, 3 to 8 percent slopes	2.6%	No	Yes			
San Joaquin-Alamo	Sandy loam, 0 to 3 percent slopes	0.9%	No	Yes	Moderately well drained	Very slow	Very high
Seville	Clay, 0 to 3 percent slopes	3.0%	No	No	Well drained	Slow	High
Tujunga	Sand, 0 to 3 percent slopes	0.4%	No	No	Somewhat excessively drained	Slow	Negligible
Whitney	Sandy loam, 3 to 8 percent slopes	4.4%	No	No	Well drained	Moderately rapid	Medium
Wyman	Loam, 0 to 3 percent slopes	2.3%	No	No	Well drained	Moderately slow	Medium
	Loam, deep over hardpan, 0 to 3 percent slopes	5.7%	No	No			
Yokohl	Loam, 0 to 3 percent slopes	1.4%	No	No	Well drained	Slow to very slow	Very high
Yolo	Loam, 0 to 5 percent slopes	2.5%	No	No	Well drained	Moderate	Low
	Loam, deep over hardpan, 0 to 1 percent slopes	1.0%	No	No			

3.8.1.2 Faults and Seismicity

Like most of California, the Project area experiences seismic activity to a varying degree. The Project APE is not located on any known fault or fault zone, but it could experience seismic activity as a result of fault activity in other parts of the state. The Ortigalita Fault Zone is located approximately 45 miles to the southwest of the south end of the Project, and the Silver Lake Fault is located approximately 75 miles northeast of the southern end of the Project.[15]

3.8.1.3 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated granular and non-plastic, fine-grained soils lose their structure or strength when subjected to high-intensity ground shaking. Soil liquefaction causes ground

[15] California Department of Conservation. Fault Activity Map of California. Website: https://maps.conservation.ca.gov/cgs/fam/. Accessed 9/2/21.

failure that can damage roads, pipelines, underground cables, and buildings with shallow foundations. Liquefaction more commonly occurs in loose, saturated materials. According to the California Geologic Survey the Project is not located in or near a zone that has been designated as an area that has experienced soil liquefaction.[16]

3.8.1.4 Soil Subsidence

Subsidence occurs below the surface when subsurface pressure is reduced by the withdrawal of fluids (e.g., groundwater, natural gas, oil) resulting in sinking of the ground. According to the United States Geological Survey[17] the Project is located northeast of a zone that is designated as land that has experienced soil subsidence due to groundwater pumping (See **Figure 3-2**).

3.8.1.5 Dam and Levee Failure

According to the California Department of Water Resources Dam Breach Inundation Map, the Project is not in an area that would be susceptible to flooding as a result of dam or levee failure.[18]

[16] California Geologic Survey. Earthquake Zones of Required Investigation. Website: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed 9/2/21.
[17]United States Geologic Survey. Areas of Land Subsidence in California. Website: https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html. Accessed 9/2/21.
[18] California Department of Water Resources. Dam Breach Inundation Map Web Publisher. Website: https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2. Accessed 9/2/21.

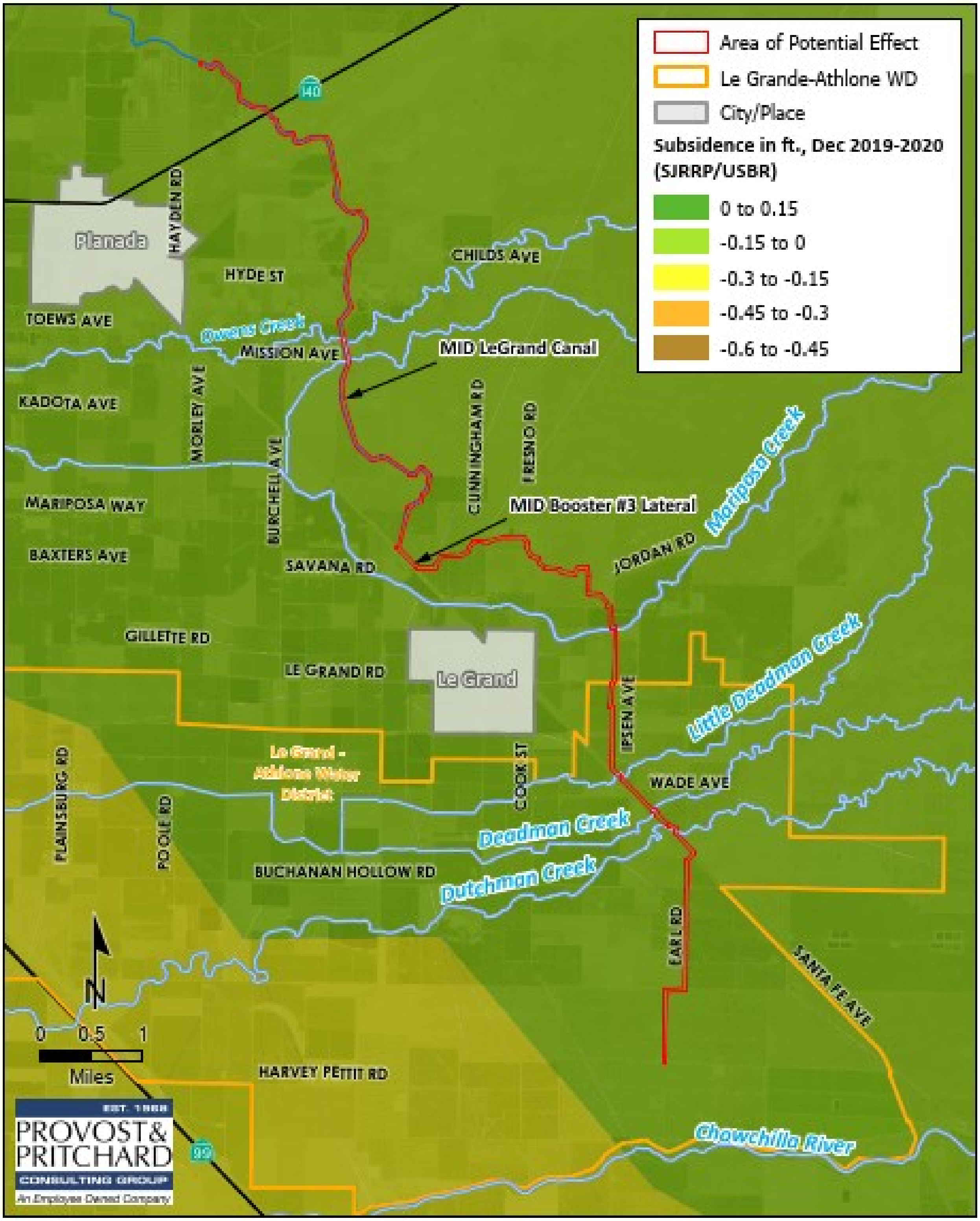

Figure 3-2. Soil Subsidence Map

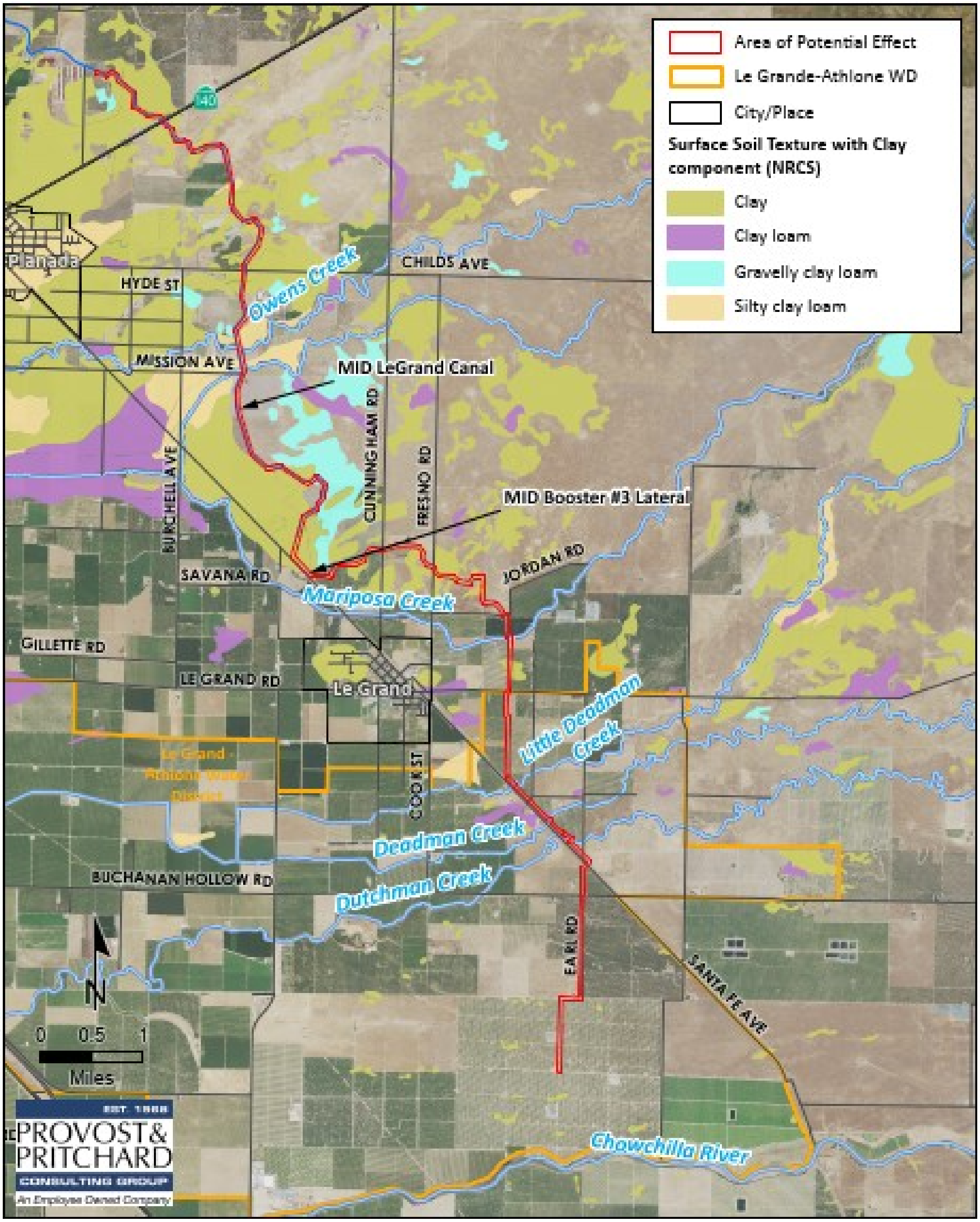

Figure 3-3. Clay Types Map

3.8.2 Impact Assessment

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

a-i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

a-ii) Strong seismic ground shaking?

Less than Significant Impact. Ground shaking intensity is a function of distance from an earthquake's epicenter and underlying geology. The most common impact associated with ground shaking is damage to structures. The Project would result in the construction of a new and updated canal that would meet California Building Code requirements governing potential structural damage due to earthquakes. The project does not include habitable structures. The Project would not cause potential substantial adverse effects, including the risk of loss, injury, or death as a result in a rupture of a known earthquake fault, nor would it result in strong seismic activity from Project inundations. Therefore, impacts would be less than significant.

a-iii) Seismic-related ground failure, including liquefaction?

No Impact. The Project would not be located in an area that is known to experience liquefaction. The Project would result in the construction of new and improved canal facilities. These new facilities would not increase the likelihood for liquefaction to occur within the Project. Therefore, there would be no impact.

a-iv) Landslides?

No Impact. The Project is located in a relatively flat area with little to no potential for landslides to occur. Construction of the Project would not increase the likelihood for landslides to occur at the Project. Therefore, there would be no impact.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. The Project would construct an approximately 16 mile stretch of new and updated canal facilities in eastern Merced County. Developers whose projects disturb one (1) or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, and construction of linear underground or overhead facilities associated with trail construction, but does not include regular maintenance activities performed to restore the original lines, grade, or capacity of the overhead or underground facilities. The Construction General Permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Project construction activities may result in soil erosion and the loss of topsoil, including the buildup of soil within the natural waterways that the Project would cross. Through the use of a SWPPP and the Best Management Practices (BMPs), impacts would be reduced to a less than significant level. Therefore, impacts would be less than significant.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less than Significant Impact. Due to the relatively flat topography of the Project and greater surrounding area and distance from active faults, landslides, lateral spreading, subsidence, liquefaction or collapse are not considered a potentially significant geologic hazard. As shown in **Figure 3-2**, areas approximately half a mile and more southwest of the Project have experienced subsidence due to excessive groundwater pumping. The

Project would result in a new canal that would aid in reducing groundwater overdraft for the area, and as a result would help to reduce the likelihood for subsidence to occur. In addition, the construction activities of the Project would not result in the likelihood for soil to become unstable through landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, impacts would be less than significant.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less than Significant Impact. The Project would not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property. Additionally, the project does not include habitable structures. Some areas of the Project APE where the existing canal would be expanded contain clay soils that are more expansive than other soils, however, project activities in these areas would result in a widening of the existing canal and would not result in a substantial direct or indirect risk to life or property. Areas of the Project APE that are constructing new canal facilities would run through small pockets of clay soils, as shown in **Figure 3-3**. Construction of new facilities in these areas would not result in the direct or indirect loss of life or property due to construction activities. Therefore, impacts would be less than significant.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The Project would not result in the use of septic tanks or any other alternative wastewater disposal systems. Therefore, there would be no impact.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Less than Significant Impact with Mitigation Incorporated. There are no known unique paleontological resources or geological features on the Project; however, during construction unique paleontological or geological resources could be unearthed. In this event all construction would stop, the County would be notified, and a qualified paleontologist or archaeologist would be consulted.[19] Therefore, impacts would be less than significant.

> **GEO-1 (Geologic Resource Recovery):** Should a unique paleontological resource, site, or unique geological feature be unearthed during any stage of Project activities, work in the area of discovery will cease until the area is evaluated by a qualified geologist or paleontologist. If discoveries are uncovered, the Project proponent will abide by recommendations of the geologist or paleontologist.

[19] County of Merced. Draft Environmental Impact Report. Website: https://www.co.merced.ca.us/3492/Environmental-Impact-Report-EIR. Accessed 12/15/21.

3.9 Greenhouse Gas Emissions

Table 3-17. Greenhouse Gas Emissions Impacts

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

3.9.1 Environmental Baseline Conditions

Commonly identified Green House Gas (GHG) emissions and sources include the following:

Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out gassing. Anthropogenic sources include the burning of coal, oil, natural gas, and wood.

Methane (CH_4) is a flammable greenhouse gas. A natural source of methane is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and ruminants such as cattle.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load.

Water vapor is the most abundant, and variable greenhouse gas. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life.

Ozone (O_3) is known as a photochemical pollutant and is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived and, therefore, is not global in nature. Ozone is not emitted directly into the atmosphere but is formed by a complex series of chemical reactions between volatile organic compounds, nitrogen oxides, and sunlight.

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. CFCs destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for CFCs. Of all the greenhouse gases, HFCs are one of three groups (the other two are perfluorocarbons and sulfur hexafluoride) with the highest global warming potential. HFCs are human-made for applications such as air conditioners and refrigerants.

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest global warming potential of any gas evaluated. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth, and what the effects of clouds will be in determining the rate at which the mean temperature will increase. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, air pollution episodes, and the consequence of these effects on the economy.

Emissions of GHGs contributing to global climate change are largely attributable to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. About three-quarters of human emissions of CO_2 to the global atmosphere during the past 20 years are due to fossil fuel burning. Atmospheric concentrations of CO_2, CH_4, and N_2O have increased 31 percent, 151 percent, and 17 percent respectively since the year 1750 (CEC 2008). GHG emissions are typically expressed in carbon dioxide-equivalents (CO_2e), based on the GHG's Global Warming Potential (GWP). The GWP is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2.

An Air Quality and Greenhouse Gas Emissions Evaluation Report was prepared in August 2021 and is contained in **Appendix A**. The essential conclusions of this Report are as follows:

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or,

b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

In accordance with SJVAPCD's *CEQA Greenhouse Gas Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects*[20], proposed projects complying with Best Performance Standards (BPS) would be determined to have a less-than-significant impact. Projects not complying with BPS would be considered less than significant if operational GHG emissions would be reduced or mitigated by a minimum of 29 percent, in comparison to business-as-usual (year 2004) conditions. In addition, project-generated emissions complying with an approved plan or mitigation program would also be determined to have a less-than-significant impact.

[20] Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. http://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf Accessed 9/2/21.

3.9.1.1 Construction-Generated Emissions

Emissions associated with the Project were calculated using SacMetro, Version 9.0.0. The emissions modeling includes emissions generated by off-road equipment, haul trucks, and worker commute trips. Emissions were quantified based on anticipated construction schedules and construction equipment requirements provided by the District with a construction schedule of approximately 36 months. All remaining assumptions were based on the default parameters contained in the model. Localized air quality impacts associated with the Project would be minor and were qualitatively assessed. Modeling assumptions and output files are included in **Appendix A**.

3.9.2 Impact Assessment

Table 3-18. SacMetro Modeling GHG Emission Estimate

Source	Emissions (MT CO_2e)(1)
Grubbing/Land Clearing	*500.77*
Grading/Excavation	*494.96*
Drainage/Utilities/Sub-Grade	*490.93*
Paving	*488.62*
Maximum (tons per phase)	*500.77*
Total (tons per construction project)	*1,975.28*
Total / Years of Construction = Annual Maximum Emissions	*658.43*
*AB 32 Consistency Threshold for Land-Use Development Projects**	*1,100*
*AB 32 Consistency Threshold for Stationary Source Projects**	*10,000*
Exceed Threshold?	***No***

1. Emissions were quantified using the SacMetro Modeling System. Refer to **Appendix A** for modeling results and assumptions. Totals may not sum due to rounding.

* As published in the Bay Area Air Quality Management District's CEQA Air Quality Guidelines. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en Accessed 9/2/21.

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact. The Project would not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. As seen in **Table 3-18. SacMetro Modeling GHG Emission Estimate**, the Project would not be in exceedance of GHG emission thresholds set by the SJVAPCD on an annual basis. Therefore, impacts would be less than significant.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant Impact. The Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. The Project would follow the standards and guidelines set by the SJVAPCD regarding GHGs. Therefore, impacts would be less than significant.

3.10 Hazards and Hazardous Materials

Table 3-19. Hazards and Hazardous Materials Impacts

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

3.10.1 Environmental Baseline Conditions

3.10.1.1 Hazardous Materials

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires the California Environmental Protection Agency to develop at least annually an updated Cortese List. The Department of Toxic Substances Control (DTSC) is responsible for a portion of the information contained in the Cortese List. Other State and local government agencies are required to provide additional hazardous material release information for the Cortese List. DTSC's EnviroStor database provides DTSC's component of Cortese List data (DTSC, 2010). In addition to the EnviroStor database, the SWRCB Geotracker database provides information on regulated hazardous waste facilities in California, including underground storage tank (UST) cases and non-UST cleanup programs, including Spills-Leaks-Investigations-Cleanups sites, Department of Defense sites, and Land Disposal program. A search of the DTSC EnviroStor database and the SWRCB Geotracker performed on June 30, 2021 determined that there are no known active hazardous waste generators or hazardous material spill sites within the Project APE or immediate surrounding vicinity.

3.10.1.2 Airports

The Merced Regional Airport is located approximately 12 miles to the west of the Project's northern most point and the Turlock Municipal Airport is located approximately 25 miles to the northwest of the northern end of the Project. The Project is not located within an airport land use plan.

3.10.1.3 Emergency Response Plan

The Merced County Department of Public Health maintains a Medical/Health Emergency Operations Plan for the County and its unincorporated cities. The Merced County Office of Emergency Services partners with communities to create and maintain Emergency Operations Plans that address risks such as fire, law enforcement, and public health threats, among other risks.

3.10.1.4 Sensitive Receptors

Sensitive Receptors are groups that would be more affected by air, noise, and light pollution, pesticides, and other toxic chemicals than others. This includes infants, children under 16, elderly over 65, athletes, and people with cardiovascular and respiratory diseases. High concentrations of these groups would include, daycares, residential areas, hospitals, elder care facilities, schools, and parks. The Project would be constructed within 100 feet of homes in some areas, exposing potential sensitive receptors to exhaust pollutants emitted by construction equipment. Le Grand Elementary School and Le Grand High School are located approximately one mile to the west of the Project.

3.10.2 Impact Assessment

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? And

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less than Significant Impact. Implementation of the Project would include the expansion of the southeastern portion of the existing MID Le Grand canal and the Booster 3 Lateral Canal, where the construction of a new intertie canal would start and end at a point approximately one mile north of the Chowchilla River. Construction of the Project could involve the use of hazardous materials associated with construction equipment, such as diesel fuel, lubricants, and solvents. However, the contractor would comply with all California Department of Occupational Safety and Health Administration regulations regarding regular maintenance and inspection of equipment, spill prevention, and spill remediation in order to reduce the potential for incidental release of pollutants or hazardous substances onsite. Furthermore, any potential accidental hazardous materials spills during construction are the responsibility of the contractor to remediate in accordance with industry BMPs and State and county regulations. Therefore, impacts would be less than significant.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. The nearest school to the Project is Le Grand Elementary School, located approximately one mile to the west of the intertie, and as a result would not emit or handle hazardous materials within one quarter mile of an existing or proposed school. Therefore, there would be no impact.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The Project APE does not involve land that is listed as a hazardous materials site pursuant to Government Code Section 65962.5 and is not included on a list compiled by the DTSC. A search of the DTSC EnviroStor database and the SWRCB Geotracker performed on June 30, 2021 determined that there are no known active hazardous waste generators or hazardous material spill sites within the Project area or immediate surrounding vicinity.[21] [22] Therefore, there would be no impact.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The Merced Regional Airport is located approximately 12 miles to the west of the Project's northern most point and the Turlock Municipal Airport is located approximately 25 miles to the northwest of the northern end of the Project. The Project is not located within an airport land use plan. Therefore, there would be no impact.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. Operational traffic would consist of as-needed maintenance trips and would have no effect on roadways or emergency access. Road closures and detours are not anticipated as part of the construction phase of the Project. The Project would result in the placement of culverts under existing roadways and would include a jack and bore activities under a segment of the Sante Fe Railroad. Any work done in roadways that would result in a partial lane-split road closure maintaining road access for affected areas and work done in existing roadways would be reviewed by the County and approved prior to the beginning of Project construction. Therefore, Project-related impacts to emergency evacuation routes or emergency response routes on local roadways would be considered less than significant.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less than Significant with Mitigation Incorporated. The Project would occur adjacent to an area that is served by the State for fire protection. As discussed further in **Section 3.21**, the Project is located in an area that is designated as a State Responsibility Area (SRA) with land classified as a moderate fire hazard severity zone. The Project area consists of annual grasses and agricultural crops. During Project construction, equipment and on-site diesel engine use may pose a risk for wildfire. Sparks may result from operation of construction equipment, heated mufflers, or there may be the accidental ignition of oils, lubricants, and other combustible materials resulting in a fire. Construction related activities such as steel cutting and welding also would be potential sources of ignition. Therefore, Project construction may result in a significant impact. Construction in the vicinity of existing wells would provide for water sources nearby and Implementation of Public Resources Code Sections 4427, 4428, 4431, and 4442 regarding prohibited activities that would cause wildfires, and Mitigation Measure **WILD-2** would ensure Project construction impacts would remain less than significant.

Mitigation Measures

The following measures would be implemented during or prior to the start of construction:

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[21] Department of Toxic Substances Control. EnviroStor. Website: https://www.envirostor.dtsc.ca.gov/public/map/?global_id=24010013. Accessed 6/30/21.

[22] State Water Resources Control Board. Geotracker. Website: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=Sacramento. Accessed 6/30/21.

3.11 WILD-2 (Water Source): Adequate on-site water sources will be made available during potential wildfire risk activities such as construction welding or vehicle and equipment activities in open spaces. On-site water sources can include, but not be limited to, water truck, water backpacks, and/or fire extinguishers. Refer to measure description under Section 3.21.2 c).Hydrology and Water Quality

Table 3-20. Hydrology and Water Quality Impacts

Hydrology and Water Quality Impacts					
	Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b)	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
	i) result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
	ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	☐	☒
	iii) 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; or	☐	☐	☒	☐
	iv) impede or redirect flood flows?	☐	☐	☒	☐
d)	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e)	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

3.11.1 Environmental Baseline Conditions

3.11.1.1 LGAWD

LGAWD provides surface water for farmland irrigation in a portion of the County of Merced. In addition, according to the legislation enabling the District's formation, the District also has the unauthorized latent powers to provide drainage service, generate and distribute electric power, reclaim wastewater, provide sewage disposal, and construct and operate incidental recreational facilities.

3.11.1.2 MID

MID owns and operates various hydrologic infrastructure across Merced County, including dams, reservoirs, hydroelectric facilities, wells, and canals. MID provides irrigation water to approximately 164,000 gross acres of land. The facilities owned by the district include thousands of delivery gates and check structures used to transfer and divert water.

3.11.1.3 Watershed

As identified in **Section 3.5**, **Biological Resources**, the Project is located within the boundaries of the Middle San Joaquin-Lower Chowchilla Watershed. The watershed totals 2,256,113 acres in size and stretches from the Coastal Range foothills in the west to the Sierra Nevada Range foothills in the east and from north of Merced to northern Fresno at its southern boundary. The watershed experiences a Mediterranean climate with temperatures ranging from near 50 to 100 degrees Fahrenheit throughout the year. Rain within the area typically averages between 12 and 15 inches per year.

3.11.1.4 Surface Waters

Waterways in the vicinity of the Project include the existing Le Grand canal, the Chowchilla River, Dutchman Creek, Deadman Creek, Little Deadman Creek, Mariposa Creek, Owens Creek, Bear Creek, Burns Creek, and Black Rascal Creek, as well as other smaller canal facilities. Dutchman Creek, Deadman Creek, Little Deadman Creek, Mariposa Creek, and Owens Creek run directly through the Project. A large area to the west of the Project, including some areas within the Project, are within a 100-year flood zone.

3.11.1.5 Groundwater

The Project is located within the San Joaquin groundwater basin and the Merced subbasin. The Project is also located within the boundaries of the Merced Subbasin Groundwater Sustainability Agency (GSA) and the Merced Irrigation-Urban Subbasin GSA. Areas within these GSA's and the overall San Joaquin Valley have become increasingly over drafted due to excessive groundwater pumping, resulting in a lessening groundwater supply available to be pumped.

3.11.1.6 Stormwater

Presently, stormwater at the Project either percolates through the existing soil base or flows to existing waterways such as the creeks and canals within the area. Canals that capture stormwater increase surface water availability.

3.11.1.7 Existing Water Uses

The project includes enlarging the lower end of the Le Grand Canal and the Booster 3 Lateral Canal, which are respectively located east and southeast of Planada.

3.11.2 Impact Assessment

The project includes enlarging the lower end of the Le Grand Canal and the Booster 3 Lateral Canal, which are respectively located east and southeast of Planada.

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less than Significant Impact. Construction activities may result in a potential impact through the erosion of soils and the build-up of silt and debris in runoff areas, however under California General Construction Permit 2009-0009-DWQ guidelines implementing a SWPPP, performed and approved by a qualified sediment practitioner (QSP) or a qualified sediment developer (QSD), would be required prior to construction, handling, and transportation of hazardous materials within the Project. In addition, construction activities could result in accidental spills of fuels, paints, and other hazardous materials entering runoff areas. Through a SWPPP carried out by the contractor and a QSP/QSD, the Project would design and utilize BMPs in order to stabilize any sedimentation and erosion from leaving the Project. Therefore, impacts would be less than significant.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than Significant Impact. The Project would result in new and expanded canal facilities that would increase the capacity of water available to be transferred through the area. The Project would result in new and expanded canal facilities that would increase the available surface water to be transferred through the area. According to the LGAWD Municipal Service Review published in 2018, the California Department of Water Resources designated the Merced Subbasin as critically over drafted in 2016.[23] The Project would aim to cut back on the reliance of groundwater pumping within the Merced Subbasin, while creating infrastructure to collect and recharge flood flows. This would, as a result, increase surface water supply and increase groundwater supplies and recharge capabilities. Therefore, impacts would be less than significant.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

c-i) result in substantial erosion or siltation on- or off-site;

Less than Significant Impact. The Project would not result in substantial erosion or siltation on- or off-site. The Project would construct a new canal that would cross the Mariposa, Little Deadman, Deadman, and Dutchman Creeks, ending at a point approximately one mile north of the Chowchilla River. To cross these creeks, canal siphon structures would be constructed in a traditional open cut excavation method. While the Project does not propose to alter the course of a natural waterway, the Project would require construction activities that would result in soil exposure. To minimize potential transport and build-up of soil materials, the Project would be required to comply with all of the requirements of the Construction General Permit, including preparation of Permit Registration Documents and submittal of a SWPPP to the SWRCB prior to the start of construction activities. Compliance with all State regulations regarding erosion and siltation would be mandatory. Therefore, impacts would be less than significant.

c-ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

No Impact. The Project would not result in an increase in the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. The Project would result in a new intertie canal that would collect flood water and surface runoff that flows into the canal. This would add to the amount of surface water supplies available to the area and offset other potential flooding. Therefore, there would be no impact.

[23] LAFCo of Merced County. Municipal Service Reviews. Website: https://www.lafcomerced.org/MunicipalServiceReviews/. Accessed 6/21/21.

c-iii) 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; or

Less than Significant. The Project would not 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. The Project would be in rural areas of Merced County where there are no constructed stormwater and drainage systems; the local creeks serve as the rural drainage systems. The Project would have the capability of discharging additional flow into Little Deadman, Deadman, and Dutchman Creeks, which would exceed their capacities downstream of the Project. The Project would be operated so discharges to the creeks are curtailed in anticipation of heavy flows in those three creeks. Any runoff generated during construction would be collected on-site and percolated through the existing soil base. Therefore, impacts would be less than significant.

c-iv) impede or redirect flood flows?

Less than Significant Impact. The Project makes it possible to redirect flood water from creeks north of the Project area. The northern creeks can be diverted into MID's system and conveyed through the Project to Little Deadman, Deadman, and Dutchman Creeks in LGAWD. This added flexibility could help manage regional flood flows more effectively. The Project would allow LGAWD growers the opportunity to irrigate with the flood water and/or implement on-farm recharge. Therefore, impacts would be less than significant.

d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundations?

Less than Significant Impact. The Project would not in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundations. According to the Federal Emergency Management Agency (FEMA), the Project would be located in multiple areas designated as FEMA flood zone A.[24] Flood zone A represents an annual probability of flooding of one percent. The Project is not located in any tsunami or seiche zone. Therefore, impacts would be less than significant.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less than Significant Impact. The Project would not be in conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. The Project would be located inside the boundaries of the Merced Subbasin GSA and the Merced Irrigation – Urban GSA. The two GSA's have a joint GSP that regulates groundwater management for the region, the Merced Subbasin GSP. The Project would follow the guidelines set forth in this GSP. Therefore, impacts would be less than significant.

[24] FEMA. FEMA's National Flood Hazard Layer (NFHL) Viewer. Website: https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd. Accessed 6/17/21.

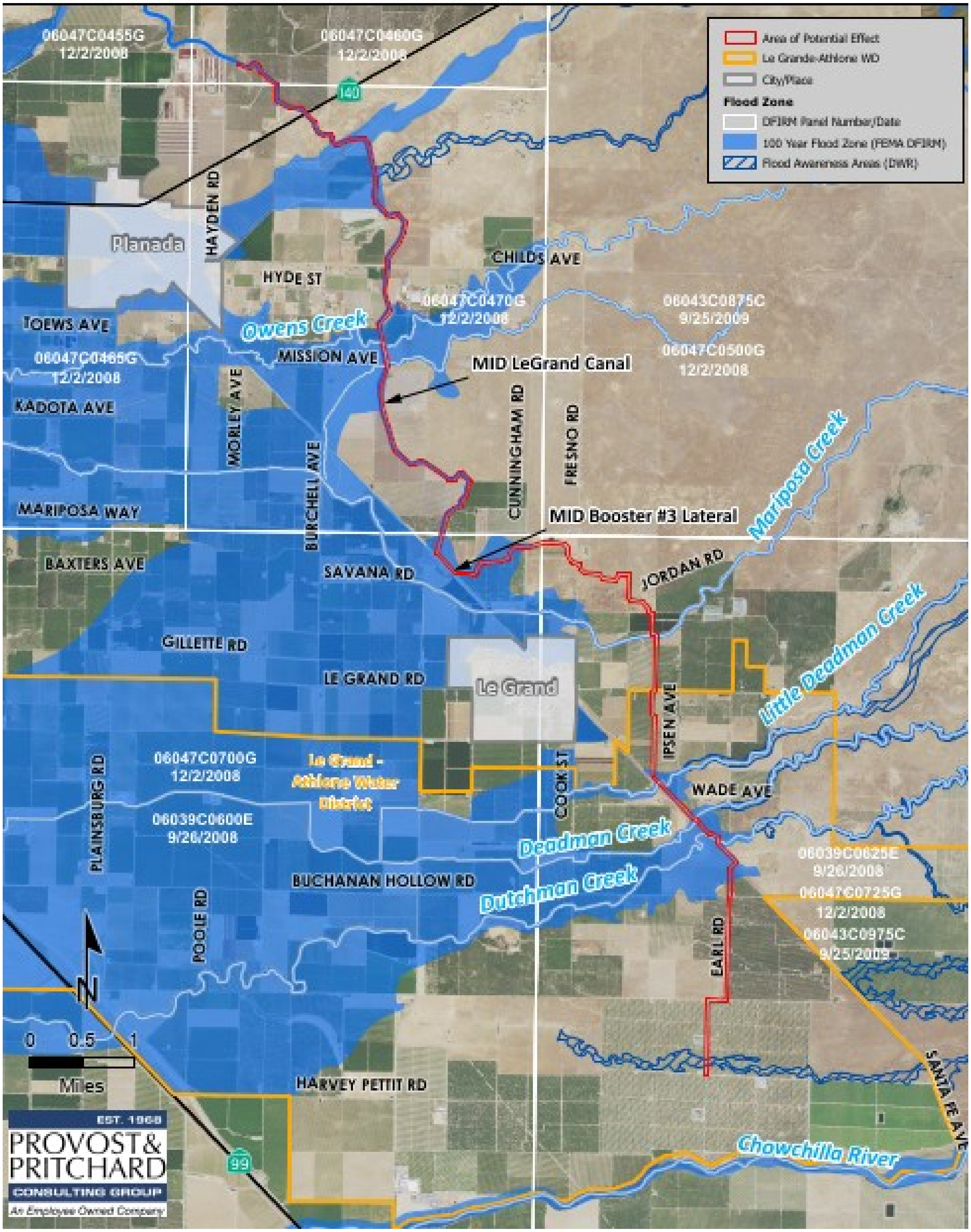

Figure 3-4. FEMA Flood Map

3.12 Land Use and Planning

Table 3-21. Land Use and Planning Impacts

Land Use and Planning Impacts					
Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Physically divide an established community?	☐	☐	☐	☒
b)	Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

3.12.1 Environmental Baseline Conditions

The Project APE is located in a rural area in eastern Merced County, substantially surrounded by agriculture on all sides, with grazing land to the east of the Project. The Project would be located on lands that are designated as A – Agriculture and FP – Foothill Pasture by the Merced County General Plan.[25] The Project is located on lands zoned for A-1 General Agriculture and A-2 Exclusive Agriculture according to the Merced County Zoning Designation Map.[26] The closest communities to the Project are Planada, located approximately two miles southwest of the Project's northern end, and Le Grand, located approximately a mile and a half from the southern section of the Project.

3.12.2 Impact Assessment

a) Would the project physically divide an established community?

No Impact. The Project would not physically divide an established community. The Project would result in the expansion of existing MID canal facilities, and a new intertie canal in a rural area of Merced County. The Project would not be implemented in an urban area and would not result in a physical divide in any community. Therefore, there would be no impact.

b) Would the project cause a significant environmental conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The Project would not cause a significant environmental conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The Project would result in the expansion of existing MID canal facilities, and a new intertie canal in a rural area of Merced County. The Project would increase water availability for farms in the surrounding area, and as a result would support agricultural activities. The Project is located in an area that is planned for agriculture and grazing. Therefore, there would be no impact.

[25] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/16/21.
[26] Merced County GIS Information Portal. Merced County Zoning Designation Map. Website: https://geostack-mercedcounty.opendata.arcgis.com/. Accessed 6/21/21.

3.13 Mineral Resources

Table 3-22. Mineral Resources Impacts

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

3.13.1 Environmental Baseline Conditions

Mineral resources found in the County are primarily sand and gravel mining operations. Sand and gravel aggregate mines are located near the existing major rivers and creeks. Eight major aggregate mine companies exist in the county. According to the Merced County General Plan Background Report significant accessible flood plain and channel deposits are located in the Atwater, Los Banos Creek, and flood plain deposits along the Merced River. County records indicate that there are presently 13 land excavation and Conditional Use Permits within the county used for either surface mining or reclamation. Figure 8-10 of the General Plan Background Report depicts the locations of aggregate resources within Merced County. As shown on this figure, the Project is near two areas identified to have a high likelihood of significant sand and gravel resources along the Mariposa and Bear Creeks. Two slate and stone quarries also exist in the county. Resources other than sand and gravel found in Merced County are: aragonite, calcite, chalcopyrite, copper, glauconite, gold, gypsum, hyromagnesite, jarosite, lawsonite, pumpellyite, soda niter, sphalerite, and stilpnomelane.[27] Based on the Department of Conservation Well Finder website there are a total of 220 wells in Merced County[28]. Four wells are nearby the course of the proposed canal pathway. The closest well to the Project is Well No. 1, owned by N.E.C.K. Petroleum Company, located approximately 1.3 miles east of the site. This well is plugged and abandoned, located southwest of the East Childs Avenue and South Cunningham Road intersection.

The Merced County Natural Resources Element contains policies that minimize agricultural loss by addressing the extraction of known mineral resources and the development of energy facilities, preventing the encroachment of incompatible uses, and minimizing the loss of agricultural values. Goal NR-3 limits impacts on agricultural resources by promoting orderly development and restricting the extraction of mineral resources and energy facilities that would impact open space, natural resources, or soil resources.[29] The goal requires that new land use applicants provide written reasoning on why the County should allow development near an identified resource. In addition, the goal requires a buffer between land used for new land use development and existing mining activities. Owners of mining operations would also be notified of new potentially incompatible land use application in the area.

[27] 2030 Merced County General Plan Background Report. Section B (merced.ca.us) Accessed 6/17/21.
[28] Department of Conservation Well Finder, Dashboard: About Wells. Microsoft Power BI (powerbigov.us). Accessed 6/17/21.
[29] Merced County. 2030 Merced County General Plan October 2013 Final PEIR. Website: https://web2.co.merced.ca.us/pdfs/planning/generalplan/FinalPEIR/4_textchan_mcgpu_feir_102913.pdf. Accessed 6/17/21.

3.13.2 Impact Assessment

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? and

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

a&b) Less than Significant Impact. The Project would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan, or one that is of regional or statewide importance. The Merced County General Plan Background Report identifies two aggregate mineral resource sites near the Project along the Mariposa and Bear Creeks. The Mariposa Creek site is located approximately two and a half miles northeast of the community of Le Grand, and one mile northeast of the Project, with active extraction activities occurring approximately one and a half miles northeast by Le Grand Asphalt. The site, known as the Craven Pit, is owned by Jaxon Enterprises and primarily produces sand and gravel as well as some gold. The operation is permitted to operate 90 acres, of which 22.5 have been disturbed under permit 3603[30]. In addition, the Bear Creek site is located approximately two and a half miles northeast of Planada and three quarters of a mile northeast of the Project. The Bear Creek site has not been excavated to date. The Project would not result in the loss of any mineral resource availability for these two mineral resource recovery sites. The Project shares the same type of gravelly soil found valuable at these identified resource locations; however, the Merced County General Plan Final EIR lists the loss of valuable mineral resources in the County as a less than significant impact.[31] Therefore, impacts would be less than significant.

[30] Division of Mine Reclamation, California Department of Conservation. Mines Online. Website: https://maps.conservation.ca.gov/mol/index.html. Accessed 10/18/21.

[31] 2030 Merced County General Plan Update. Final Program Environmental Impact Report. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 10/18/21.

3.14 Noise

Table 3-23. Noise Impacts

Noise Impacts					
Would the project result in:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b)	Generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c)	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.14.1 Environmental Baseline Conditions

LGAWD is located in Merced County near Planada and Le Grand. The Project APE is located in a rural area in eastern Merced County, on lands designated as A – Agriculture and FP – Foothill Pasture by the Merced County General Plan[32] and zoned for A-1 General Agriculture and A-2 Exclusive Agriculture according to the Merced County Zoning Designation Map.[33] The area is dominated by agricultural and rural residential uses and, as such, noise levels around the Project are associated with farm equipment and related agricultural activities, as well as rural traffic noise.

The Merced County General Plan includes noise standards for noise sensitive uses. While there are no noise standards associated with agricultural uses, all residential uses have noise standards outlined in tables HS-1 and HS-2 of the General Plan. Noise levels in outdoor residential areas should not exceed 75 Day/Night Average Sound Level (Ldn) during the day and 70 Ldn during the night. Noise levels in indoor residential areas should not exceed 55 Ldn at any time during the day.[34] Maximum noise levels generated by farm-related tractors typically range from 77 to 85 decibels (dBA) at a distance of 50 feet from the tractor, depending on the horsepower of the tractor and the operating conditions.

Table 3-24. Construction Equipment Noise Emission Levels
shows typical noise levels associated with heavy equipment used for construction.

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[32] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/16/21.
[33] Merced County GIS Information Portal. Merced County Zoning Designation Map. Website: https://geostack-mercedcounty.opendata.arcgis.com/. Accessed 6/21/21.
[34] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/16/21.

Table 3-24. Construction Equipment Noise Emission Levels[35]

Equipment	Typical Noise Levels 50 from Source (dBA)
Pile Driver (Impact)	101
Rock Drill	98
Pile Driver (Sonic)	96
Paver	89
Scraper	101
Crane, Derrick	98
Jack Hammer	96
Truck	89
Concrete Mixer	89
Dozer	88
Grader	88
Impact Wrench	88
Loader	85
Pneumatic Tool	85
Crane, Mobile	83
Compactor	82
Concrete Pump	82
Shovel	82
Air Compressor	81
Generator	81
Backhoe	80
Concrete Vibrator	76
Pump	76
Saw	76
Roller	74

3.14.2 Impact Assessment

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less than Significant Impact. Noise generated by the Project would primarily occur during the construction phase over approximately 36 months. Policy HS-7.5: Noise Generating Activities (RDR), from the Merced County General Plan requires that noise generating activities, such as construction, be limited to hours of normal business.[36] Project operation would generate noise levels above the allowed 75 Ldn set by the County at a distance of 100 feet away; however, Project construction would involve temporary noise sources, mostly from trucks and other equipment used for construction. Construction associated noises are temporary and would not remain in place once construction is completed within the area being worked on. In addition, the Project is located within agricultural lands, accustomed to noises associated with farm equipment. Operational maintenance activities would be as needed. Therefore, impacts would be less than significant impact.

b) Would the project result in generation of excessive ground borne vibration or ground borne noise levels?

Less than Significant Impact. The Project would not result in the generation of excessive ground borne vibration or ground borne noise levels. The Project would have some grading associated with the development

[35] Federal Transit Administration, April 1995. Accessed 9/3/21.
[36] County of Merced. General Plan. Website: https://www.co.merced.ca.us/100/General-Plan. Accessed 6/16/21.

of the site, but associated vibration and noise impacts would be minimal and temporary. Therefore, impacts would be less than significant impact.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The Merced Regional Airport is located approximately 12 miles to the west of the northern end of the Project and the Turlock Municipal Airport is located approximately 25 miles to the northwest of the Project's northern most point. The Project is not located within an airport land use plan. The construction and operation of the Project would not cause an increase in air traffic levels or cause a change in air traffic location. Therefore, there would be no impact.

3.15 Population and Housing

Table 3-25. Population and Housing Impacts

Population and Housing Impacts					
Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b)	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.15.1 Environmental Baseline Conditions

The Project is located in Merced County near the communities of Planada and Le Grand, California. Merced County has a population of 284,738[37] while Planada has a population of 4,418[38] and Le Grand has a population of 1,739 people.[39] The Merced County General Plan Land Use section includes Table LU-2: Land Use Standards, which sets the minimum parcel size for each land use designation. Agricultural parcels are required to have a minimum size of 40 acres, while Foothill Pasture parcels are required to have a minimum size of either 20 or 40 acres depending on if the parcel is under zoning prior to 2010.

3.15.2 Impact Assessment

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? and

b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Less than Significant Impact. The Project would construct a new intertie canal would start east of Planada and end at a point approximately one mile north of the Chowchilla River, southeast of Le Grand. The canal would be used for agricultural purposes and as a result, would not encourage population growth directly or indirectly through an increase in population or an increase in the amount of housing available. While the Project would take land from areas planned for Agriculture and Foothill Pasture, none of the parcels being affected would fall below the minimum parcel acreage requirement for their land use designation and no housing or people would be displaced by the Project. Therefore, impacts would be less than significant.

[37] World Population Review. Merced County, California Population 2021. Website: https://worldpopulationreview.com/us-counties/ca/merced-county-population. Accessed 9/1/21.
[38] World Population Review. Planada, California Population 2021. Website: https://worldpopulationreview.com/us-cities/planada-ca-population. Accessed 9/1/21.
[39] World Population Review. Le Grand, California Population 2021. Website: https://worldpopulationreview.com/us-cities/le-grand-ca-population. Accessed 9/1/21.

3.16 Public Services

Table 3-26. Public Services Impacts

Public Services Impacts					
Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
	Fire protection?	☐	☐	☐	☒
	Police protection?	☐	☐	☐	☒
	Schools?	☐	☐	☐	☒
	Parks?	☐	☐	☐	☒
	Other public facilities?	☐	☐	☐	☒

3.16.1 Environmental Baseline Conditions

Fire Protection: The Project area would be served by the Merced County Fire Department. Merced County General Plan policies ensure adequate staffing of the Department to maintain service levels. The closest county fire station is Merced County Fire Station 86 in Planada, located approximately two miles southwest of the Project and Merced County Fire Station 84 in Le Grand approximately one and a quarter mile southwest of the Project.

Police Protection: Police protection in unincorporated Merced County is provided by the Merced County Sheriff's Department. The Merced County General Plan requires new development pay for its share of policing costs. The closest Merced County Sheriff's Department is located two miles southwest of the Project in Planada.

Schools: There are 20 different school districts in Merced County, overseen by the Merced County Office of Education. There are several schools located within three miles of the Project including Planada High, Planada Elementary, Cesar E. Chavez Middle School, Plainsburg Elementary, Le Grand High, and Le Grand Elementary.

Parks: Merced County has several regional parks, as well as state and national parks, national forest, wilderness areas, and ecological reserves. There are 10 community parks and recreation facilities that are owned and operated by Merced County as well as three regional parks. The nearest park to the Project is Houlihan Park in Planada, approximately two miles southwest of the Project.

Landfills: There are two active solid waste disposal (landfill) facilities in Merced County, both owned and operated by the Merced County Regional Waste Management Authority: the SR 59 Landfill (Merced County Regional Waste) approximately 13 miles northwest of the Project, and the Billy Wright Landfill west of Los Banos. There are no transfer stations in the County, nor does the County operate solid or hazardous waste hauling operations. Waste is collected primarily through drop boxes and curbside collection.

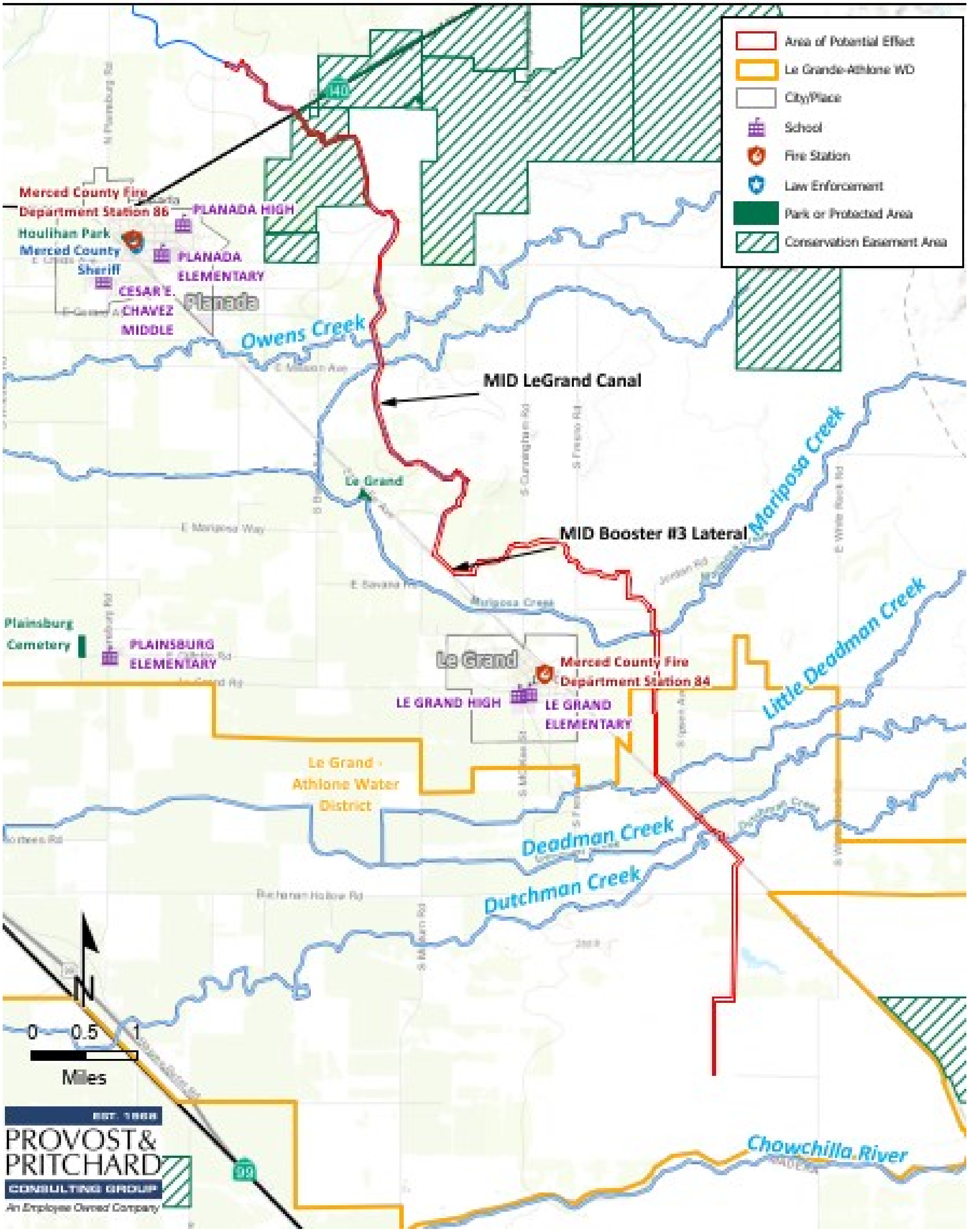

Figure 3-5. Public Services Proximity Map

3.16.2 Impact Assessment

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

No Impact. The project would not require new or altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for the listed public services. Therefore, there would be no impact.

Fire Protection: No Impact. The Merced County Fire Department would continue to provide fire protection services to the Project area. No residential or commercial construction is identified as part of the Project. Therefore, there would be no impact to fire protection services.

Police Protection: No Impact. The Merced County Sheriff's Department would continue to provide police protection services to the Project area. No residential or commercial construction is identified as part of the Project and no additional police protection would be needed. Therefore, there would be no impact.

Schools: No Impact. The Project would not result in an increase of population that would require additional school facilities. Therefore, there would be no impact.

Parks: No Impact. The construction of the proposed improvements, rehabilitation, and expanding the existing MID canal capacity and the new canal would not result in the loss of parks or open space, nor would it increase demand for parks or open space through the construction of additional residential units. Therefore, there would be no impact.

Landfills: No Impact. The Merced County Regional Waste landfill is the closest landfill, located approximately 13 miles to the northwest of the Project. The construction and operation of the completed intertie would not generate significant amounts of waste, nor would it impact landfill operation. Therefore, there would be no impact.

3.17 Recreation

Table 3-27. Recreation Impacts

Recreation Impacts					
Would the project:		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.17.1 Environmental Baseline Conditions

Merced County has several regional parks, as well as State and national parks, national forest, wilderness areas, and ecological reserves. There are 10 community parks and recreation facilities that are owned and operated by Merced County as well as three regional parks. The Merced County Department of Public Works and Division of Parks and Recreation maintains and develops regional parks and landscaped areas. There are three National Wildlife Refuges located in Merced County: the Merced National Wildlife Refuge, the San Luis National Wildlife Refuge, and the San Joaquin River National Wildlife Refuge. Eastman Lake Recreation Area is southeast of Le Grand closest to the canal pathway.

Merced County contains several county, State, and federal parks and recreation areas and public open space areas. There are approximately 114,000 acres of park and recreation facilities in the county that offer a variety of amenities such as picnicking, swimming, boating, hunting, bird watching, playgrounds, sports fields, and hiking. The Merced County General Plan sets forth guidelines in order to maintain an overall standard for dedication of parkland within residential development is 3.0 acres per 1,000 people. Communities in the unincorporated area of the county currently (2006) do not have parkland available consistent with this standard.[40]

In addition to the ten community parks, and three regional parks, the County of Merced also operates the El Nido Community Hall, which offers a meeting place and rental opportunities for Merced residents.

3.17.2 Impact Assessment

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? and,

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. No Impact. The Project does not include recreational facilities and it will have no effect on the use of existing parks or recreational facilities. The Project would construct a new canal and make improvements to

[40] 2030 Merced County General Plan Background Report. Section B (merced.ca.us) Accessed 7/17/21.

the existing Le Grand Canal in rural areas of eastern Merced County. While canals in the area can provide for areas for residents of the area to walk along, they are not designated as a recreational use. In addition, the Project would not create a new increase in population which would increase usage of existing recreational facilities within the area. The Project does not propose the alteration or creation of any recreational facility. Therefore, there would be no impact.

3.18 Transportation

Table 3-28. Transportation Impacts

Transportation Impacts					
	Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b)	Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)??	☐	☐	☒	☐
c)	Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d)	Result in inadequate emergency access?	☐	☐	☒	☐

3.18.1 Environmental Baseline Conditions

The main form of travel in southeastern Merced County is vehicle travel. The major transportation routes near the Project are State Routes 59, 99, 140, 152, and 233. In addition, Interstate 5 runs north and south through the western part of the county. The Project would include jack and bore activities at two locations that would result in a total of approximately 330 feet of steel casing being laid under the Sante Fe railroad and Sante Fe Avenue, and culvert installation under other rural roadways. The Project is located in a rural area that relies upon a network of dirt roads used for farming activities by landowners in the area. In addition, canals in the area, including the existing Le Grand Canal, contain drivable banks that are used for operations and maintenance activities associated with the canals.

3.18.2 Impact Assessment

a) Would the project conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less than Significant Impact. The Project would not conflict with a plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. While the Project would result in work being done within existing roadways, the Project would be required to adhere to all applicable laws, policies, and plans regarding circulation and transit facilities within Merced County. Any work done in roadways would result in a partial lane-split road closure maintaining road access for affected areas. Therefore, impacts would be less than significant.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?

Less than Significant Impact. The Project would not conflict with or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b). The Project would not increase population for the surrounding area. Construction and expansion of canal facilities would not result in an increase in vehicle miles traveled (VMT) due to worker trips and would not result in a rise in VMT for the area after construction is finished. Therefore, impacts would be less than significant.

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less than Significant Impact. The Project would not substantially increase hazards due to a geometric design feature or incompatible uses. The Project would expand existing MID canal facilities and create a new intertie canal to the southeast of Le Grand. The construction of the new canal would result in numerous new culverts being placed under roadways. With adequate signage and review and approval of proposed work within roadways by Merced County, any construction beneath a roadway or in the vicinity of a roadway would not increase hazards due to geometric design or create an incompatible use for the area. Therefore, impacts would be less than significant.

d) Would the project result in inadequate emergency access?

Less than Significant Impact. The Project would not result in inadequate emergency access. Any work done in roadways would result in a partial lane-split road closure maintaining road access for affected areas and work done in existing roadways would be reviewed by Merced County and approved prior to the beginning of Project construction. In addition, construction of the Project would primarily occur in rural areas of Merced County, away from major roadways that would serve as emergency routes. Therefore, impacts would be less than significant.

3.19 Tribal Cultural Resources

Table 3-29. Tribal Cultural Resources Impacts

Tribal Cultural Resources Impacts					
Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☒	☐	☐
i. Listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.19.1 Environmental Baseline Conditions

The APE falls within territory ethnographically attributed to the Northern Valley Yokuts, which were comprised of approximately 60 tribelets, each with a few hundred to several thousand members, living throughout the San Joaquin Valley. The Northern Valley Yokuts occupied an area straddling the San Joaquin River, south of the Mokelumne River, east of the Diablo Range, and north of the sharp bend that the San Joaquin River takes to the northeast. Specifically, the APE is within the ethnographic territory of the Chauchila tribelet of the Northern Valley Yokuts. The Chauchila triblet lived in the plains along the channels of the Chowchilla River. The Chauchila tribelet was likely largely populated and quite warlike.

Public Resources Code Section 21080.3.1, et seq. (codification of AB 52, 2013-14), requires that a lead agency, within 14 days of determining that it would undertake a project, must notify in writing any California Native American Tribe traditionally and culturally affiliated with the geographic area of the Project if that Tribe has previously requested notification about projects in that geographic area. The notice must briefly describe the project and inquire whether the Tribe wishes to initiate request formal consultation. Tribes have 30 days from receipt of notification to request formal consultation. The lead agency then has 30 days to initiate the consultation, which then continues until the parties come to an agreement regarding necessary mitigation or agree that no mitigation is needed, or one or both parties determine that negotiation occurred in good faith.

The Native American Heritage Commission (NAHC) in Sacramento was also contacted in August 2021. They were provided with a brief description of the Project and a map showing its location and requested that the NAHC perform a search of the Sacred Lands File to determine if any Native American resources have been recorded in the immediate APE. The NAHC identifies, catalogs, and protects Native American cultural resources -- ancient places of special religious or social significance to Native Americans and known ancient graves and cemeteries of Native Americans on private and public lands in California. The NAHC is also charged with ensuring California Native American tribes' accessibility to ancient Native American cultural resources on public lands, overseeing the treatment and disposition of inadvertently discovered Native American human remains and burial items, and administering the CNAGPRA, among many other powers and duties. NAHC provide a current list of Native American Tribal contacts to notify of the project. The 12 tribal representatives identified by NAHC were contacted in writing via United States Postal Service in a letter mailed October 11, 2021, informing each Tribe of the Project.

1. Amah Mutsun Tribal Band, Valentin Lopez, Chairperson
2. Chicken Ranch Rancheria of Me-Wuk Indians, Lloyd Mathiesen, Chairperson
3. Dumna Wo-Wah Tribal Government, Robert Ledger Sr., Chairperson
4. Muwekma Ohlone Indian Tribe of the SF Bay Area, Monica Arellano, Vice Chairwoman
5. Nashville Enterprise Miwok-Maidu-Nishinam Tribe, Cosme A. Valdez, Chairperson
6. North Fork Rancheria of Mono Indians, Elaine Bethel Fink, Chairperson
7. North Valley Yokuts Tribe, Katherine Erolinda Perez, Chairperson
8. Picayune Rancheria of Chukchansi Indians, Claudia Gonzales, Chairwoman
9. Santa Rosa Rancheria Tachi Yokut Tribe, Leo Sisco, Chairperson
10. Southern Sierra Miwuk Nation, Sandra Chapman, Chairperson
11. Tule River Indian Tribe, Neil Peyron, Chairperson
12. Tuolumne Band of Me-Wuk Indians, Andrea Reich, Chairperson

3.19.2 Impact Assessment

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a-i) Listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code section 5020.1(k), or

a-ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Less than Significant Impacts with Mitigation Incorporated. The Le Grand-Athlone Water District, as the lead agency, has not received a letter any tribal letters pursuant to PRC § 21080.3.1 (AB 52) officially requesting notification of any projects. In response to the October 11, 2021 mailing providing tribes with Project details, no requests for tribal consultation were received. In the unlikely event of a discovery, mitigation will be implemented. With incorporation of mitigation measure **CUL-1** and **CUL-2** described above in **Section 3.6**, impacts resulting from the discovery of remains interred on the Project would be less than significant.

3.20 Utilities and Service Systems

Table 3-30. Utilities and Service Systems Impacts

Utilities and Service Systems Impacts					
	Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b)	Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d)	Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e)	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

3.20.1 Environmental Baseline Conditions

The Project is located in an unincorporated area of eastern Merced County. The Project would result in construction activities from east of Planada to the southeast of Le Grand. Lands that the Project would be located on and in the vicinity are planned and zoned for agricultural uses.

3.20.1.1 Water Supply

Unincorporated areas of Merced County rely on privately owned groundwater wells for their water supply needs. The Project would result in increased water availability for areas surrounding the Project.

3.20.1.2 Wastewater Collection and Treatment

While Planada and Le Grand have sanitary sewer systems for wastewater collection and treatment, the Project is located in rural areas outside of these communities and does not include habitable structures. In unincorporated areas of the county wastewater is collected and disposed of through the use of individual septic systems.

3.20.1.3 Landfills

Unincorporated areas of eastern Merced County are served by the Merced County Regional Waste Landfill approximately 12 miles northwest of where the Project starts, and the Waste Management Hinton Hauling Facility in Atwater approximately 16 miles northwest of where the Project begins.

3.20.2 Impact Assessment

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

No Impact. Although the Project is an expansion of an existing water conveyance system for irrigation uses, the water would not be reallocated for drinking water or wastewater treatment. Nor would it contribute to requiring additional stormwater drainage facilities. The expansion of any associated communication facilities are also not an activity associated with the Project. Water usage as a result of canal expansion would continue to be used for agricultural purposes and continue to assist with groundwater sustainability. The Project would result in the replacement of the existing MID Booster Lateral #3 Pump Station and the construction of a new water pump station immediately south of Dutchman Creek. Replacement of the MID Booster Lateral #3 Pump Station may require the installation of new electrical equipment. The construction of the new pump station south of Dutchman Creek would require the installation of new electrical equipment, including PG&E transformers, to allow operation of the pumping facility. The replacement and construction of these stations would include the installation of new PG&E transformers. Therefore, there impacts would be less than significant.

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

No Impact. The Project would have sufficient water supplies available to serve the District and reasonably foreseeable future development during normal, dry and multiple dry years. The Project would result in an increased capacity of surface water for farmers within the District for agricultural operations. The Project would result in a canal connection that would increase water supply reliability for the area once the Project is completed. The canal that would be built as a result of the Project is not something that would increase the demand of water in the future, rather, it would provide an additional mechanism for water to be delivered throughout the subbasin, while at the same time decreasing reliance on groundwater pumping and increasing water supply reliability for the area. The canal does not require any water and just serves as a piece of infrastructure to deliver water. As a result, during dry years, the canal would likely face extended periods of time where there is no water flowing through it at all. Any reasonably foreseeable future development within the surrounding area would benefit from the Project providing water supply reliability and decreasing the reliance on groundwater pumping. Therefore, there would be no impact.

c) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. The Project would be located in an unincorporated section of eastern Merced County. In this area wastewater is collected through the use of individual septic tank systems rather than a city-wide sewer collection system. In addition, the Project would expand upon existing canal facilities and construct a new canal intertie. Project activities would not result in an influx of population or an increase in wastewater systems, septic or otherwise. Therefore, there would be no impact.

d) Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less than Significant Impact. The Project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. The Project is located in an unincorporated, rural area of eastern Merced County. This area is served by the Merced County Regional Waste Highway 59 Landfill and the Waste Management Hinton Hauling facility for its solid waste needs. The Highway 59 landfill is not expected to reach capacity until the year 2030 according to the Merced County General Plan Background Report.[41] The Project is not expected to generate excessive amounts of waste related to Project related construction activities Therefore, impacts would be less than significant.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The Project would be required to comply with federal, State, and local management and reduction statutes and regulations related to solid waste. Compliance with the applicable laws and regulations would limit any excessive waste production from construction activities performed for the Project. Therefore, there would be no impact.

[41] County of Merced. Background Report. Website: https://www.co.merced.ca.us/DocumentCenter/View/6768/GP-Background-Report?bidId=. Accessed 6/17/21.

3.21 Wildfire

Table 3-31. Wildfire Impacts

Wildfire Impacts				
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrollable spread of wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☒	☐	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☒	☐	☐

3.21.1 Environmental Baseline Conditions

The Project APE encompasses an approximately 320 acres of land in Merced County to the east of Planada and Le Grand. Land surrounding the Project is mainly rural and used for agricultural activities, with some rural single-family residences within the vicinity. According to the California Department of Forestry and Fire Protection, the project is not located within or near an area designated as a very high fire hazard zone; however, the Project is located within an area designated as a SRA to the north of where the Project crosses the Mariposa Creek. SRAs are areas that are protected by the State for wildfire protection, rather than by local services and departments.

3.21.2 Impact Assessment

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. The Project would not result in inadequate emergency access or conflict with an emergency evacuation plan for the area. Any lane closures as a result of the Project would utilize a split-lane closure method and use adequate signage, allowing for continued access for emergency vehicles. Therefore, impacts would be less than significant.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. The Project would not exacerbate wildfire risks due to slope, prevailing winds, and other factors, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. The Project is located in a relatively flat area that does not have a significant slope or experience high winds. Therefore, impacts would be less than significant.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less than Significant with Mitigation Incorporated. The Project is located within an area designated as a SRA. The Project is relatively flat, primarily comprised of lands used for agriculture. Any potential impacts associated with construction, consolidation, and implementation of the new facilities would be considered less than significant with the implementation of **WILD-1** and **WILD-2** mitigation measures described below.

Mitigation Measures:

The following measures would be implemented during or prior to the start of construction:

- **WILD-1 (Defensible Space).** Pre-wildfire mitigation measures focus on the maintenance of defensible space and fire-focused landscaping, and may include:
    a) Highly flammable vegetation near Project will be maintained to reduce fire fuel, as appropriate.
    b) Dispose of debris, such as dry debris, leaves, and dead limbs near and within the Project.
    c) Design defensible spaces with fire breaks around the Project, as appropriate.
- **WILD-2 (Water Source).** Adequate on-site water sources will be made available during high fire risk construction activities and will include, but not limited to, water truck, water backpacks, and/or fire extinguishers.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less than Significant with Mitigation Incorporated. Part of the Project is located within an area designated as a SRA. The Project is relatively flat, primarily comprised of lands used for agriculture. Any potential impacts associated with construction, consolidation and implementation of the Project's new facilities relating to slope, flooding, and landslides would be considered less than significant with the implementation of **WILD-1** and **WILD-2** mitigation measures as noted above.

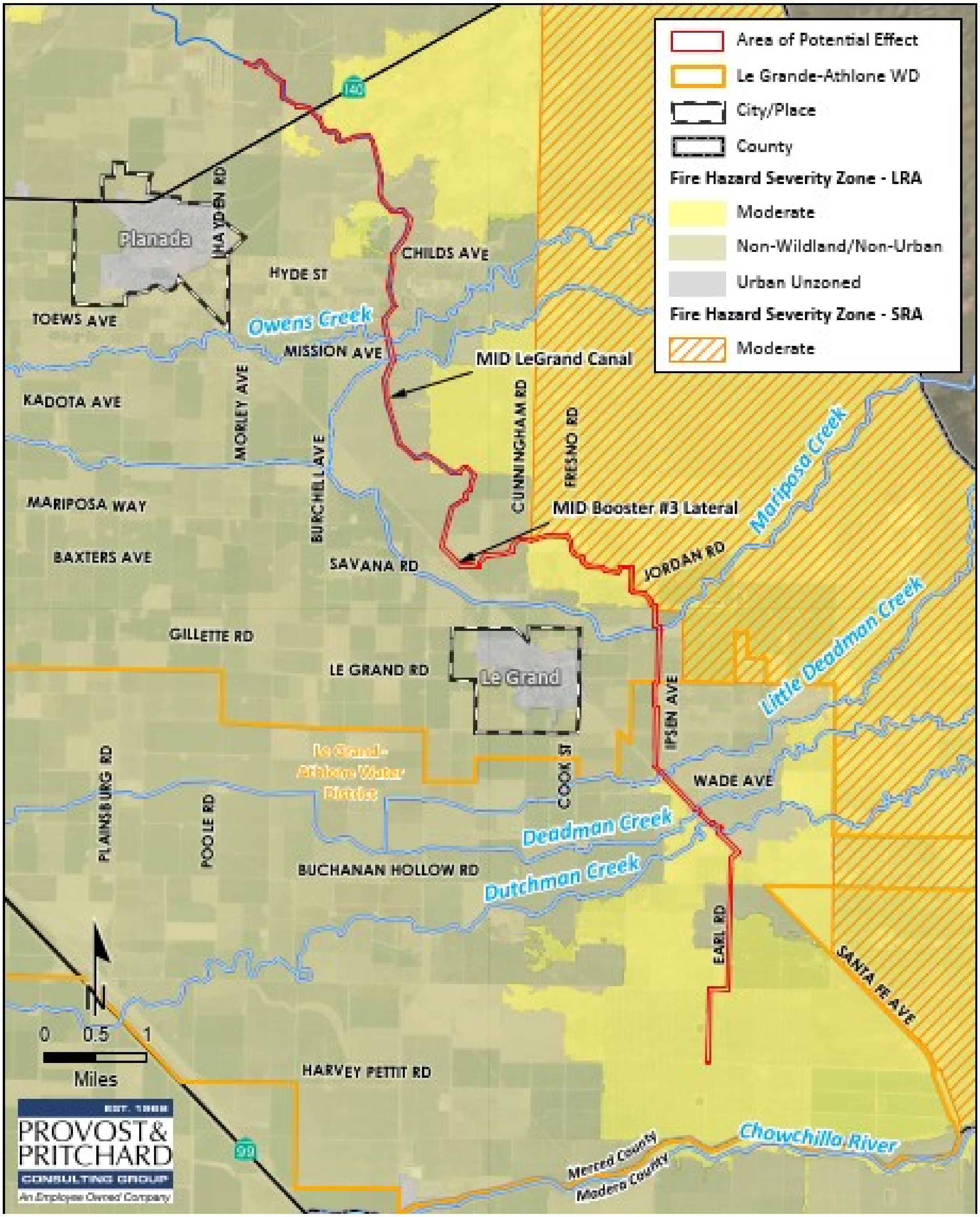

Figure 3-6. Fire Hazard Map

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3.22 CEQA Mandatory Findings of Significance

Table 3-32. Mandatory Findings of Significance Impacts

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

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less than Significant Impact with Mitigation Incorporated. The analysis conducted in this Initial Study/Mitigated Negative Declaration results in a determination that the Project, with incorporation of mitigation measures, would have a less than significant effect on the environment. The potential for impacts to aesthetics, air quality, biological resources, cultural resources, hazards and hazardous materials, and wildfire from the implementation of the Project would be less than significant with the incorporation of the mitigation measures identified in this analysis. Accordingly, the Project would involve no potential for significant impacts through the degradation of the quality of the environment, the reduction in the habitat or population of fish or wildlife, including endangered plants or animals, the elimination of a plant or animal community or example of a major period of California history or prehistory.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less than Significant Impact. CEQA Guidelines Section 15064(i) States that a Lead Agency shall consider whether the cumulative impact of a project is significant and whether the effects of the project are cumulatively considerable. The assessment of the significance of the cumulative effects of a project must, therefore, be conducted in connection with the effects of past projects, other current projects, and probable future projects. The Project involves the enlargement of existing MID canal segments and construction of a new intertie canal, the effects of which would not result in significant cumulatively considerable impacts. Implementation of the Project would not result in significant cumulative impacts and all potential impacts would be less than significant through the implementation of basic regulatory requirements and Project design.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant Impact with Mitigation Incorporated. The analysis conducted in this Initial Study/Mitigated Negative Declaration results in a determination that the Project, with incorporation of mitigation measures, would have a less than significant effect on the environment. Potential impacts to air quality could result in adverse effects to human beings, however, incorporation of the proposed mitigation would result in a determination that impacts would be less than significant to human beings.

3.23 Determination: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

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

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

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

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

Brad Samuelson
Signature

5/3/2022
Date

Brad Samuelson, Manager
Printed Name/Position

Chapter 4 Mitigation Monitoring and Reporting Program

This Mitigation Monitoring and Reporting Program (MMRP) has been formulated based upon the findings of the Initial Study/Mitigated Negative Declaration (IS/MND) for the Project in the Le Grand-Athlone Water District. The MMRP lists mitigation measures recommended in the IS/MND for the Project and identifies monitoring and reporting requirements.

Table 4-1 presents the mitigation measures identified for the proposed Project. Each mitigation measure is numbered with a symbol indicating the topical section to which it pertains, a hyphen, and the impact number. For example, AIR-2 would be the second mitigation measure identified in the Air Quality analysis of the IS/MND.

The first column of **Table 4-1** identifies the mitigation measure. The second column, entitled "When Monitoring is to Occur," identifies the time the mitigation measure should be initiated. The third column, "Frequency of Monitoring," identifies the frequency of the monitoring of the mitigation measure. The fourth column, "Agency Responsible for Monitoring," names the party ultimately responsible for ensuring that the mitigation measure is implemented. The last two columns will be used respectively by LGAWD to verify the method utilized to confirm or implement compliance with mitigation measures and identify the individual(s) responsible to confirm mitigation measures have been complied with and monitored.

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
Aesthetics					
AES-1: Construction Hours					
Limit construction near residences to daylight hours. Construction activities scheduled to occur between 7 a.m. and 6 p.m. near residential areas within 0.25 mile of construction sites will not take place before or past daylight hours, which vary according to season. This will reduce the amount of construction experienced by viewer groups because most construction activities would occur during business hours when most viewer groups are likely to be at work and eliminate the need to introduce high-wattage lighting sources that would operate near residences.	During Construction Activities	Daily	LGAWD and/or construction contractor	Contractor to provide construction schedule and construction field supervisor to verify compliance	
AES-2.: Fugitive Lighting					
Minimize fugitive light from portable sources used for construction. Any nighttime lighting used for nighttime construction will be evaluated for its ability to safely light the construction work area while reducing light spill and glare. At a minimum, the construction contractor will minimize Project-related light and glare to the maximum extent feasible, given safety considerations, for all viewer groups. Color-corrected halide lights or balloon lights, if suitable for construction of the Project, will be used. Portable lights will be operated at the lowest allowable wattage and height and raised to a height no greater than 20 feet. All lights will be screened and directed downward toward work activities and away from the night sky and nearby residential areas to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
Air Quality					
AQ-1: Dust Control					
The Project will maintain dust controls pursuant to the SJVAPCD standards on fugitive dust control.	During Construction Activities	Daily	LGAWD and/or construction contractor	Posting of Dust control plan on LGAWD website	
Biological Resources					
BIO-1a (Avoidance):					

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.	Between September 16 and January 31	10 days prior to start of construction	LGAWD and/or construction contractor	Contractor's construction schedule	
BIO-1b (Pre-construction Surveys):					
If construction activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for Merlin, Mountain Plover, Northern Harrier, Swainson's Hawk, and Tricolored Blackbird nests onsite and within a 0.5-mile radius. These surveys will be conducted in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's hawk Technical Advisory Committee, 2000) or current guidance. In addition to the focused Swainson's hawk survey, a qualified biologist will conduct a pre-construction survey for all other nesting birds within 10 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. All raptor nests will be considered "active" upon the nest-building stage.	February 1 to September 15	10 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-1c (Establish Buffers):					
On discovery of any active nests near work areas, the biologist will determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged and are no longer dependent on the nest.	Prior to the start of construction activities	10 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-1d (WEAP Training):					
All personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, prior to initiating construction activities (including staging and mobilization). The specifics of this program will include identification of the special status species and suitable habitats, a description of the regulatory status and general ecological characteristics of the species, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. A fact sheet conveying this information, along with photographs or illustrations of the special status species, will also be prepared for distribution to all contractors, their employees, and all other personnel involved with	Prior to the start of any construction activities	Prior to the start of construction and whenever new construction staff arrive on-site	LGAWD and/or construction contractor	Qualified biologist will provide sign-in sheets and species fact sheets to all construction crews prior to the start of construction activities	

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.					
BIO-1e (Minimization):					
The Project will observe all minimization and protective measures from the Construction and On-Going Operational Requirements including, but not limited to: construction speed limits, covering of pipes, installation of escape structures, restriction of herbicide and rodenticide use, proper disposal of food items and trash, prohibition of pets and firearms, and completion of an employee education program.	During Construction Activities	Daily	Construction Contractor	Construction field supervisor to verify compliance	
BIO-2a (Pre-construction Survey):					
If activities must occur within breeding season (February 1 to August 31), a qualified biologist will conduct pre-construction surveys for eagle nests within 30 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within one mile. Eagle nests are considered "active" upon the nest-building stage.	Prior to the start of any construction activities - February 1 to August 31	30 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-2b (Establish Buffers):					
On discovery of an active eagle nest near work areas, the following no-disturbance buffers will be maintained around each nest: Bald Eagle: 660-foot no-disturbance buffer. If a 600-foot buffer zone is infeasible, the Project proponent will contact CDFW for guidance on how to proceed.	On discovery of an active eagle nest near work areas	30 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-2c (Reporting):					
All detected eagle nests will be reported to CDFW and USFWS immediately. This includes any nest that has been used by a bald eagle in the past or is being used currently as a primary or alternate nest site. The discovery of any bald eagle carcasses and any non-lethal or lethal incidental "take" of these species will be reported to CDFW and USFWS immediately.	During construction activities	Daily	LGAWD	Qualified biologist or LGAWD will provide notification	
BIO-3a (Pre-construction Survey):					
Within 30 days prior to the start of construction, a pre-construction survey for San Joaquin kit fox will be conducted on and within 200 feet of proposed work areas. If a potential San Joaquin kit fox den is detected within 200 feet or of construction activities, a Focused Survey will be performed in accordance with the USFWS 2011 Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance by a qualified biologist to determine if	Prior to the start of any construction activities	30 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey and if necessary, a Focused survey report	

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
the den is active or inactive and appropriate buffer zones will be placed to protect the dens, if found active. If the active dens cannot be avoided, CDFW and/or USFWS will be contacted to determine next steps.					
BIO-3b (Mortality Reporting):					
The Sacramento Field Office of USFWS and the Fresno Field Office of CDFW will be notified in writing within three working days in the case of the accidental death or injury to a San Joaquin kit fox during construction. Notification must include the date, time, and location of the incident and any other pertinent information.	During construction activities	Upon observation of mortality	LGAWD	Qualified biologist or LGAWD will provide notification	
BIO-4a (Pre-construction Survey):					
Within 10 days prior to the onset of construction activities, a qualified biologist will conduct pre-construction surveys for western spadefoot and giant garter snake individuals and suitable habitats within the proposed work area and surrounding lands within 50 feet of canals and wetlands. If no individuals, active burrows, or suitable habits are observed during the preconstruction survey, then construction activities may begin. If construction is delayed or halted for more than 30 days, another pre-construction survey for western spadefoot and giant garter snake will be conducted. If the survey results in the identification of a western spadefoot or giant garter snake, the qualified biologist will determine if appropriate buffers can be implemented to avoid impacts to the individual(s).	Prior to the start of any construction activities	10 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-4b (Biological Monitoring):					
If suitable habitat for western spadefoot and/or giant garter snake are identified during the pre-construction survey, a biological monitor will be required to oversee construction actives within the areas identified.	During construction activities	Daily	LGAWD and/or construction contractor	Qualified biologist daily log	
BIO-5a (Avoidance):					
The Project's construction activities will occur, if feasible, between May 1 and September 30 (outside of wet season) in an effort to avoid impacts to California tiger salamander.	May 1 and September 30 of each year	Prior to the start of construction activities	LGAWD and/or construction contractor	Contractor's construction schedule	
BIO-5b (Pre-construction Survey):					
If activities must occur within the wet season (October 1 to April 30), a qualified biologist will conduct pre-construction surveys for California tiger salamanders within 30 days prior to the start of construction. The survey will be conducted within the sensitive habitat areas as identified in Appendix B.	Prior to the start of any construction activities	30 days prior to start of construction	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
BIO-5c (Exclusion fencing):					
The Project will install exclusion fencing around active construction to ensure California tiger salamanders do not enter the site during construction. Fencing will be installed as directed by a qualified biologist prior to ground disturbing activities in areas deemed sensitive habitat for California tiger salamander (See Appendix B).	Prior to the start of construction activities	Daily	LGAWD and/or construction contractor	Qualified biologist report of pre-construction survey	
BIO-5d (Equipment and materials):					
The Project will check all equipment and materials for California tiger salamanders, daily, prior to the beginning of construction activities. Further, any trenches with walls too steep for a salamander to exit, will be completely covered at the end of each day.	During Construction Activities	Daily	Construction contractor and construction field supervisor	Construction field supervisor to verify compliance	
BIO-5e (Formal Consultation):					
If any California tiger salamanders are observed during construction, work will stop immediately. A qualified wildlife biologist, approved to handle and remove California tiger salamander will be called to identify and remove the species. If take of any individual California tiger salamanders occurs, work will stop, and USFWS will be notified immediately, before more construction proceeds.	During construction activities	Daily	LGAWD	Qualified biologist or LGAWD will provide notification	
BIO-6a (Pre-Construction Survey):					
A qualified botanist/biologist will conduct focused botanical surveys for the three special status plants listed above, according to CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (2018).	Between September 16 and January 31	10 days prior to start of construction	LGAWD and/or construction contractor	Contractor's construction schedule	
BIO-6b (Avoidance):					
If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.	Prior to the start of construction activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
BIO-6c (Formal Consultation):					
If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, the Project proponent will initiate consultation with CDFW and/or USFWS. If CDFW and/or USFWS determines that "take" cannot be avoided, the Project proponent may be required to obtain an Incidental Take Permit.	During construction activities	Daily	LGAWD	Qualified biologist or LGAWD will provide notification	
BIO-7a (Operational Hours):					

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
Construction activities will be limited to daylight hours to reduce potential impacts to wildlife movement corridors.	During Construction Activities	Daily	LGAWD and/or construction contractor	Contractor's construction schedule	
BIO-7b (Wildlife Access):					
At no point will access along the MID canal be blocked on parallel sections of bank at the same time overnight. If construction is occurring on both banks during the day, a wildlife access route through the construction area will be identified before sunset.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
BIO-7c (Excavations):					
The ends of open Pipelines/culverts/siphons shall be blocked each night to prevent wildlife from entering. Excavations shall be covered or sloped to prevent wildlife from falling in and becoming trapped or injured during migratory or dispersal movements. The existing canal is precluded from this mitigation since the banks are not steep enough to prevent wildlife from escaping.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
BIO-8a (Avoidance):					
No construction activities will occur on the banks adjacent to the two wetlands (Wetland A and Wetland B) identified within the Aquatic Resources Delineation.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
Cultural Resources					
CUL-1 (Archaeological Remains):					
Should archaeological remains or artifacts be unearthed during any stage of project activities, work in the area of discovery shall cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the project proponent shall abide by recommendations of the archaeologist.	During Construction Activities	Daily	LGAWD and/or construction contractor	LGAWD with assistance of a qualified cultural subconsultant	
CUL-2 (Human Remains):					
In the event that any human remains are discovered on the Project site, the Merced County Coroner must be notified of the discovery (California Health and Safety Code, Section 7050.5) and all activities in the immediate area of the find or in any nearby area reasonably suspected to overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit	During Construction Activities	Daily	LGAWD and/or construction contractor	LGAWD with assistance of a qualified cultural subconsultant	

Mitigation Measure/Condition of Approval	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
the NAHC to determine the Most Likely Descendent of the deceased Native American.					
Geology and Soils					
GEO-1 (Geologic Resources Recovery):					
Should a unique paleontological resource, site, or unique geological feature be unearthed during any stage of Project activities, work in the area of discovery will cease until the area is evaluated by a qualified geologist or paleontologist. If discoveries are uncovered, the Project proponent will abide by recommendations of the geologist or paleontologist.	During Construction Activities	Daily	LGAWD and/or construction contractor	By subconsultant/contractor reports to LGAWD	
Tribal Cultural Resources					
See CUL-1 and CUL-2 above	During Construction Activities	Daily	LGAWD and/or construction contractor	By subconsultant/contractor reports to LGAWD, Merced County Coroner notification and report, and notification to NAHC, if applicable	
Wildfire					
WILD-1 (Defensible Space):					
Pre-wildfire mitigation measures focus on the maintenance of defensible space and fire-focused landscaping, and may include: a) Highly flammable vegetation near Project will be maintained to reduce fire fuel, as appropriate. b) Dispose of debris, such as dry debris, leaves, and dead limbs near and within the Project. c) Design defensible spaces with fire breaks around the Project, as appropriate.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	
WILD-2 (Water Source):					
Adequate on-site water sources will be made available during high fire risk construction activities and will include, but not limited to, water truck, water backpacks, and/or fire extinguishers.	During Construction Activities	Daily	LGAWD and/or construction contractor	Construction field supervisor to verify compliance	

Appendix A

Air Quality and Greenhouse Gas Emissions Evaluation Report

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	1.27	22.20	8.62	15.34	0.34	15.00	3.35	0.23	3.12	0.05	5,437.57	0.95	0.38	5,575.72
Grading/Excavation	1.16	21.94	7.66	15.32	0.32	15.00	3.33	0.21	3.12	0.05	5,375.80	0.95	0.37	5,511.05
Drainage/Utilities/Sub-Grade	1.10	21.79	7.16	15.31	0.31	15.00	3.32	0.20	3.12	0.05	5,332.88	0.94	0.37	5,466.20
Paving	1.09	21.74	7.12	0.31	0.31	0.00	0.20	0.20	0.00	0.05	5,308.17	0.94	0.36	5,440.49
Maximum (pounds/day)	1.27	22.20	8.62	15.34	0.34	15.00	3.35	0.23	3.12	0.05	5,437.57	0.95	0.38	5,575.72
Total (tons/construction project)	0.46	8.68	3.03	4.58	0.13	4.46	1.01	0.08	0.93	0.02	2,123.99	0.37	0.15	2,177.35

Notes:

Project Start Year ->	2022
Project Length (months) ->	36
Total Project Area (acres) ->	114
Maximum Area Disturbed/Day (acres) ->	2
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	501	1	520	20	400	20
Grading/Excavation	501	1	520	20	400	20
Drainage/Utilities/Sub-Grade	501	1	520	20	400	20
Paving	501	1	520	20	400	20

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.13	2.20	0.85	1.52	0.03	1.49	0.33	0.02	0.31	0.01	538.32	0.09	0.04	500.77
Grading/Excavation	0.11	2.17	0.76	1.52	0.03	1.49	0.33	0.02	0.31	0.01	532.20	0.09	0.04	494.96
Drainage/Utilities/Sub-Grade	0.11	2.16	0.71	1.52	0.03	1.49	0.33	0.02	0.31	0.01	527.95	0.09	0.04	490.93
Paving	0.11	2.15	0.71	0.03	0.03	0.00	0.02	0.02	0.00	0.01	525.51	0.09	0.04	488.62
Maximum (tons/phase)	0.13	2.20	0.85	1.52	0.03	1.49	0.33	0.02	0.31	0.01	538.32	0.09	0.04	500.77
Total (tons/construction project)	0.46	8.68	3.03	4.58	0.13	4.46	1.01	0.08	0.93	0.02	2123.99	0.37	0.15	1,975.28

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Appendix B

Biological Evaluation Report

Biological Evaluation

Le Grand-Athlone
WATER DISTRICT

MERCED I.D. CANAL INTERTIE PROJECT

DECEMBER 2021

Prepared for:
Le Grand-Athlone Water District
216 Robertson Boulevard
Chowchilla, CA, 93610

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I. Introduction

The following technical report, prepared by Provost & Pritchard Consulting Group, in compliance with the California Environmental Quality Act (CEQA) includes a description of the biological resources present or with potential to occur within the proposed Le Grand-Athlone Water District (LGAWD or District) for the Merced Irrigation District (MID) Intertie Canal Project (Project) and surrounding areas, and evaluates potential Project-related impacts to those resources.

Project Description

The LGAWD Board of Directors in a joint effort with MID proposes to construct the Project. MID's canal system provides the primary conveyance of surface water in the Merced Subbasin and is the Project's water source. The Project will construct a critical piece of infrastructure to help LGAWD, and the larger Merced Groundwater Subbasin, become more sustainable through reduced reliance on groundwater pumping. The Project Area of Potential Effect (APE) includes improvements, rehabilitation, and expanding the existing MID canal capacity for approximately 9.8 miles and constructing approximately 4.9 miles of new canal and pipeline infrastructure from MID Booster #3 Lateral to LGAWD. The APE includes a 50-foot buffer on each side of the proposed construction limits on the existing and proposed canals and encompasses approximately 320 acres. The APE is illustrated in **Figure 3**.

Report Objectives

Construction activities such as that proposed by the Project could potentially damage biological resources or modify habitats that are crucial for sensitive plant and wildlife species. In cases such as these, development may be regulated by State or federal agencies, and/or addressed by local regulatory agencies.

This report addresses issues related to the following:

1. The presence of sensitive biological resources onsite, or with the potential to occur onsite.
2. The federal, State, and local regulations regarding these resources.
3. Mitigation measures that may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies.

Therefore, the objectives of this report are:

1. Summarize all site-specific information related to existing biological resources.
2. Make reasonable inferences about the biological resources that could occur onsite based on habitat suitability and the proximity of the site to a species' known range.
3. Summarize all State and federal natural resource protection laws that may be relevant to the APE.
4. Identify and discuss Project impacts to biological resources likely to occur onsite within the context of CEQA and/or State or federal laws.
5. Identify and publish a set of avoidance and mitigation measures that would reduce impacts to a less-than-significant level (as identified by CEQA) and are generally consistent with recommendations of the resource agencies for affected biological resources.

Study Methodology

A reconnaissance-level field survey of the Project site and surrounding areas was conducted on August 19–20, 2021, by Provost & Pritchard biologists, Jacob Rogers and Mary Beth Bourne. The survey consisted of walking and driving the APE while identifying and noting plant and animal species encountered, biological habitats and communities, and land uses. Furthermore, the site and surrounding areas were assessed for suitable habitats of various wildlife species.

The biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the APE. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database (Jepson eFlora); United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS) and Information for Planning and Consultation (IPaC) system; the NatureServe Explorer online database; the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plants Database; CDFW California Wildlife Habitat Relationships (CWHR) database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the San Joaquin Valley region.

The field investigation did not include focused surveys for special status species. The field survey conducted included the appropriate level of detail to assess the significance of potential impacts to sensitive biological resources resulting from the Project. The field investigation included an aquatic resources delineation and results are discussed further below. Furthermore, the field survey was sufficient to generally describe those features of the Project that could be subject to the jurisdiction of federal and/or State agencies, such as the United States Army Corps of Engineers (USACE), CDFW, Regional Water Quality Control Board (RWQCB) and SWRCB, and used to support CEQA documents.

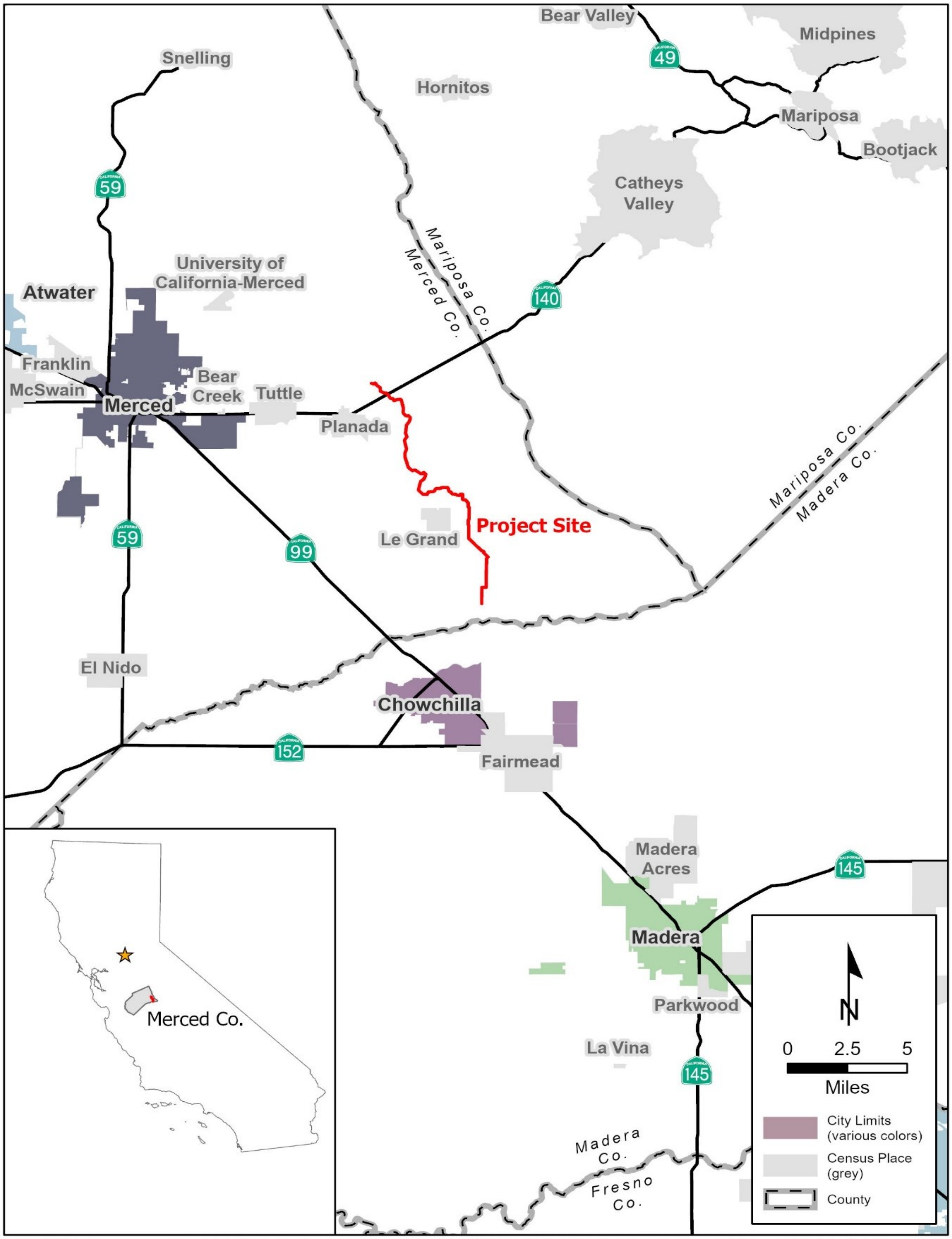

Figure 1. Regional Location

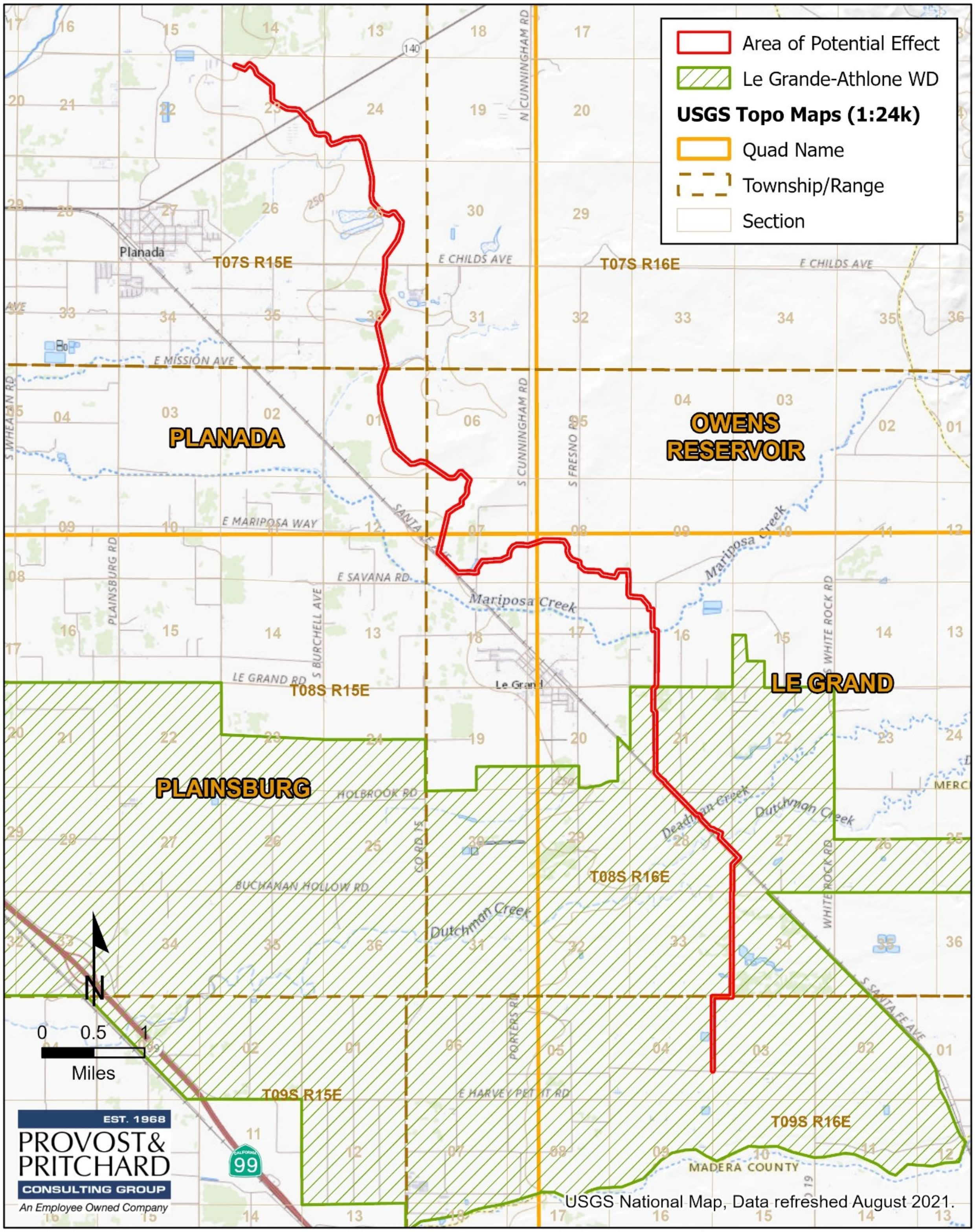

Figure 2. Topographic Quadrangle Map

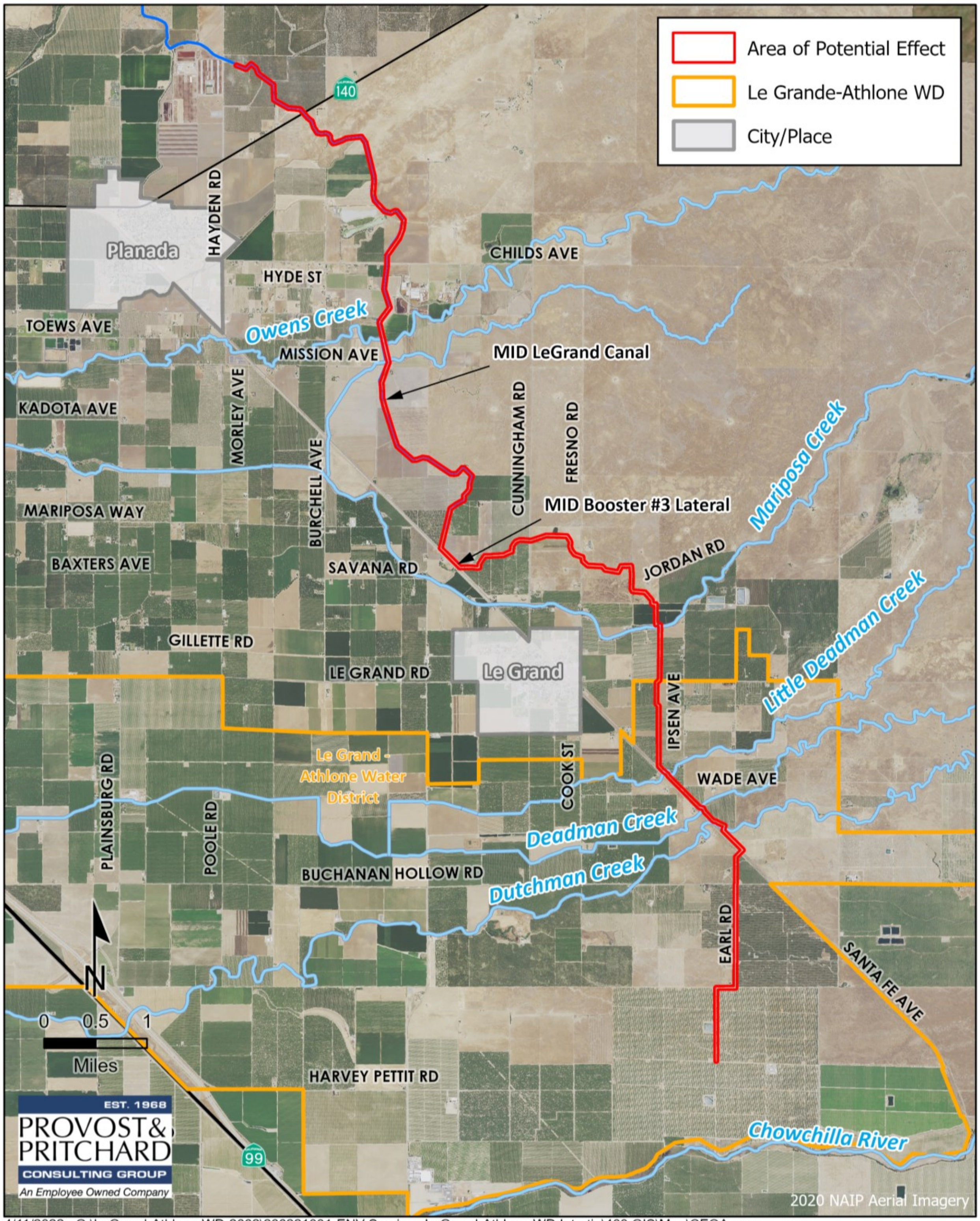

Figure 3. Area of Potential Effect

II. Existing Conditions

Regional Setting

The APE is located in the County of Merced, between Planada and Chowchilla, California (see **Figure 1 and Figure 2**). This area is within the San Joaquin Valley and lies west of the foothills of the Sierra Nevada Mountain Range.

Most of the San Joaquin Valley experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures range from 70 to 80 degrees Fahrenheit (F), but often exceeds 90 degrees F. Winter minimum temperatures are near 30 degrees F. Near the Project, the average annual precipitation is approximately 13 inches, falling primarily from October to April.

The APE lies within the Middle San Joaquin-Lower Chowchilla watershed; Hydrologic Unit Code (HUC): 18040001 and eight subwatersheds: Lower Owens Creek subwatershed; HUC: 180400011703, the Miles Creek subwatershed; HUC: 180400011701, the Upper Owens Creek sub-watershed; HUC: 180400011702, the Mariposa Creek-Duck Slough subwatershed; HUC: 180400011504, the South Slough-Deadman Creek subwatershed; HUC: 180400011604, the Flat Top Mountain-Deadman Creek subwatershed; HUC: 180400011601, the Lower Dutchman Creek subwatershed; HUC: 180400010903, and the Raynor Creek-Chowchilla River subwatershed; HUC: 180400010703. Surface water features within the watershed are influenced by rainfall events and do not flow every year. Water entering the watershed begins with rainfall events on western slopes of the Sierra Nevada Mountain Range, which flows westward into foothills, and continues to the valley floor through Dutchman Creek, Deadman Creek, Little Deadman Creek, Mariposa Creek and Chowchilla River. Water travels during wet years to sloughs which connect to the San Joaquin River

Photographs of the Project areas and vicinity are available in **Appendix A**.

Project Site

Ruderal/Agricultural

As illustrated in **Figure 3**, the APE includes approximately 320 acres of ruderal and agricultural land spanning approximately 14.7 miles from Planada to Chowchilla, California. The APE is primarily surrounded by expansive tracts of agriculture in the form of almond orchards, vineyards, corn fields, and grazing lands. Small residential towns including Planada, Plainsburg, Le Grand, and Chowchilla are located west of the APE.

The APE is comprised of a portion of already existing canal as well as undeveloped agricultural lands. The APE is dominated by bare ground, loose soil, and herbaceous vegetation. Intermittent pockets of riparian vegetation occur at bends in the canal and spots where the canal will cross natural waterways. Dominant vegetation within the APE includes Bermuda grass (*Cynodon dactylon*), great brome (*Bromus diandrus*), sacred datura (*Datura wrightii*), cattails (*Typha* sp.), rushes (*Juncus* sp.), and Fremont's cottonwood (*Populus fremontii*). Small clusters of black walnuts (*Juglans nigra*) were also present along the canal banks in the agriculturally duisturabed area. Two small wetlands were observed within grazing lands located along the existing MID Booster #3 Lateral canal north of Mariposa Creek (Wetland A to the north-west, Wetland B to the southeast). The southern wetland was dominated by spike rush (*Eleocharis palustris*) while the northern wetland contained various hydrophytic plant species, including floating primrose-willow (*Ludwigia peploides*). Both wetlands also contained positive indicators of wetland hydrology and hydric soils, meeting the definition of a wetland according to *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (United States Army Corps of Engineers, 2008). Representative photographs of the site at the time of the survey are presented in **Appendix A** at the end of this document.

The survey of the APE resulted in the identification of numerus bird species including Loggerhead Shrike (*Lanius ludovicianus*), Mourning Dove (*Zenaida macroura*), Great Egret (*Adrea alba*), Great Blue Heron (*Ardea herodias*), Killdeer (*Charadrius vociferus*), Barn Swallow (*Hirundo rustica*), Red-Tailed Hawk (*Buteo jamaicensis*), American Kestrel (*Falco sparverius*), Northern Mockingbird (*Mimus polyglottos*), and Belted Kingfisher (*Megaceryle alcyon*). During the survey, lodges constructed of mud and dried reeds were observed adjacent to the northern wetland. These lodges were likely built by muskrats; however, were occupied by ground squirrels at the time of the survey.

Biologists also noted the possibility of San Joaquin kit fox (SJKF) (*Vulpes macrotis mutica*) to utilize the APE and surrounding areas as foraging habitat, although no SJKF or SJKF dens were observed. Coyotes were observed foraging inside the heavily disturbed grazing grasslands, indicating that the habitat could support other canids.

Burrows located on multiple berms were observed throughout the APE. Due to the size of openings and lack of markings around the burrows (e.g., scat, footprints, and tail drags), it was determined the burrows were likely created by California ground squirrels (*Otospermophilus beecheyi*) and Botta's pocket gophers (*Thomomys bottae*), and not special-status mammals such as certain kangaroo rats (sp. *Dipodomys*) and SJKF.

Canal

The APE contains the main MID canal. At the time of the survey, vegetation within most of the canal was absent or confined to the water's edge. Biomes surrounding the APE varied throughout the alignment. Highly disturbed portions included grazing lands with cattle access to the canal. Other areas contained dense stands of rushes and riparian trees, providing suitable habitat for shorebirds. Water was present throughout the canal, flowing slowly in some sections while stagnant in others.

Riparian

Riparian habitat within the APE was primarily concentrated around Mariposa Creek, Dutchman Creek, and Deadman Creek. The other ephemeral creek (Little Deadman Creek) within the APE likely lacked a riparian corridor due to agricultural maintenance activities. All natural waterbodies within the APE were dry at the time of the field survey, although the Le Grand canal contained water throughout the APE. The Mariposa Creek channel was composed of sand, cobbles, and gravel. The banks of the channel were moderately high and covered in dry herbaceous vegetation, Fremont cottonwoods, sacred datura, and silverscale saltbush (*Atriplex argentea*). A large, hollow tree stump was identified on the northern bank from which skunk odor was emanating and in which tufts of striped skunk (*Mephitis mephitis*) fur were visible. Skunk prints were numerous within the channel. Patches of riparian habitat were also identified along the Le Grand canal. Stands of Fremont's Cottonwoods and soft rush were growing densely in areas where agricultural production and grazing were not currently active. Numerous observations of Great Blue Herons and Great Egrets occurred within these patches, as well as in the transition between riparian and grazing lands.

Habitats throughout the APE hold variable value to wildlife. While highly maintained agricultural lands are less than suitable for sensitive species, riparian habitat and wetlands could be critical to certain species in a region that is otherwise highly disturbed. Mitigation measures designed to avoid impacts to special status species, though minimal, are discussed in **Section III**.

Soils

The APE contains 41 soil mapping units from 26 soil series (NRCS 2021). These soils and their characteristics are summarized in **Table 1** below.

Table 1. Soils of the Area of Potential Effect

Soil	*Soil Map Unit*	*Percent of APE*	*Hydric Unit*	*Hydric Minor Units*	*Drainage*	*Permeability*	*Runoff*
Alamo	Clay, 0 to 1 percent slopes	0.7%	Yes	No	Poorly drained	Very slow	Very high
Bear Creek	Loam, 0 to 3 percent slopes	< 0.1%	Yes	No	Moderately well drained	Slow	Low
Burchell	Silty clay loam, 0 to 1 percent slopes	0.6%	Yes	No	Somewhat poorly drained	Moderately slow	Low
Greenfield	Sandy loam, deep over hardpan, 0 to 3 percent slopes	0.7%	No	No	Well drained	Moderately rapid	Very low
	Sandy loam, moderately deep and deep over hardpan, 3 to 8 percent slopes	< 0.1%	No	No			
Hanford	Sandy loam, 0 to 1 percent	0.3%	No	No	Well drained	Moderately rapid	Very low
Honcut	Fine sandy loam, 0 to 1 percent slopes	0.8%	No	No	Well drained	Moderately rapid	Very low
	Silt loam, 0 to 1 percent slopes	0.9%	No	No			
Hopeton	Clay, 0 to 8 percent slopes	1.5%	No	No	Moderately well drained	Slow	High
	Clay loam, 0 to 3 percent slopes	0.4%	No	No			
Keyes	Gravelly clay loam, 0 to 8 percent slopes	1.2%	No	Yes	Moderately well drained	Very slow	Very high
	Gravelly loam, 0 to 8 percent slopes	1.4%	No	Yes	Moderately well drained		Very high
Keyes-Pentz	Gravelly loam, 0 to 8 percent slopes	6.8%	No	Yes	Moderately well drained	Moderately high	Very high
Madera	Fine sandy loam, 0 to 3 percent slopes	0.9%	No	No	Moderately well drained	Very slow	High
	Loam, 0 to 1 percent slopes	2.0%	No	Yes			
	Sandy loam, 0 to 3 percent slopes	0.3%	No	Yes			
	Sandy loam, 3 to 8 percent slopes	1.2%	No	Yes			
Marguerite	Loam, 0 to 1 percent slopes	1.0%	No	No	Well drained	Slow	Medium
	Silty clay loam, deep over hardpan 0 to 1 percent slopes	1.2%	No	No			
Pachappa	Fine sandy loam, 0 to 1 percent slopes	1.0%	No	No	Well drained	Moderate	Low
Pentz	Gravelly loam, 0 to 8 percent slopes	2.0%	No	No	Well drained	Moderately high	Low
Peters	Cobbly clay, 8 to 30 percent slopes	< 0.1%	No	No	Well drained	Moderately high	Very high
Porterville	Clay, 0 to 3 percent slopes	11.7%	No	No	Well drained	Slow	High
	Clay, 3 to 8 percent slopes	0.2%	No	No			
Raynor	Clay, 0 to 3 percent slopes	11.2%	No	No	Well drained	Slow	High
	Clay, 3 to 8 percent slopes	0.2%	No	No			

Soil	Soil Map Unit	Percent of APE	Hydric Unit	Hydric Minor Units	Drainage	Permeability	Runoff
	Cobbly clay, 0 to 3 percent slopes	6.7%	No	No			
	Cobbly clay, 3 to 8 percent slopes	2.8%	No	No			
Redding	Gravelly loam, 0 to 8 percent slopes, dry	7.7%	No	No	Moderately well drained	Slow to very slow	Low
Ryer	Silt loam, 0 to 3 percent slopes	0.4%	No	No	Well drained	Slow	Medium
San Joaquin	Sandy loam, 0 to 3 percent slopes	8.3%	No	Yes	Moderately well drained	Very slow	Very high
	Sandy loam, 3 to 8 percent slopes	2.6%	No	Yes			
San Joaquin-Alamo	Sandy loam, 0 to 3 percent slopes	0.9%	No	Yes	Moderately well drained	Very slow	Very high
Seville	Clay, 0 to 3 percent slopes	3.0%	No	No	Well drained	Slow	High
Tujunga	Sand, 0 to 3 percent slopes	0.4%	No	No	Somewhat excessively drained	Slow	Negligible
Whitney	Sandy loam, 3 to 8 percent slopes	4.4%	No	No	Well drained	Moderately rapid	Medium
Wyman	Loam, 0 to 3 percent slopes	2.3%	No	No	Well drained	Moderately slow	Medium
	Loam, deep over hardpan, 0 to 3 percent slopes	5.7%	No	No			
Yokohl	Loam, 0 to 3 percent slopes	1.4%	No	No	Well drained	Slow to very slow	Very high
Yolo	Loam, 0 to 5 percent slopes	2.5%	No	No	Well drained	Moderate	Low
	Loam, deep over hardpan, 0 to 1 percent slopes	1.0%	No	No			

Soils within the APE included clays, silts, and loams, as well as mixed soil types. A total of 10 minor components of the soil map units were identified as hydric soils. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions such that under sufficiently wet conditions, hydrophytic vegetation can be supported. Soil samples tested during the field survey confirmed the presence of hydric soils in the Project area.

The complete NRCS Web Soil Survey report is available in **Appendix C** at the end of this document.

Natural Communities of Special Concern

Natural communities of special concern are those of limited distribution, distinguished by significant biological diversity, or home to special status species. CDFW is responsible for the classification and mapping of all-natural communities in California. Just as the special status plant and animal species, these natural communities of special concern can be found within CNDDB.

According to CNDDB, there are no recorded observations of natural communities of special concern with potential to occur within the APE. Northern Hardpan Vernal Pool habitat was previously mapped near the terminus of the proposed canal, however this community was not observed during the survey.

Designated Critical Habitat of the APE

The USFWS often designates areas of “Critical Habitat” when it lists species as threatened or endangered. Critical Habitat is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and may require special management or protection. According to CNDDB and IPaC, designated critical habitat is present within the Project area and vicinity.

Wildlife Movement Corridors

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation.

While ruderal habitats adjacent to the MID Canal are heavily disturbed from agricultural activities, the canal as well as the natural waterways within the APE likely function as wildlife movement corridors for passage through the agricultural complexes of the San Joaquin Valley. Due to disturbance and presence of water throughout the MID canal, the banks of the canals, creeks, and river, as well as the beds of each during the dry season, are likely primarily utilized by nocturnal wildlife.

Special Status Plants and Animals

California contains several "rare" plant and animal species. In this context, rare is defined as species known to have low populations or limited distributions. As human population grows, urban expansion encroaches on the already-limited suitable habitat. This results in sensitive species becoming increasingly more vulnerable to extirpation. State and federal regulations have provided CDFW and USFWS with a mechanism for conserving and protecting the diversity of plant and animal species native to California. Numerous native plants and animals have been formally designated as "threatened" or "endangered" under State and federal endangered species legislation. Other formal designations include "candidate" for listing or "species of special concern" by CDFW. The CNPS has a list of native plants considered rare, threatened, or endangered. Collectively these plants and animals are referred to as "special status species."

A thorough search of CNDDB for published accounts of special status plant and animal species was conducted for the *Planada* and *Le Grand* 7.5-minute quadrangles, which contains the entire Project site, and for the twelve surrounding quadrangles: *Yosemite Lake*, *Haystack Mountain*, *Indian Gulch*, *Cathey's Valley*, *Merced*, *Owens Reservoir, Illinois Hill, El Nido, Plainsburg*, *Raynor Creek*, *Bliss Ranch*, *Chowchilla*, *Berenda*, and *Kismet*. These species, and their potential to occur within the APE, are listed in Table 2 and Table 3 on the following pages. Raw data obtained from CNDDB is available in Appendix B. All relevant sources of information, as discussed in the Study Methodology section of this report (above), were used to determine if any special status species are known to be within the Project APE. Figure 2 shows the Project's two 7.5-minute quadrangles, according to United States Geological Survey Topographic Maps.

Table 2. List of Special Status Animals with Potential to Occur Onsite and/or in the Vicinity.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
American badger (*Taxidea taxus*)	CSC	Grasslands, savannas, and mountain meadows near timberline are preferred. Most abundant in drier open spaces of shrub and grassland. Burrows in soil.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The APE is dominated by agriculture and ruderal land. Grasslands present within the APE are heavily disturbed by grazing, and therefore unsuitable for this species. This species was last observed 5 miles west of APE in 2018.
Bald Eagle (*Haliaeetus leucocephalus*)	CE, CFP	Resides in old growth forests as well as lower montane coniferous forests. Nests are generally found in large, old-growth trees within a mile of water. Nests and winters along ocean shores, lake margins, and rivers.	**Possible.** The disturbed habitats of the APE are generally unsuitable for this species. The APE intermittently provides large Fremont cottonwood trees that could support nesting of large birds, like Bald Eagle. An individual flying over the APE is possible and was last observed 4 miles east of APE in 2001.
Burrowing Owl (*Athene cunicularia*)	CSC	Resides in open, dry annual or perennial grasslands, deserts, and scrublands with low growing vegetation. Nests underground in existing burrows created by mammals, most often ground squirrels.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Raptors were observed multiple times during the survey, the presence of which would discourage burrowing owls from nesting in the area. This species was observed 3 miles northwest of the APE in 2018, however habitat suitable for foraging is unavailable. Further, no dens or indicators of this species were documented during the survey.
California tiger salamander (*Ambystoma californiense*)	FT, CT, CWL	Requires vernal pools or seasonal ponds for breeding and small mammal burrows for aestivation. Generally found in grassland and oak savannah plant communities in central California from sea level to 1500 feet in elevation.	**Possible.** The disturbed habitats of the APE are generally unsuitable for this species. There are several recent observations of this species near the APE, but the agricultural canals do not provide suitable aquatic habitat to support this species. The only potential suitable breeding habitat identified near the APE included the northern wetland adjacent to the Le Grand canal. While cattle have access to this pond, this species is known to utilize stock ponds when higher quality habitat is unavailable. However, aerial imagery reveals that this pond is present year-round, allowing aquatic predators, such as American bullfrogs (*Lithobates catesbeianus*), to utilize the habitat making it unsuitable for this species. Additionally, the recent observations of this species have occurred in high quality vernal pool habitat northwest of the site, removed from agricultural activities. Critical habitat for this species has been mapped within the Phase 2 alignment. Therefore the potential for this species to occur within the APE exists despite the lack of suitable habitat.
Conservancy fairy shrimp (*Branchinecta conservatio*)	FE	Endemic to the grasslands of the northern two-thirds of the Central Valley. Found in large, turbid pools.	**Unlikely.** Vernal pool habitat required by this species is absent from the APE. Vernal pool habitats are present regionally, however the cattle pond and wetland area studied in the ARD do not meet the definition of vernal pools. This species was last observed in the region in

Species	*Status*	*Habitat*	*Occurrence on Project Site*
			2016, 4 miles northwest of the APE in vernal pool grassland habitat. Portions of the Phase 2 alignment run through critical habitat mapped for this species, however this portion of the project includes improvements to the existing canal, therefore habitat for this species will not be impacted. Agricultural canals do not contain the primary constituent elements for this species.
Crotch bumble bee (*Bombus crotchii*)	CCE	Occurs throughout coastal California, as well as east to the Sierra-Cascade crest, and south in to Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia*, and *Eriogonum*.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. This species was last observed in the Sierra Nevada foothills in 2020, 13 miles north of the APE. However, no regional recorded observations of this species have occurred on the valley floor and the APE does not provide suitable vegetation for this species.
Ferruginous Hawk (*Buteo regalis*)	CWL	Inhabits open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats. Preys on lagomorphs, ground squirrels and mice.	**Absent.** The preferred vegetation required for this species is not present within the APE and the disturbed habitats are less than suitable for this species. This species has not been observed in the region in over 20 years.
Foothill yellow-legged frog (*Rana boylii*)	CCT, CSC	Frequents rocky streams and rivers with rocky substrate and open, sunny banks in forests, chaparral, and woodlands. Occasionally found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	**Absent.** The disturbed habitats of the APE are generally unsuitable for this species. The canals and wetland areas do not provide suitable aquatic habitat to support this species due to degraded water quality and disturbance from grazing cattle. Suitable aquatic habitat is located in the Sierra Nevada foothills, making it unlikely that an individual would pass through the area during dispersal. This species has not been observed in the region in over 50 years.
Giant gartersnake (*Thamnophis gigas*)	FT, CT	Occurs in marshes, sloughs, drainage canals, irrigation ditches, rice fields, and adjacent uplands. Prefers locations with emergent vegetation for cover and open areas for basking. This species uses small mammal burrows adjacent to aquatic habitats for hibernation in the winter and to escape from excessive heat in the summer.	**Possible.** Portions of the canal and wetland habitats of the APE are highly disturbed, however there are areas which contain appropriate aquatic vegetation to potentially support this species. This species has not been observed in the region in over 100 years.
Hardhead (*Mylopharodon conocephalus*)	CSC	Occurs in low- to mid-elevation streams in the Sacramento-San Joaquin drainage. Clear, deep pools with sand-gravel-boulder bottoms and slow-moving water is required. This species is often sympatric with Sacramento pikeminnow and Sacramento sucker. Hardhead are typically absent form streams occupied by centrarchids and from heavily altered habitats.	**Absent.** This species was last observed in the region in 2007, never occurring within a canal. The Le Grand canal does not provide suitable perennial aquatic habitat for this species.

Species	Status	Habitat	Occurrence on Project Site
Merlin (*Falco columbarius*)	CWL	Found throughout North America in habitats ranging from tidal estuaries to open woodlands and valley grasslands. Generally roosts in clumps of trees or windbreaks.	**Possible.** The disturbed habitats of the APE are unsuitable for this species. The APE intermittently provides large Fremont cottonwood trees that could support nesting. An individual flying over the APE is possible, although this species has not been observed in the region in over 20 years.
Mountain Plover (*Charadrius montanus*)	CSC	Breeds on open plains at moderate elevations. Winters in short-grass plains and fields, plowed or fallow fields, and sandy deserts. Prefers flat, bare ground with burrowing rodents.	**Possible.** The disturbed habitats of the APE could potentially provide winter foraging habitat for this species. Further, many egrets were observed flying and foraging throughout the APE. The APE provides flat, bare ground however, this species has not been observed in the region in over 20 years.
Northern Harrier (*Circus hudsonius*)	CSC	Nests and forges in various grasslands, including salt grass in desert sinks, riparian scrub, and wetland edges. Nests constructed on the ground from sticks in wet areas, usually on the edge of marshes.	**Possible.** The wetland edge habitats of the APE are potentially suitable for this species. Nesting habitat is scarce, but present in the form of intermittent Fremont cottonwood trees. There has been one observation of this species in the region in 2015.
Pallid bat (*Antrozous pallidus*)	CSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods, and occasionally takes insects in flight. Prefers to roost in rock crevices, but may also use tree cavities, caves, bridges, and other man-made structures.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting and foraging habitat are not present for this species. This species has not been observed in the region in over 20 years.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Underground dens with multiple entrances in alkali sink, valley grassland, and woodland in valleys and adjacent foothills.	**Possible.** No dens or signs of this species were observed during the survey, however grassland habitat in the area likely supports prey species This species could potentially forage within the APE and surrounding lands. This species was last observed 4 miles from APE in 2001.
Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus pop.11*)	FT	This winter-run fish begins migration to fresh water during peak flows during December and February. Spawning season is typically from February to April. After hatching, fry move to deeper, mid-channel habitats in late summer and fall. In general, both juveniles and adults prefer complex habitat boulders, submerged clay and undercut banks, and large woody debris.	**Absent.** This species was last observed in the region in 2013, never occurring within a canal. The Le Grand canal does not provide suitable perennial aquatic habitat for this species.

Species	Status	Habitat	Occurrence on Project Site
Swainson's Hawk (*Buteo swainsoni*)	CT	Nests in large trees in open areas adjacent to grasslands, grain or alfalfa fields, or livestock pastures suitable for supporting rodent populations.	**Possible.** The APE intermittently provides large Fremont cottonwood trees that could support nesting of large birds. An individual flying over the APE is possible. There have been more than 20 observations of this species in the region in the last 20 years.
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Nests colonially near fresh water in dense cattails or tules, or in thickets of riparian shrubs. Forages in grassland and cropland. Large colonies are often found on dairy farm forage fields.	**Possible.** The APE provides pockets of cattail habitat within intermittently flooded canals and creeks. Croplands surrounding the APE could possibly support foraging. This species was observed within 1 mile of APE in 2015.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of the Central Valley and foothills. Adults are active March to June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. No elderberry shrubs were observed during the field survey. Both regional observations of this species occurred in woodland and forest habitats, both of which are absent from the APE.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occupies vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Unlikely**. Although this species was observed within 1 mile of APE in 1993, the APE does not provide suitable vernal pool habitat. The wetlands onsite do not meet the definition of vernal pools and are highly disturbed by cattle grazing. Regionally, vernal pools exist northeast of the site in ungrazed areas. While critical habitat for this species has been mapped within Phase 2 of the Project, this section of the alignment will be undergoing improvements which will have no impact on habitats suitable for this species. Agricultural canals do not contain the primary constituent elements for this species.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Unlikely**. Over 150 observations of this species have occurred in the region. The last was recorded in 2017, within three miles of APE. While the habitats onsite appear unsuitable or this species, critical habitat has been mapped within the Phase 2 and Phase 3 alignments. Phase 3 of the project involves significant ground disturbance through the creation of a new canal alignment through land that currently functions as an orchard. However, it is highly unlikely that any individuals of this species currently exist in the soils of the APE. The land within Phase 3 is visible in historical aerial imagery and has been under agricultural production for more than 17 years. Orchards are visible in imagery from 12 years ago. This level of disturbance has created unsuitable conditions for the survival of this species.
Western mastiff bat (*Eumops perotis californicus*)	CSC	Found in open, arid to semi-arid habitats, including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces but may also use high buildings and tunnels.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting habitat is not present and foraging habitat is marginal for this species. This species has not been observed in the region in over 20 years.

Species	Status	Habitat	Occurrence on Project Site
Western pond turtle (*Emys marmorata*)	CSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The canals and wetlands do not provide suitable aquatic habitat to support this species. Disturbance from cattle grazing makes the site unsuitable for nesting, and poor water quality would deter this species from basking or foraging within the APE. This species has not been observed in the region in over 20 years.
Western red bat (*Lasiurus blossevillii*)	CSC	Roosts primarily in trees, 2–40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable roosting habitat is not present and foraging habitat is marginal for this species. This species has not been observed in the region in over 20 years.
Western spadefoot (*Spea hammondii*)	CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal pools or temporary wetlands, lasting a minimum of three weeks, which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Possible.** The disturbed habitats of the APE are likely unsuitable for this species. However, the canals do provide marginal aquatic habitat to support this species. There have been over 40 observations in the region, as recent as 2019, within 1 mile of the APE.

Table 3. List of Special Status Plants with Potential to Occur Onsite and/or in the Vicinity.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
Alkali-sink goldfields (*Lasthenia chrysantha*)	CNPS 1B	Found in vernal pool and wet saline flat habitats. Occurrences documented in the San Joaquin and Sacramento Valleys at elevations below 656 feet. Blooms February - April.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable vernal pools are absent from the APE. This species has not been observed in the region in over 80 years.
Beaked clarkia (*Clarkia rostrata*)	CNPS 1B	Found in woodlands and valley foothill grasslands on the west slope of the Sierra Nevada range, around 1,640 feet in elevation. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 20 years.
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)	CE, CNPS 1B	Found in freshwater marshes, swamps, and vernal pools in clay soils at elevations below 5250 feet. Blooms April – September.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. Suitable freshwater habitat is absent from the APE. There is only one recorded observation of this species in the region, 3 miles north of the APE in 2002.
California alkali grass (*Puccinellia simplex*)	CNPS 1B	Found in the San Joaquin Valley and other parts of California in saline flats and mineral springs within valley grassland and wetland-riparian communities at elevations below 3000 feet. Blooms March–May.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although few small wetland areas exist within the APE, there is only one recorded observation of this species in the region from a historical collection dated 1935.
Colusa grass (*Neostapfia colusana*)	FT, CE, CNPS 1B	Found in vernal pools in the San Joaquin Valley at elevations below 410 feet. Blooms May – August.	**Unlikely.** The APE does not support any vernal pool habitat to host this species. However, there have been over 25 observations of this species in the region.
Dwarf downingia (*Downingia pusilla*)	CNPS 2B	Found in vernal pools in valley and foothill grassland communities at elevations below 1600 feet. Blooms March – May.	**Absent.** The APE does not support any vernal pools or foothill grasslands to host this species. This species has not been observed in the region over 20 years.
Forked hare-leaf (*Lagophylla dichotoma*)	CNPS 1B	Found in cismontane woodland, and valley and foothill grassland communities at elevations between 600 feet and 1100 feet.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 100 years.
Greene's tuctoria (*Tuctoria greenei*)	FE, CR, CNPS 1B	Found in the San Joaquin Valley and other parts of California in vernal pools within valley grassland, wetland, and riparian communities at elevations below 3500 feet. Blooms May – September.	**Possible.** The APE does not support any vernal pools or riparian communities to host this species. However, there have been 15 observations of this species in the region, one occurring within two miles of the APE in 2011. Also, critical habitat for this species has been mapped within Phase 2 of the Project.
Hairy Orcutt grass (*Orcuttia pilosa*)	FE, CE, CNPS 1B	Found in vernal pools in valley grassland, wetland, and riparian communities at elevations below 650 feet. Blooms May – September.	**Absent.** The APE does not support any vernal pools, and grassland habitat within the APE are too disturbed from cattle grazing to host this species. This species has not been historically observed in the region in over 50 years.
Hartweg's golden sunburst (*Pseudobahia bahifolia*)	FE, CE, CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities in clay soils that are often acidic. Occurs predominantly on northern slopes, but also	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE does not host habitat to support this species. This species was last observed in the region in 2010, eight miles north of the APE.

Species	Status	Habitat	Occurrence on Project Site
		along shady creeks and near vernal pools at elevations between 300 feet and 650 feet. Blooms March – May.	
Heartscale (*Atriplex cordulata var. cordulata*)	CNPS 1B	Found in the San Joaquin Valley and Sacramento Valley in saline or alkaline soils within shadescale scrub, valley grassland, and wetland-riparian communities at elevations below 230 feet. Blooms June–July.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although few small wetland areas exist within the APE, this species has not been observed in the region in over 30 years.
Henderson's bent grass (*Agrostis hendersonii*)	CNPS 3.2	Found in valley and foothill grassland, and vernal pools in the San Joaquin Valley, Sacramento Valley, Sierra Nevada foothills, and Cascade Range foothills. Grows in moist places in grassland or vernal pool habitat at elevations below 3,380 feet. Blooms May – July.	**Absent.** The APE does not support any vernal pools or grasslands to host this species. This species has not been observed in the region in over 20 years.
Hoover's calycadenia (*Calycadenia hooveri*)	CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities on exposed, rocky, barren soil at elevations between 300 feet and 1300 feet. Blooms June – September.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although rocky, barren soils exist within the APE, this species has not been observed in the region in over 20 years.
Hoover's cryptantha (*Cryptantha hooveri*)	CNPS 1A	Presumed extirpated in California. Found in valley and foothill grassland and inland dunes in coarse sand at elevations below 250 feet. Blooms Mar – May.	**Absent.** Suitable habitat required by this species is absent from the APE and surrounding lands. This species is assumed extirpated from California
Keck's checkerbloom (*Sidalcea keckii*)	FE, CNPS 1B	Occurs in cismontane woodland, valley and foothill grassland, typically on grassy slopes in clay soils at elevations between 275 feet – 1650 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE does not host habitat to support this species. This species was last observed in the region in 2016.
Lesser saltscale (*Atriplex minuscula*)	CNPS 1B	Found in the San Joaquin Valley in sandy, alkaline soils in alkali scrub, valley and foothill grassland, and alkali sink communities at elevations below 750 feet. Blooms April–October.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although sandy soils exist within the APE, this species has not been observed in the region in over 20 years.
Madera leptosiphon (*Leptosiphon serrulatus*)	CNPS 1B	Found in openings in foothill woodland, often yellow-pine forest, and chaparral at elevations between 1000 feet and 4300 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE is outside of the species elevational range. This species has not been observed in the region in over 60 years.
Mariposa cryptantha (*Cryptantha mariposae*)	CNPS 1B.3	Grows on serpentine outcrops in chaparral habitat. Found in the Sierra Nevada foothills at elevations between 295 – 2,700 feet. Blooms April – June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks required habitat and is outside of the species elevational range. This species has not been observed in the region in over 80 years.

Species	Status	Habitat	Occurrence on Project Site
Merced phacelia (*Phacelia ciliata var. opaca*)	CNPS 3.2	Grows in heavy clay soils in foothills and grasslands of the San Joaquin Valley. Found at elevations below 330 feet. Blooms February – May.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 50 years.
Munz's tidy-tips (*Layia munzii*)	CNPS 1B	Found in the San Joaquin Valley in alkaline clay soils; often along hillsides in alkali scrub and sometimes valley and foothill grassland. Occurs at elevations between 145 feet and 2625 feet Blooms March–April.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years.
Pincushion navarettia (*Navarretia myersii spp. myersii*)	CNPS 1B	Found in vernal pools in clay soils at elevations between 65-295 feet. Often associated with non-native grasslands. Blooms in May.	**Unlikely.** The APE does not support any vernal pools or grasslands to host this species. However, this species was last observed in the region in 2011.
Recurved larkspur (*Delphinium recurvatum*)	CNPS 1B	Occurs in poorly drained, fine, alkaline soils in grassland and alkali scrub communities at elevations between 100 feet and 2600 feet. Blooms March–June.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	FT, CE, CNPS 1B	Found in the eastern San Joaquin Valley and the Sierra Nevada foothills in vernal pools within valley grassland, freshwater wetland, and wetland-riparian communities at elevations below 2600 feet. Blooms April – September.	**Possible.** The APE does not support any vernal pools to host this species. However, this species has over 20 observations, with the most recent in 2017 within one mile of the APE. Also, critical habitat for this species has been mapped within Phase 3 of the project.
Sanford's arrowhead (*Sagittaria sanfordii*)	CNPS 1B	Found in the San Joaquin Valley and other parts of California in freshwater-marsh, primarily ponds and ditches, at elevations below 1000 feet. Blooms May–October.	**Unlikely.** The disturbed habitats of the APE are unsuitable for this species. Although canals exist within the APE, they are unlikely to host this species. This species was last observed in the region in 2012.
Shaggyhair lupine (*Lupinus spectabilis*)	CNPS 1B	Grows in chaparral and cismontane woodland on open rocky slopes of serpentine soils. Endemic to the Sierra Nevada foothills at 655 – 2,700 feet. Blooms April – May.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 80 years
Shining navarretia (*Navarretia nigelliformis ssp. radians*)	CNPS 1B	Found in cismontane woodland and valley and foothill grassland communities, sometimes in vernal pools. Occurs at elevations between 200 feet and 3200 feet. Blooms May – July.	**Unlikely.** The APE does not support woodlands, vernal pools, or grasslands to host this species. However, this species has over 35 observations and in 2011 was recorded within 1 mile of the APE.

Species	Status	Habitat	Occurrence on Project Site
Spiny-sepaled button-celery (*Eryngium spinosepalum*)	CNPS 1B	Found in the Sierra Nevada Foothills and the San Joaquin Valley. Occurs in vernal pools, swales, and roadside ditches. Often associated with clay soils in vernal pools within grassland communities. Occurs at elevations between 50 feet and 4160 feet. Blooms April–July.	**Unlikely.** The APE does not support any vernal pools or grasslands to host this species. However, this species has over 30 observations, with the most recent in 2009.
Subtle orache (*Atriplex subtilis*)	CNPS 1B	Found in the San Joaquin Valley in saline depressions in alkaline soils within valley and foothill grassland communities at elevations below 330 feet. Blooms June–October.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 90 years
Succulent owl's-clover (*Castilleja campestris var. succulenta*)	FT, CE, CNPS 1B	Found in vernal pools, often in acidic soils at elevations below 2500 feet. Blooms April – July.	**Possible.** The APE does not support any vernal pools to host this species. However, this species has over 60 observations, with the most recent in 2019. Also, critical habitat for this species is mapped within Phase 2 of the project.
Vernal pool smallscale (*Atriplex persistens*)	CNPS 1B	Occurs in the San Joaquin Valley and Sacramento Valley in alkaline vernal pools at elevations below 375 feet. Blooms June–September.	**Unlikely.** The APE does not support any vernal pools to host this species. However, this species has over 10 observations, with the most recent in 2017.
Watershield (*Brasenia schreberi*)	CNPS 2B	Found in marshes and swamps, as well as near artificial waterbodies at elevations below 2200 feet. Blooms April – October.	**Absent.** The disturbed habitats of the APE are unsuitable for this species. The APE lacks the required habitat to support this species. This species has not been observed in region in over 100 years

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present:	Species observed on the site at time of field surveys or during recent past.
Likely:	Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible:	Species not observed on the site, but it could occur there from time to time.
Unlikely:	Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent:	Species not observed on the site, and precluded from occurring there due to absence of suitable habitat.

STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CCT	California Threatened (Candidate)
FPT	Federally Threatened (Proposed)	CFP	California Fully Protected
FC	Federal Candidate	CSC	California Species of Concern
		CWL	California Watch List
		CCE	California Endangered (Candidate)
		CR	California Rare

CNPS LISTING

1A	Plants Presumed Extinct in California.	2A	Plants Presumed Extirpated in California, but more common elsewhere.
1B	Plants Rare, Threatened, or Endangered in California and elsewhere.	2B	Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

III. Impacts and Mitigation

Significance Criteria

CEQA

General plans, area plans, and specific projects are subject to the provisions of CEQA. The purpose of CEQA is to assess the impacts of proposed projects on the environment prior to project implementation. Impacts to biological resources are just one type of environmental impact assessed under CEQA and vary from project to project in terms of scope and magnitude. Projects requiring removal of vegetation may result in the mortality or displacement of animals associated with this vegetation. Animals adapted to humans, roads, buildings, and pets may replace those species formerly occurring on a site. Plants and animals that are State and/or federally listed as threatened or endangered may be destroyed or displaced. Sensitive habitats such as wetlands and riparian woodlands may be altered or destroyed. Such impacts may be considered either "significant" or "less than significant" under CEQA. According to CEQA, Statute and Guidelines (AEP 2012), "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 interest. Specific project impacts to biological resources may be considered "significant" if they 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 CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (CWA) (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 native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) states that a project may trigger the requirement to make a "mandatory finding of significance" if the project has the potential to:

> "Substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare or threatened species, or eliminate important examples of the major periods of California history or prehistory."

Relevant Goals, Policies, and Laws

Merced County General Plan

The Merced County General Plan set a goal to preserve and protect the biological resources of the County from "Significant Impact," through coordination with the public and private sectors. Policies within the Natural Resources Element of the General Plan supporting this goal are listed below.

Policy NR-1.1: *Habitat Protection*. Identify areas that have significant long-term habitat and wetland values including riparian corridors, wetlands, grasslands, rivers and waterways, oak woodlands, vernal pools, and wildlife movement and migration corridors, and provide information to landowners.

Policy NR-1.2: *Protected Natural Lands*. Identify and support methods to increase the acreage of protected natural lands and special habitats, including but not limited to, wetlands, grasslands, vernal pools, and wildlife movement and migration corridors, potentially through the use of conservation easements.

Policy NR-1.4: *Important Vegetative Resource Protection*. Minimize the removal of vegetative resources which stabilize slopes, reduce surface water runoff, erosion, and sedimentation.

Policy NR-1.5: *Wetland and Riparian Habitat Buffer*. Identify wetlands and riparian habitat areas and designate a buffer zone around each area sufficient to protect them from degradation, encroachment, or loss.

Policy NR-1.6: *Terrestrial Wildlife Mobility*. Encourage property owners within or adjacent to designated habitat connectivity corridors that have been mapped or otherwise identified by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service to manage their lands in accordance with such mapping programs. In the planning and development of public works projects that could physically interfere with wildlife mobility, the County shall consult with the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service to determine the potential for such effects and implement any feasible mitigation measures.

Policy NR-1.10: *Aquatic and Waterfowl Habitat Protection*. Cooperate with local, State, and Federal water agencies in their efforts to protect significant aquatic and waterfowl habitats against excessive water withdrawals or other activities that would endanger or interrupt normal migratory patterns or aquatic habitats.

Policy NR-1.12: *Wetland Avoidance*. Avoid or minimize loss of existing wetland resources by careful placement and construction of any necessary new public utilities and facilities, including roads, railroads, high speed rail, sewage disposal ponds, gas lines, electrical lines, and water/wastewater systems.

Policy NR-1.13: *Wetland Setbacks*. Require an appropriate setback, to be determined during the development review process, for developed and agricultural uses from the delineated edges of wetlands.

Policy NR-1.21: *Special Status Species Surveys and Mitigation*. Incorporate the survey standards and mitigation requirements of state and federal resource management agencies for use in the County's review processes for both private and public projects.

Threatened and Endangered Species

Permits may be required from the USFWS and/or CDFW if activities associated with a project have the potential to result in the "take" of a species listed as threatened or endangered under the federal and/or state Endangered Species Acts. Take is defined by the State of California as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86). Take is more broadly defined by the federal Endangered Species Act to include "harm" (16 United States Code (USC), Section 1532(19), 50 Code of Federal Regulation (CFR), Section 17.3). CDFW and USFWS are responsible agencies under CEQA and National Environmental Policy Act (NEPA). Both agencies review CEQA and NEPA documents in order to determine the adequacy of their treatment of endangered species issues and to make project-specific recommendations for their conservation.

Designated Critical Habitat

When species are listed as threatened or endangered, the USFWS often designates areas of "Critical Habitat" as defined by Section 3(5)(A) of the federal Endangered Species Act (ESA). Critical Habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical Habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation with the federal government. Designations only affect federal agency actions or federally funded or permitted activities. Critical Habitat does not prevent activities that occur within the designated area. Only activities that involve a federal permit, license, or funding and are likely to destroy or adversely modify Critical Habitat will be affected.

Migratory Birds

The Federal Migratory Bird Treaty Act (MBTA) (16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it covers nearly all bird's native to the United States, even those that are non-migratory. The MBTA encompasses whole birds, parts of birds, nests, and eggs. Additionally, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the MBTA (Section 3513), as well as any other native non-game bird (Section 3800).

Birds of Prey

Birds of prey are protected in California under provisions of Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The Bald Eagle and Golden Eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.

Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto". Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the CDFW.

Wetlands and other "Jurisdictional Waters"

Natural drainage channels and adjacent wetlands may be considered "waters of the U.S." or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations but has also been subject to interpretation of the federal courts. Jurisdictional waters generally include:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

- All interstate waters including interstate wetlands;

- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;

- All impoundments of waters otherwise defined as waters of the U.S. under the definition;

- Tributaries of waters identified in paragraphs (a)(1)-(4) (i.e. the bulleted items above).

As determined by the U.S. Supreme Court in its 2001 *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (*SWANCC*) decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated *Carabell/Rapanos* decision, the Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water. Furthermore, the Supreme Court clarified that the U.S. Environmental Protection Agency (EPA) and the USACE will not assert jurisdiction over ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE regulates the filling or grading of Waters of the U.S. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high-water marks" on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that results in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet State water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the SWRCB has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the U.S., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one acre or more of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the U.S. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a notification of a Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

Potentially Significant Project-Related Impacts and Mitigation

Species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations by CDFW or USFWS that have the potential to be impacted by the Project are identified below with corresponding mitigation measures.

Project-Related Mortality and/or Disturbance of Nesting Raptors, Migratory Birds, and Special Status Birds.

The APE contains some suitable nesting and/or foraging habitat for avian species. Ground nesting birds, such as Killdeer, could potentially nest on the bare ground or compacted dirt roads onsite; however, no nests were observed at the time of survey. Large, riparian trees within and near the APE could potentially host nests of raptors, woodpeckers, and perching birds. The APE largely provides marginal nesting habitat for Bald Eagle, Northern Harrier, and Swainson's Hawk, in the form of intermittent large Fremont cottonwood trees. It is possible these species are observed flying over the APE or using adjacent habitat for foraging. Birds nesting within the Project area during construction have the potential to be injured or killed by Project-related activities. In addition to the direct "take" of nesting birds, nesting birds within the Project site or adjacent areas could be disturbed by Project-related activities resulting in nest abandonment. Projects that adversely affect the nesting success of raptors and migratory birds or result in the mortality of individual birds is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Nesting bird season is generally accepted as February 1 through August 31; however, Swainson's hawk nesting season is generally accepted as March 1 through September 15. For simplicity, these timeframes have been combined.

Implementation of the following measures would reduce potential impacts to nesting raptors, migratory birds, and special status birds, including Merlin, Mountain Plover, Northern Harrier, Swainson's Hawk, and Tricolored Blackbird to a less than significant level under CEQA, and would ensure compliance with State and federal laws protecting these avian species.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-1a (Avoidance):*** The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.
>
> ***Mitigation Measure BIO-1b (Pre-construction Surveys):*** If activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for Merlin, Mountain Plover, Northern Harrier, Swainson's Hawk, and Tricolored Blackbird nests onsite and within a 0.5-mile radius. These surveys will be conducted in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's hawk Technical Advisory Committee, 2000) or current guidance. In addition to the focused Swainson's hawk survey, a qualified biologist will conduct a pre-construction survey for all other nesting birds within 10 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. All raptor nests will be considered "active" upon the nest-building stage.
>
> ***Mitigation Measure BIO-1c (Establish Buffers):*** On discovery of any active nests near work areas, the biologist will determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged and are no longer dependent on the nest.

Mitigation Measure BIO-1d (WEAP Training): All personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, prior to initiating construction activities (including staging and mobilization). The specifics of this program will include identification of the special status species and suitable habitats, a description of the regulatory status and general ecological characteristics of the species, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. A fact sheet conveying this information, along with photographs or illustrations of the special status species, will also be prepared for distribution to all contractors, their employees, and all other personnel involved with construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.

Mitigation Measure BIO-1e (Minimization): The Project will observe all minimization and protective measures from the Construction and On-Going Operational Requirements including, but not limited to: construction speed limits, covering of pipes, installation of escape structures, restriction of herbicide and rodenticide use, proper disposal of food items and trash, prohibition of pets and firearms, and completion of an employee education program.

Implementation of Mitigation Measures ***BIO-1a*** through ***BIO-1e*** will reduce potential impacts to nesting birds and any other special status avian species to a less than significant level and will ensure compliance with State and federal laws protecting these resources.

Project-Related Mortality and/or Disturbance of Bald Eagles

Bald eagles are documented as recently occurring within the Project's vicinity. The bald eagle is protected under the California Endangered Species Act as well as fully protected by the federal Bald and Golden Eagle Protection Act in addition to the Migratory Bird Treaty Act and the California Fish and Game Code. The Bald and Golden Eagle Protection Act prohibits take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, or export/import of any eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. The term "take" includes to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

Project-related activities that result in injury, mortality, or disturbance to nesting, foraging, or roosting bald eagles would violate State and federal laws protecting these species and would be considered a significant impact under CEQA and NEPA.

In order to avoid and minimize potential Project-related impacts to Bald and Golden Eagles, the Project proponent will implement protective measures. Implementation of general mitigation measure BIO-1a (WEAP) listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of bald eagles, laws protecting the species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take." In addition to the mandatory training, the Project proponent will ensure implementation of the following measures in all work areas:

Mitigation Measure BIO-2a (Pre-construction Survey): If activities must occur within breeding season (February 1 to August 31), a qualified biologist will conduct pre-construction surveys for eagle nests within 30 days prior to the start of construction. The survey will include the proposed work area and surrounding lands within one mile. Eagle nests are considered "active" upon the nest-building stage.

Mitigation Measure BIO-2b (Establish Buffers): On discovery of an active eagle nest near work areas, the following no-disturbance buffers will be maintained around each nest: Bald Eagle: 660-foot no-disturbance buffer. If a 660-foot buffer zone is infeasible, the Project proponent will contact CDFW for guidance on how to proceed.

Mitigation Measure BIO-2c (Reporting): All detected eagle nests will be reported to CDFW and USFWS immediately. This includes any nest that has been used by a bald eagle in the past or is being used currently as a primary or alternate nest site. The discovery of any bald eagle carcasses and any non-lethal or lethal incidental "take" of these species will be reported to CDFW and USFWS immediately.

Implementation of mitigation measures **BIO-2a** through **BIO-2c** and mitigation measures **BIO-1a**, **BIO-1c,** and **BIO-1e** listed above, will avoid and minimize the Project's potential impacts to Bald Eagles to a less than significant level under CEQA and NEPA and will ensure compliance with State and federal laws protecting these species.

Project-Related Mortality and/or Disturbance of Special Status Mammals

San Joaquin kit foxes have been documented near the Project vicinity. Although frequent disturbance may deter this species, the species could still potentially forage or pass through the APE. If a San Joaquin kit fox were present onsite during ground-disturbance, it could be injured or killed by construction activities. Projects that result in the mortality of special status species are considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will further reduce potential impacts to the San Joaquin kit fox to a less than significant level under CEQA and will ensure compliance with State and federal laws protecting this species.

Mitigation. The following mitigation are derived from the *USFWS 2011 Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance*. The following measures will be implemented**:**

> ***Mitigation Measure BIO-3a (Pre-construction Survey):*** Within 30 days prior to the start of construction, a pre-construction survey for San Joaquin kit fox will be conducted on and within 200 feet of proposed work areas. If a potential San Joaquin kit fox den is detected within 200 feet or of construction activities, a Focused Survey will be performed in accordance with the *USFWS 2011 Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* by a qualified biologist to determine if the den is active or inactive and appropriate buffer zones will be placed to protect the dens, if found active. If the active dens cannot be avoided, CDFW and/or USFWS will be contacted to determine next steps.

> ***Mitigation Measure BIO-3b (Mortality Reporting):*** The Sacramento Field Office of USFWS and the Fresno Field Office of CDFW will be notified in writing within three working days in the case of the accidental death or injury to a San Joaquin kit fox during construction. Notification must include the date, time, and location of the incident and any other pertinent information.

Implementation of the above measures will reduce potential impacts to San Joaquin kit fox to a less than significant level and will ensure compliance with State and federal laws protecting this species.

Project-Related Mortality and/or Disturbance of Special Status Reptiles and Amphibians

Project construction activities will result in temporary disturbance to potential suitable and/or occupied habitat for giant garter snake and western spadefoot. Construction activities occurring within occupied habitat could result in injury, mortality, displacement, disturbance, or inhibit the movement of these species. Implementation of mitigation measure ***BIO-1d*** listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of special status reptiles with potential to occur onsite, laws protecting these species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take" or other significant impacts.

In addition to ***BIO-1d***, the Project proponent will ensure implementation of the following measures in to avoid and minimize potential individual impacts to special status amphibians during construction:

> ***Mitigation Measure BIO-4a (Pre-construction Survey):*** Within 10 days prior to the onset of construction activities, a qualified biologist will conduct pre-construction surveys for western spadefoot and giant garter snake individuals and suitable habitats within the proposed work area and surrounding

lands within 50 feet of canals and wetlands. If no individuals, active burrows, or suitable habits are observed during the preconstruction survey, then construction activities may begin. If construction is delayed or halted for more than 30 days, an additional pre-construction survey for western spadefoot and giant garter snake will be conducted. If the survey results in the identification of a western spadefoot or giant garter snake, the qualified biologist will determine if appropriate buffers can be implemented to avoid impacts to the individual(s).

Mitigation Measure BIO-4b (Biological Monitoring): If suitable habitat for western spadefoot and/or giant garter snake are identified during the pre-construction survey, a biological monitor will be required to oversee construction actives within the areas identified.

Implementation of mitigation measures **BIO-1d**, **BIO-4a,** and **BIO-4b** will avoid and minimize the Project's potential impacts to western spadefoot and giant garter snake to a less than significant level under CEQA.

Project-Related Mortality and/or Disturbance of California Tiger Salamander

Project construction activities will result in temporary disturbance to potential designated critical and/or sensitive habitat for California tiger salamander. Construction activities occurring within sensitive habitat could result in injury, mortality, displacement, disturbance, or inhibit the movement of this species. Implementation of mitigation measure ***BIO-1d*** listed above, requires each employee, worker, or visitor onsite to attend a mandatory training session, including printed educational materials regarding the conservation status of special status reptiles with potential to occur onsite, laws protecting these species, penalties for violation of those laws, and a list of required protective measures that must be employed to avoid "take" or other significant impacts.

In addition to ***BIO-1d***, the Project proponent will ensure implementation of the following measures in to avoid and minimize potential individual impacts to special status amphibians during construction:

Mitigation Measure BIO-5a (Avoidance): The Project's construction activities will occur, if feasible, between May 1 and September 30 (outside of wet season) in an effort to avoid impacts to California tiger salamander.

Mitigation Measure BIO-5b (Pre-construction Survey): If activities must occur within the wet season (October 1 to April 30), a qualified biologist will conduct pre-construction surveys for California tiger salamanders within 30 days prior to the start of construction. The survey will be conducted within the APE and sensitive habitat areas as identified in **Figure 4**.

Mitigation Measure BIO-5c (Exclusion fencing): The Project will install exclusion fencing around active construction to ensure California tiger salamanders do not enter the site during construction. Fencing will be installed as directed by a qualified biologist prior to ground disturbing activities in areas deemed sensitive habitat for California tiger salamander (See **Figure 4**).

Mitigation Measure BIO-5d (Equipment and materials): The Project will check all equipment and materials for California tiger salamanders, daily, prior to the beginning of construction activities. Further, any trenches with walls too steep for a salamander to exit, will be completely covered at the end of each day or provide escape ladders and inspected before each work day.

Mitigation Measure BIO-5e (Formal Consultation): If any California tiger salamanders are observed during construction, work in the area will stop immediately. A qualified wildlife biologist, approved to handle and remove California tiger salamander will be called to identify and remove the species. If take of any individual California tiger salamanders occurs, work will stop, and USFWS will be notified immediately, before more construction proceeds.

Project-Related Impacts to Special Status Plant Species

In reviewing the CNDDB and IPaC, the special status plant species Greene's tuctoria, San Joaquin Orcutt grass, and succulent owl's clover, were identified to occur within or adjacent to the APE and/or have designated critical habitat within the APE. The APE survey was conducted outside the blooming season for these plants. It is recommended a more detailed survey be conducted inside the blooming season.

Projects that adversely affect special status plants or result in the mortality of special status plants is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will reduce potential impacts to special status plants to a less than significant level under CEQA and will ensure compliance with state and federal laws protecting these plant species.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-6a (Pre-Construction Survey):*** A qualified botanist/biologist will conduct focused botanical surveys for the three special status plants listed above, according to CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018).
>
> ***Mitigation Measure BIO-6b (Avoidance):*** If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.
>
> ***Mitigation Measure BIO-6c (Formal Consultation):*** If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, the Project proponent will initiate consultation with CDFW and/or USFWS. If CDFW and/or USFWS determines that "take" cannot be avoided, the Project proponent may be required to obtain an Incidental Take Permit.

Project-Related Impacts to Wildlife Movement Corridors and Native Wildlife Nursery Sites.

Proximity to the Sierra Nevada foothills and other high quality grassland habitats makes it likely that a variety of wildlife migrate through the region. Dry streambeds and canal banks can function as passages through highly disturbed areas within the San Joaquin Valley. Agricultural activities would deter wildlife from using these corridors during the day, though these deterrents are absent at night. The following mitigation measures would reduce impacts to nocturnal wildlife movement to a less than significant level.

Mitigation. The following measures would be implemented during or prior to the start of construction:

> ***Mitigation Measure BIO-7a (Operational Hours):*** Construction activities will be limited to daylight hours to reduce potential impacts to wildlife movement corridors.
>
> ***Mitigation Measure BIO-7b (Wildlife Access):*** At no point will access along the MID canal be blocked on parallel sections of bank at the same time overnight. If construction is occurring on both banks during the day, a wildlife access route through the construction area will be identified before sunset.
>
> ***Mitigation Measure BIO-7c (Cover Excavations)***: Pipeline/culvert/siphon excavations and vertical pipes shall be covered each night to prevent wildlife from falling in and becoming trapped or injured during migratory or dispersal movements. The existing canal is precluded from this mitigation since the banks are not steep enough to prevent wildlife from escaping.

Project-Related Impacts to Local Policies or Habitat Conservation Plans.

The Project appears to be largely consistent with the goals and policies of the Merced County General Plan. The only trees identified for removal during the Project include a cluster of black walnuts adjacent to the Deadman Creek crossing. Since this is not a native tree species, mitigation is not warranted beyond mitigation measures **BIO-1a**, **BIO-1b**, and **BIO-1c**. Protection of wildlife movement corridors is addressed mitigation measures **BIO-7a**, **BIO-7b**, and **BIO-7c**. The two wetlands identified during the survey are not currently within the construction area, although the widening of portions of the MID canal could potentially impact these areas. In order to avoid potentially significant impacts to wetlands, the following mitigation measures will be implemented.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-8a (Avoidance):*** No construction activities will occur on the banks adjacent to the two wetlands (Wetland A and Wetland B) identified within the ARD.

Lastly, there are no known habitat conservation plans (HCPs) or a Natural Community Conservation Plan (NCCP) in the Project vicinity.

Project-Related Impacts to Critical Habitat.

Designated critical habitat is present within the Project area and surrounding lands, including habitat for California tiger salamander, conservancy fairy shrimp, Greene's tuctoria, San Joaquin Valley Orcutt grass, succulent owl's-clover, vernal pool fairy shrimp, and vernal pool tadpole shrimp. Mitigation measures ***BIO-5a – 5e*** and ***BIO-6a – 6c*** will avoid and minimize the Project's potential impacts to California tiger salamander, Greene's tuctoria, San Joaquin Valley Orcutt grass, and succulent owl's-clover. Habitats within the Project boundaries are unsuitable for vernal pool shrimp species (agricultural canal, agricultural orchards, grazing lands, and permanent wetland), therefore further mitigation is not warranted.

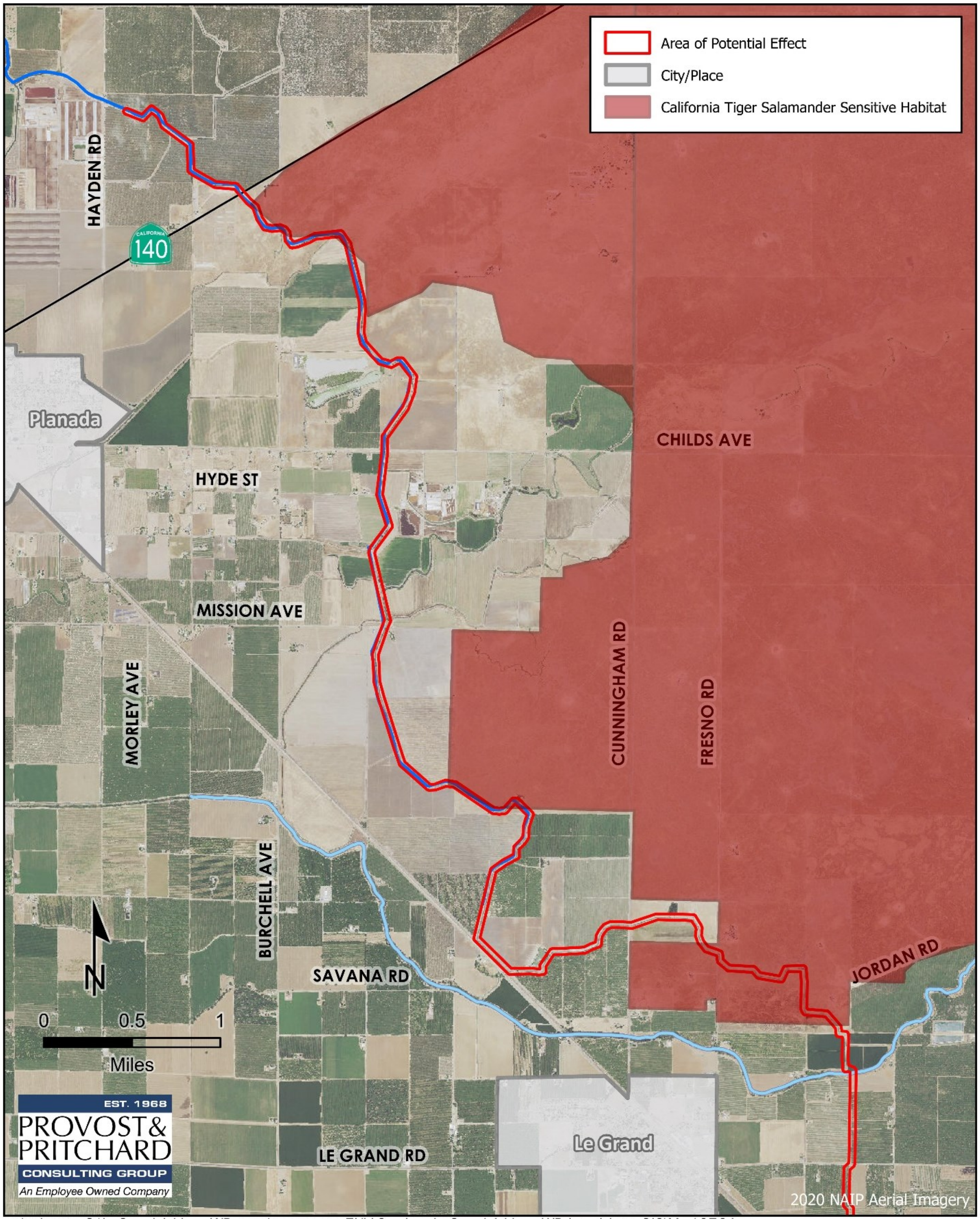

Figure 4. California Tiger Salamander Sensitive Habitat

Less Than Significant Project-Related Impacts

Project-Related Impacts to Special Status Animal Species Absent From, or Unlikely to Occur on, the Project Site

Of the 25 regionally occurring special status animal species, 15 are considered absent from or unlikely to occur within the Project area due to past or ongoing disturbance and/or the absence of suitable habitat. As explained in **Table 1**, the following species were deemed absent from the Project site: Ferruginous Hawk (*Buteo regalis*), Foothill yellow-legged frog (*Rana boylii*), Hardhead (*Mylopharodon conocephalus*), Pallid bat (*Antrozous pallidus*), Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus pop.11*), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Western mastiff bat (*Eumops perotis californicus*), and Western red bat(*Lasiurus blossevillii*), and the following species were deemed unlikely to occur within the APE: American badger (*Taxidea taxus*), Burrowing Owl (*Athene cunicularia*), California tiger salamander (*Ambystoma californiense*), Conservancy fairy shrimp (*Branchinecta conservatio*), Crotch bumble bee (*Bombus crotchii*), Vernal pool fairy shrimp (*Branchinecta lynchi*), Vernal pool tadpole shrimp (*Lepidurus packardi*), and Western pond turtle (*Emys marmorata*). Since it is highly unlikely that these species would occur onsite, implementation of the Project should have no impact on these special status species through construction mortality, disturbance, or loss of habitat. Further mitigation measures are not warranted.

Project-Related Impacts to Special Status Plant Species

29 of the 32 of the special status plant species which have been documented in the Project vicinity are considered absent from or unlikely to occur within the Project area due to past or ongoing disturbance and/or the absence of suitable habitat. As explained in **Table 2**, the following species were deemed absent from the Project site: Alkali-sink goldfields (*Lasthenia chrysantha*), Beaked clarkia (*Clarkia rostrata*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), Dwarf downingia (*Downingia pusilla*), Forked hare-leaf (*Lagophylla dichotoma*), Hairy Orcutt grass (*Orcuttia pilosa*), Hartweg's golden sunburst (*Pseudobahia bahifolia*), Henderson's bent grass (*Agrostis hendersonii*), Hoover's cryptantha (*Cryptantha hooveri*), Keck's checkerbloom (*Sidalcea keckii*), Madera leptosiphon (*Leptosiphon serrulatus*), Mariposa cryptantha (*Cryptantha mariposae*), Munz's tidy-tips (*Layia munzii*), recurved larkspur (*Delphinium recurvatum*), Shaggyhair lupine (*Lupinus spectabilis*), Subtle orache (*Atriplex subtilis*), Watershield (*Brasenia schreberi*), and the following species were deemed unlikely to occur within the APE: California alkali grass (*Puccinellia simplex*), Colusa grass (*Neostapfia colusana*), Heartscale (*Atriplex cordulata var. cordulata*), Hoover's calycadenia (*Calycadenia hooveri*), Lesser saltscale (*Atriplex minuscula*), Merced phacelia (*Phacelia ciliata var. opaca*), Pincushion navarettia (*Navarretia myersii spp. myersii*), Sanford's arrowhead (*Sagittaria sanfordii*), Shining navarretia (*Navarretia nigelliformis ssp. radians*), Spiny-sepaled button-celery (*Eryngium spinosepalum*), and Vernal pool smallscale (*Atriplex persistens*). Since it is highly unlikely that these species would occur onsite, implementation of the Project should have no impact on these special status species through construction mortality, disturbance, or loss of habitat. Further mitigation measures are not warranted.

Project-Related Impacts to Riparian Habitat and Natural Communities of Special Concern

There are no CNDDB-designated "natural communities of special concern" recorded within the Project area or surrounding lands. Mitigation is not warranted.

Project-Related Impacts to Regulated Waters, Wetlands, and Water Quality.

The Project involves open cut trenches to install 84-inch culverts beneath Mariposa, Little Deadman, Deadman, and Dutchman Creeks. The Project will also install 36-inch turnout discharges into Little Deadman and Deadman Creeks, and an 84-inch turnout discharge to Dutchman Creek. Mariposa Creek and Dutchman Creek are both ephemeral creeks with downstream connections to the San Joaquin River, a Water of the United States. Therefore, it is reasonable to assume that USACE would claim jurisdiction over these waterways. Under the most recent updates to WOTUS rules, Deadman and Little Deadman creeks are also protected despite being isolated with no connections to jurisdictional water bodies. An Aquatic Resources Delineation was conducted on August 20, 2021, to evaluate the site for potential Waters of the United States and delineate potential jurisdictional boundaries of these features. The investigation and delineation were conducted in accordance with the 1987 *Corps of Engineers Wetland Delineation Manual*, and the *Arid West Regional Supplement*. The field work revealed two areas which met all three criteria of a wetland: hydric soils, hydrophytic vegetation, and wetland hydrology. These areas included two isolated wetlands adjacent to the Le Grand canal. Hydrologic indicators of ordinary high-water mark such as knickpoints, vegetation, gravel sheets, and drift were used to map the limits of potential USACE jurisdiction of the creeks.

The creeks and river within the APE, below the OHWM, would fall under the jurisdiction of USACE and construction activities in this area would be subject to USACE permit requirements pursuant to Section 404 of the CWA. This Project may be authorized under a Nationwide Permit but could require an individual permit if Nationwide Permit limits are exceeded. In addition, a Section 401 Water Quality Certification from the RWQCB is required for dredge and fill of waters of the State and activities must meet State water quality standards. These permits and certifications are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values.

If the Project's construction work will result in impacts to Waters of the United States the Project proponent will be required to secure permits from USACE and RWQCB. Compliance with each permit requires avoidance, minimization, and mitigation measures to ensure that Project-related impacts to these potentially jurisdictional waters are less-than-significant in nature or are fully mitigated.

Project activities with potential to alter the creeks including the bed, bank, floodplain and associated riparian habitat, and would be within CDFWs jurisdiction, pursuant to Section 1602 of the California Fish and Game Code. The Project proponent is required to notify CDFW if the Project's activities have potential to impact rivers, streams, or the riparian corridor of any aquatic features onsite that may be beneficial to fish or wildlife resources. If CDFW determines that the Project could potentially adversely affect fish and wildlife resources and/or riparian habitat, a Lake or Streambed Alteration (LSA) Agreement will be issued prior to construction. LSA Agreements are typically issued with mandatory avoidance and minimization measures, protective measures for special status species, and required compensatory mitigation for removal of riparian trees, shrubs, and herbaceous cover along the banks. Compliance with measures of the LSA Agreement will ensure that the Project's impacts to aquatic features and riparian habitat within CDFW's jurisdiction remain less-than-significant or are fully mitigated.

There are no designated wild and scenic rivers within the Project area; therefore, the Project will not result in direct impacts to wild and scenic rivers. Compliance with USACE, RWQCB, and CDFW permits, certifications, and agreements will ensure there are no indirect downstream effects to water quality.

I. References

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Appendix A: Photos of the Project Area

LEGRAND-ATHLONE WATER DISTRICT

CANAL INTERTIE PROJECT

Photograph 1

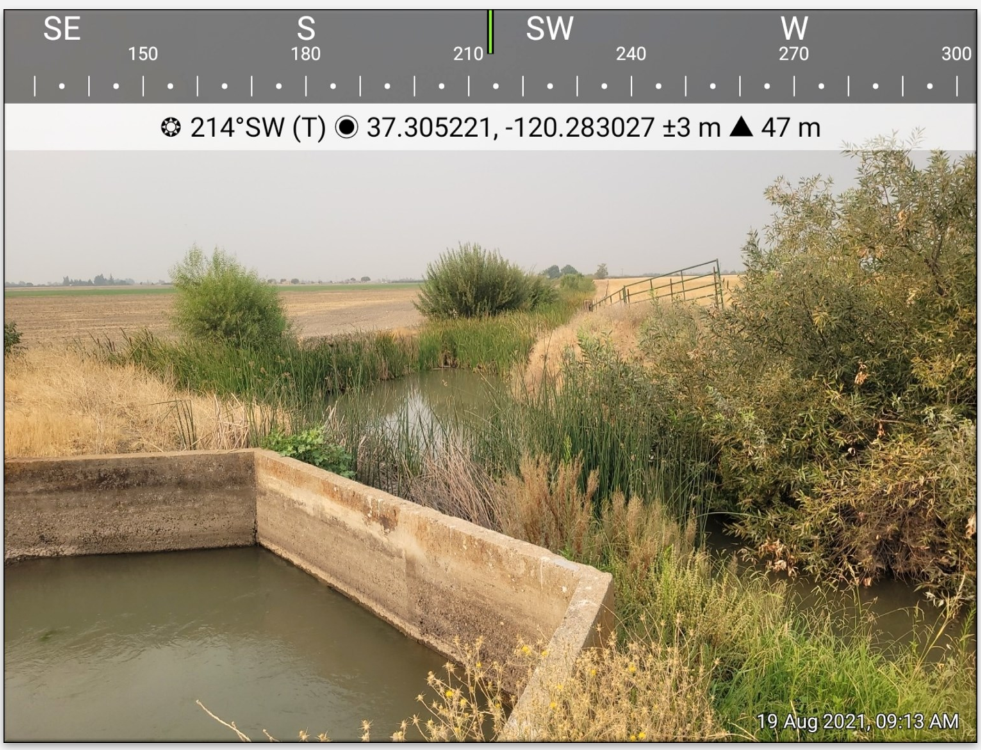
Photograph was taken facing east. Photograph shows overview of LeGrand Canal near northern boundary.

Photograph 2

Photograph was taken facing southeast. Photograph shows agricultural land bordering APE.

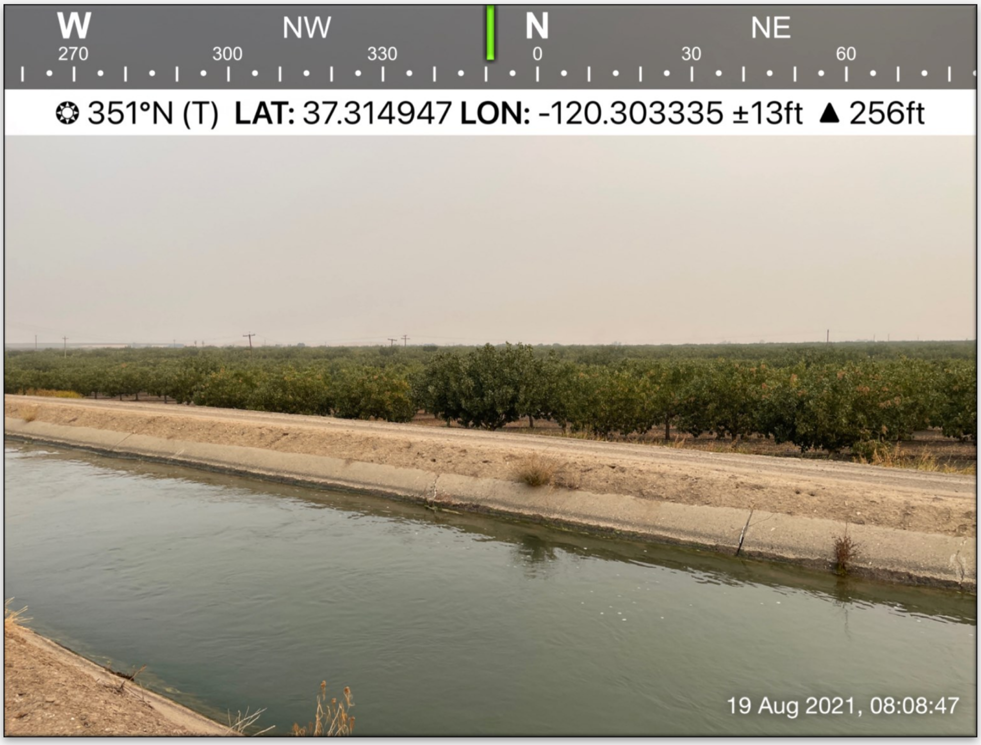
Photograph 3

Photograph was taken facing north. Photograph shows water pumping into LeGrand Canal.



Photograph 4

Photograph was taken facing southwest. Photograph shows riparian habitat bordering canal.



Photograph 5

Photograph was taken facing north. Photograph shows a LeGrand Canal bordered by agricultural almond trees. The majority of the APE resembles this photograph.

Photograph 6

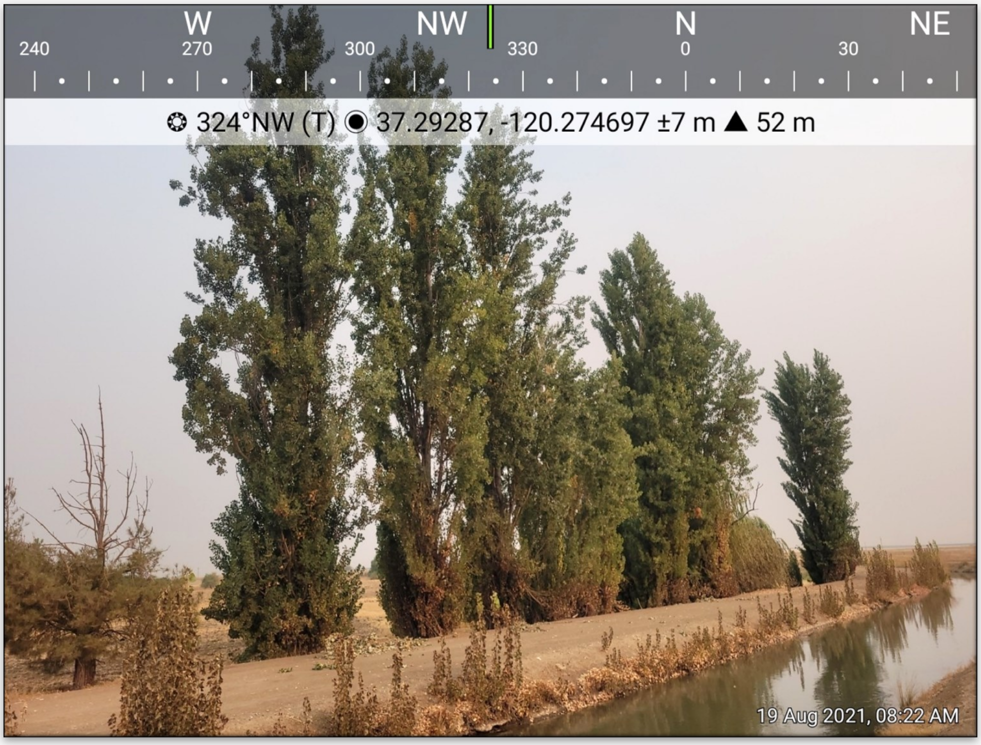
Photograph was taken facing northeast. Photograph shows Fremont cottonwoods bordering canal and agricultural land.

Photograph 7

Photograph was taken facing north. Photograph shows Great Egret utilizing LeGrand Canal and surrounding agriculture as foraging habitat.

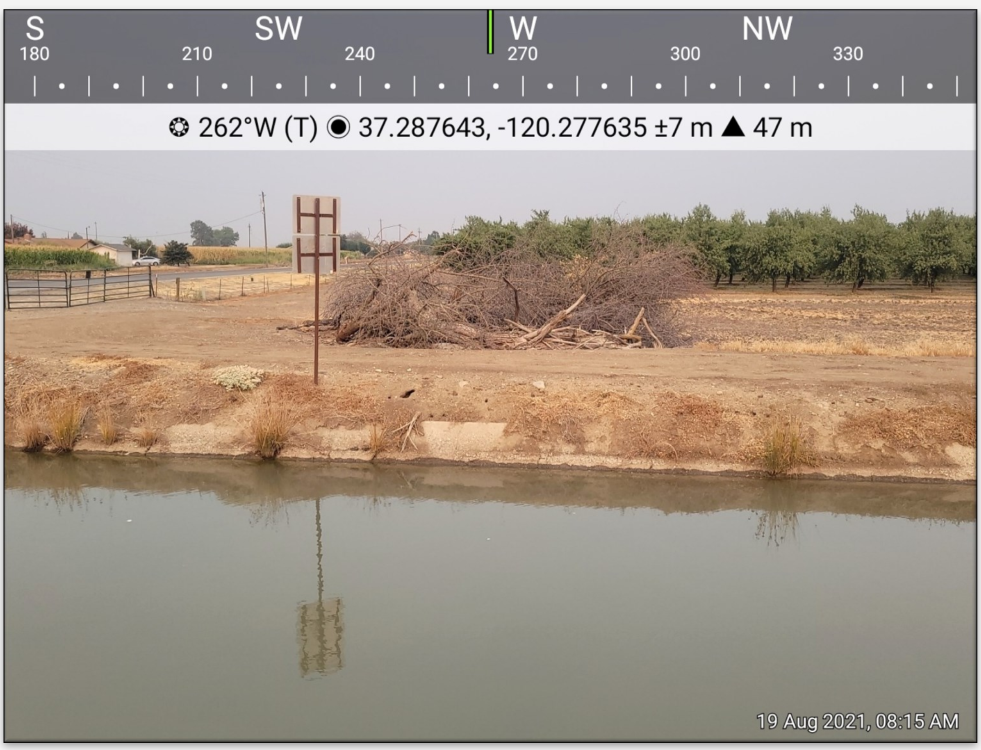
Photograph 8

Photograph was taken facing north. Photograph shows burrow likely created by ground squirrels.



Photograph 9

Photograph was taken facing northwest. Photograph shows Fremont cottonwoods near LeGrand Canal.



Photograph 10

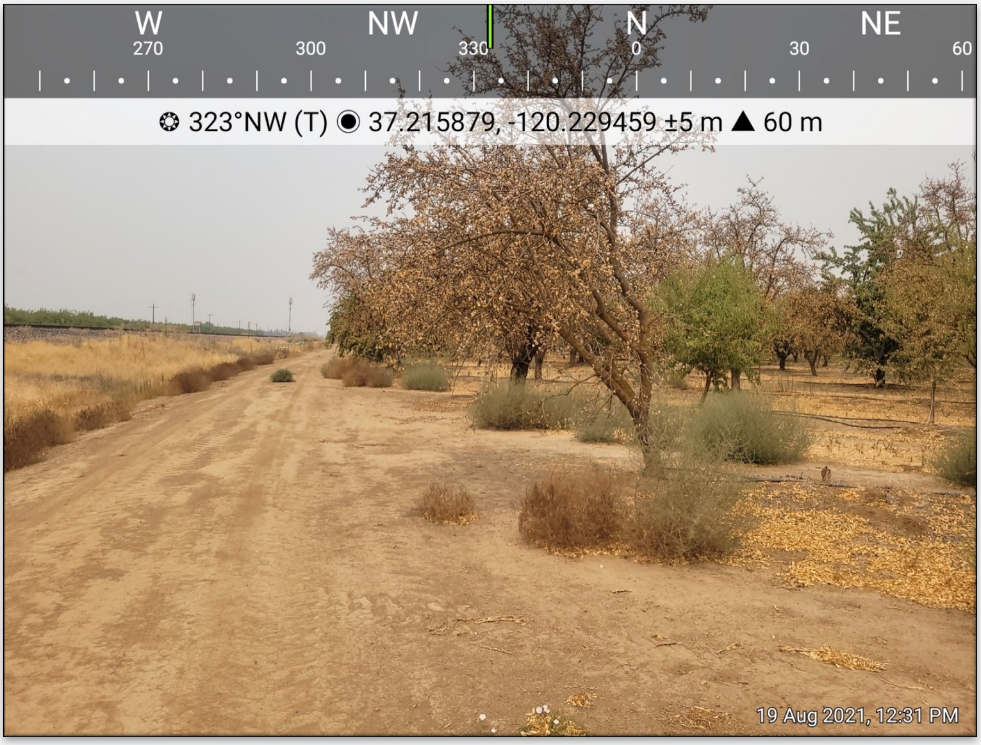
Photograph was taken facing west. Photograph shows piled trees near agricultural fields.

Photograph 11

Photograph was taken facing southeast. Photograph shows road crossing directly over canal through APE.

Photograph 12

Photograph was taken facing south. Photograph shows agricultural uses of APE habitat.



Photograph 13

Photograph was taken facing northwest. Photograph shows agriculture, vegetation, and railroad tracks through APE.

Photograph 14

Photograph was taken facing northeast. Photograph shows disturbed grassy habitat near Deadman Creek.

Photograph 15

Photograph was taken facing west. Photograph shows railroad tracks through APE.

Photograph 16

Photograph was taken facing east. Photograph shows disturbed agricultural use surrounding LeGrand Canal within APE.

Photograph 17

Photograph was taken facing south. Photograph shows ordinary high water mark and steep slopes of Mariposa Creek.

Photograph 18

Photograph was taken facing southeast. Photograph shows sandy soils and riparian vegetation of Mariposa Creek.

Photograph 19

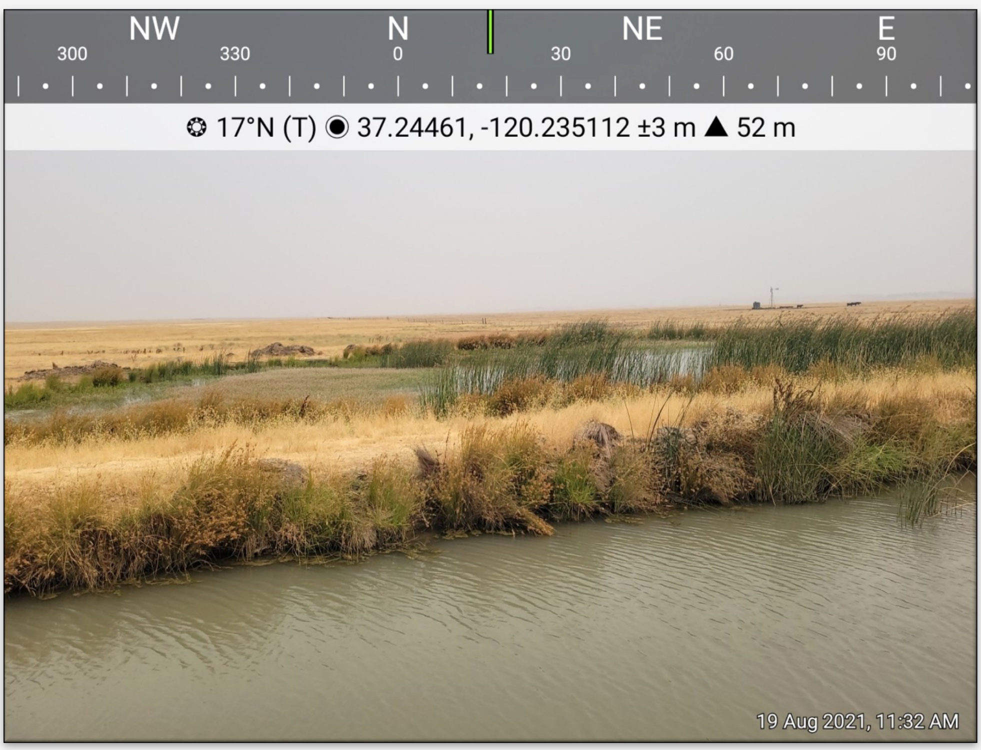
Photograph was taken facing northeast. Photograph shows riparian vegetation of Deadman Creek.

Photograph 20

Photograph was taken facing south. Photograph shows potential muskrat lodge currently occupied by ground squirrels during time of survey.

Photograph 21

Overview of Wetland B facing south-southwest.

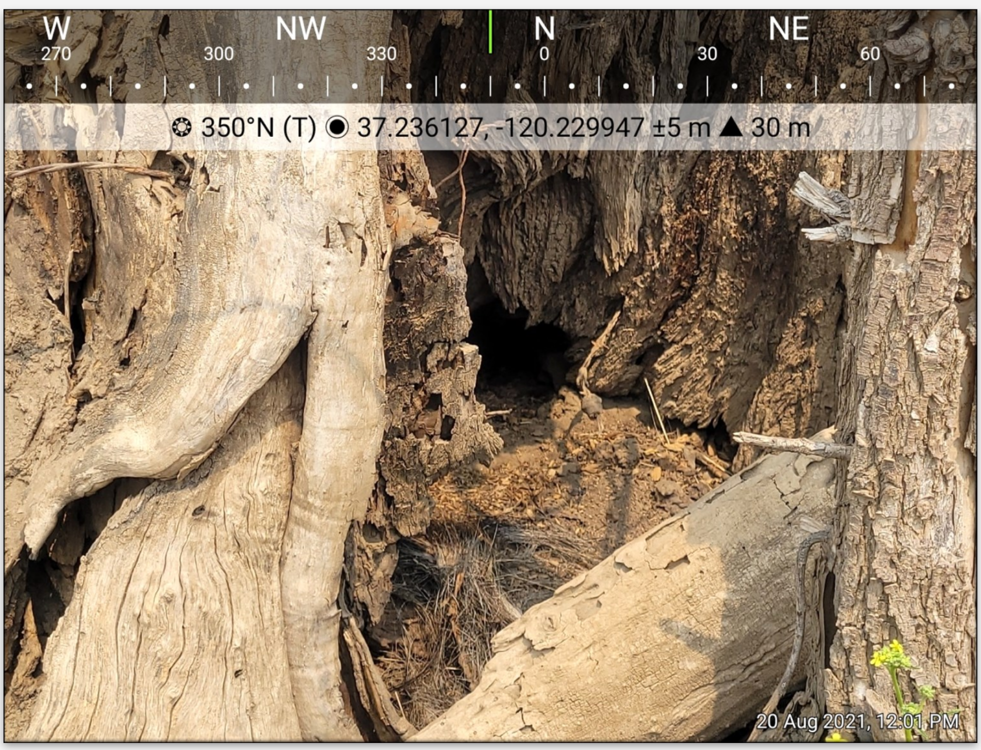


Photograph 22

Overview of Wetland A facing north-northeast.

Photograph 23

Overview of Mariposa Creek facing northeast.



Photograph 24

Overview of a hollow tree stump on the northern bank of Mariposa Creek. A patch of skunk fur is visible in the foreground.

Appendix B: CNDDB 16-Quad Search

LEGRAND-ATHLONE WATER DISTRICT

CANAL INTERTIE PROJECT

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Yosemite Lake (3712044) OR Haystack Mtn. (3712043) OR Indian Gulch (3712042) OR Catheys Valley (3712041) OR Illinois Hill (3712031) OR Raynor Creek (3712021) OR Kismet (3712011) OR Berenda (3712012) OR Chowchilla (3712013) OR Bliss Ranch (3712014) OR El Nido (3712024) OR Merced (3712034) OR Planada (3712033) OR Owens Reservoir (3712032) OR Le Grand (3712022) OR Plainsburg (3712023))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
alkali-sink goldfields *Lasthenia chrysantha*	PDAST5L030	None	None	G2	S2	1B.1
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
beaked clarkia *Clarkia rostrata*	PDONA050Y0	None	None	G2G3	S2S3	1B.3
Boggs Lake hedge-hyssop *Gratiola heterosepala*	PDSCR0R060	None	Endangered	G2	S2	1B.2
burrowing owl *Athene cunicularia*	ABNSB10010	None	None	G4	S3	SSC
California alkali grass *Puccinellia simplex*	PMPOA53110	None	None	G3	S2	1B.2
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
California tiger salamander *Ambystoma californiense*	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Colusa grass *Neostapfia colusana*	PMPOA4C010	Threatened	Endangered	G1	S1	1B.1
Conservancy fairy shrimp *Branchinecta conservatio*	ICBRA03010	Endangered	None	G2	S2	
Crotch bumble bee *Bombus crotchii*	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
dwarf downingia *Downingia pusilla*	PDCAM060C0	None	None	GU	S2	2B.2
ferruginous hawk *Buteo regalis*	ABNKC19120	None	None	G4	S3S4	WL
foothill yellow-legged frog *Rana boylii*	AAABH01050	None	Endangered	G3	S3	SSC
forked hare-leaf *Lagophylla dichotoma*	PDAST5J070	None	None	G2	S2	1B.1
giant gartersnake *Thamnophis gigas*	ARADB36150	Threatened	Threatened	G2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Greene's tuctoria *Tuctoria greenei*	PMPOA6N010	Endangered	Rare	G1	S1	1B.1
hairy Orcutt grass *Orcuttia pilosa*	PMPOA4G040	Endangered	Endangered	G1	S1	1B.1
hardhead *Mylopharodon conocephalus*	AFCJB25010	None	None	G3	S3	SSC
Hartweg's golden sunburst *Pseudobahia bahiifolia*	PDAST7P010	Endangered	Endangered	G1	S1	1B.1
heartscale *Atriplex cordulata var. cordulata*	PDCHE040B0	None	None	G3T2	S2	1B.2
Henderson's bent grass *Agrostis hendersonii*	PMPOA040K0	None	None	G2Q	S2	3.2
hoary bat *Lasiurus cinereus*	AMACC05030	None	None	G3G4	S4	
Hoover's calycadenia *Calycadenia hooveri*	PDAST1P040	None	None	G2	S2	1B.3
Hoover's cryptantha *Cryptantha hooveri*	PDBOR0A190	None	None	GH	SH	1A
Keck's checkerbloom *Sidalcea keckii*	PDMAL110D0	Endangered	None	G2	S2	1B.1
lesser saltscale *Atriplex minuscula*	PDCHE042M0	None	None	G2	S2	1B.1
Madera leptosiphon *Leptosiphon serrulatus*	PDPLM09130	None	None	G3	S3	1B.2
Mariposa cryptantha *Cryptantha mariposae*	PDBOR0A1Q0	None	None	G2G3	S2S3	1B.3
Merced kangaroo rat *Dipodomys heermanni dixoni*	AMAFD03062	None	None	G4T2T3	S2S3	
Merced phacelia *Phacelia ciliata var. opaca*	PDHYD0C0S2	None	None	G5TH	SH	3.2
merlin *Falco columbarius*	ABNKD06030	None	None	G5	S3S4	WL
midvalley fairy shrimp *Branchinecta mesovallensis*	ICBRA03150	None	None	G2	S2S3	
moestan blister beetle *Lytta moesta*	IICOL4C020	None	None	G2	S2	
molestan blister beetle *Lytta molesta*	IICOL4C030	None	None	G2	S2	
mountain plover *Charadrius montanus*	ABNNB03100	None	None	G3	S2S3	SSC
Munz's tidy-tips *Layia munzii*	PDAST5N0B0	None	None	G2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
North American porcupine *Erethizon dorsatum*	AMAFJ01010	None	None	G5	S3	
Northern Hardpan Vernal Pool *Northern Hardpan Vernal Pool*	CTT44110CA	None	None	G3	S3.1	
northern harrier *Circus hudsonius*	ABNKC11011	None	None	G5	S3	SSC
pallid bat *Antrozous pallidus*	AMACC10010	None	None	G4	S3	SSC
pincushion navarretia *Navarretia myersii ssp. myersii*	PDPLM0C0X1	None	None	G2T2	S2	1B.1
Pleasant Valley mariposa-lily *Calochortus clavatus var. avius*	PMLIL0D095	None	None	G4T2	S2	1B.2
recurved larkspur *Delphinium recurvatum*	PDRAN0B1J0	None	None	G2?	S2?	1B.2
San Joaquin kit fox *Vulpes macrotis mutica*	AMAJA03041	Endangered	Threatened	G4T2	S2	
San Joaquin pocket mouse *Perognathus inornatus*	AMAFD01060	None	None	G2G3	S2S3	
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	PMPOA4G060	Threatened	Endangered	G1	S1	1B.1
Sanford's arrowhead *Sagittaria sanfordii*	PMALI040Q0	None	None	G3	S3	1B.2
shaggyhair lupine *Lupinus spectabilis*	PDFAB2B3P0	None	None	G2	S2	1B.2
shining navarretia *Navarretia nigelliformis ssp. radians*	PDPLM0C0J2	None	None	G4T2	S2	1B.2
spiny-sepaled button-celery *Eryngium spinosepalum*	PDAPI0Z0Y0	None	None	G2	S2	1B.2
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	
subtle orache *Atriplex subtilis*	PDCHE042T0	None	None	G1	S1	1B.2
succulent owl's-clover *Castilleja campestris var. succulenta*	PDSCR0D3Z1	Threatened	Endangered	G4?T2T3	S2S3	1B.2
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S3	
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T2	S3	
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
vernal pool smallscale *Atriplex persistens*	PDCHE042P0	None	None	G2	S2	1B.2
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G4	S3S4	
watershield *Brasenia schreberi*	PDCAB01010	None	None	G5	S3	2B.3
western mastiff bat *Eumops perotis californicus*	AMACD02011	None	None	G4G5T4	S3S4	SSC
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western red bat *Lasiurus blossevillii*	AMACC05060	None	None	G4	S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G2G3	S3	SSC
Yuma myotis *Myotis yumanensis*	AMACC01020	None	None	G5	S4	

Record Count: 67

Appendix C: NRCS Soils Report

LEGRAND-ATHLONE WATER DISTRICT

CANAL INTERTIE PROJECT

USDA United States Department of Agriculture

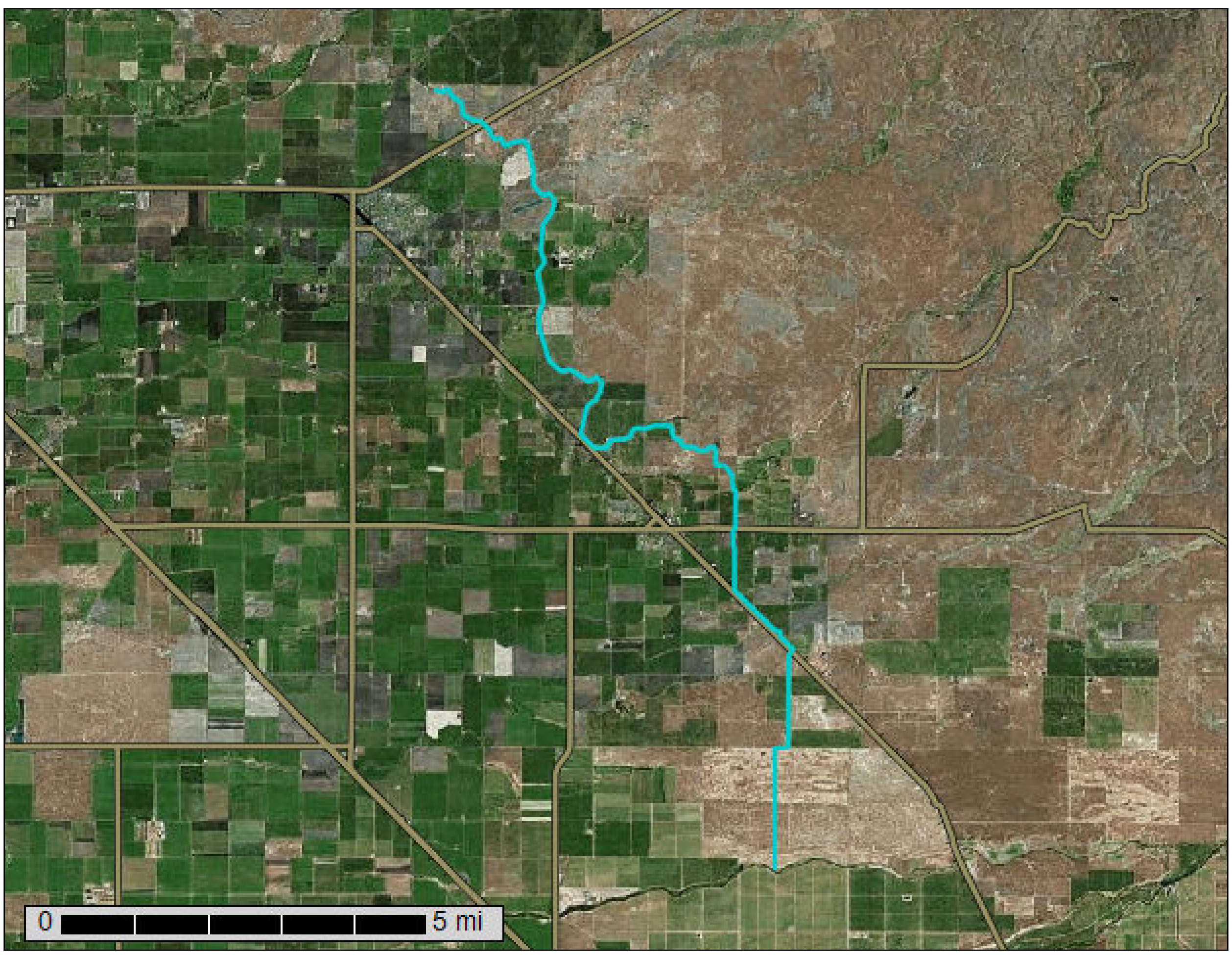
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Madera Area, California, and Merced Area, California



September 2, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

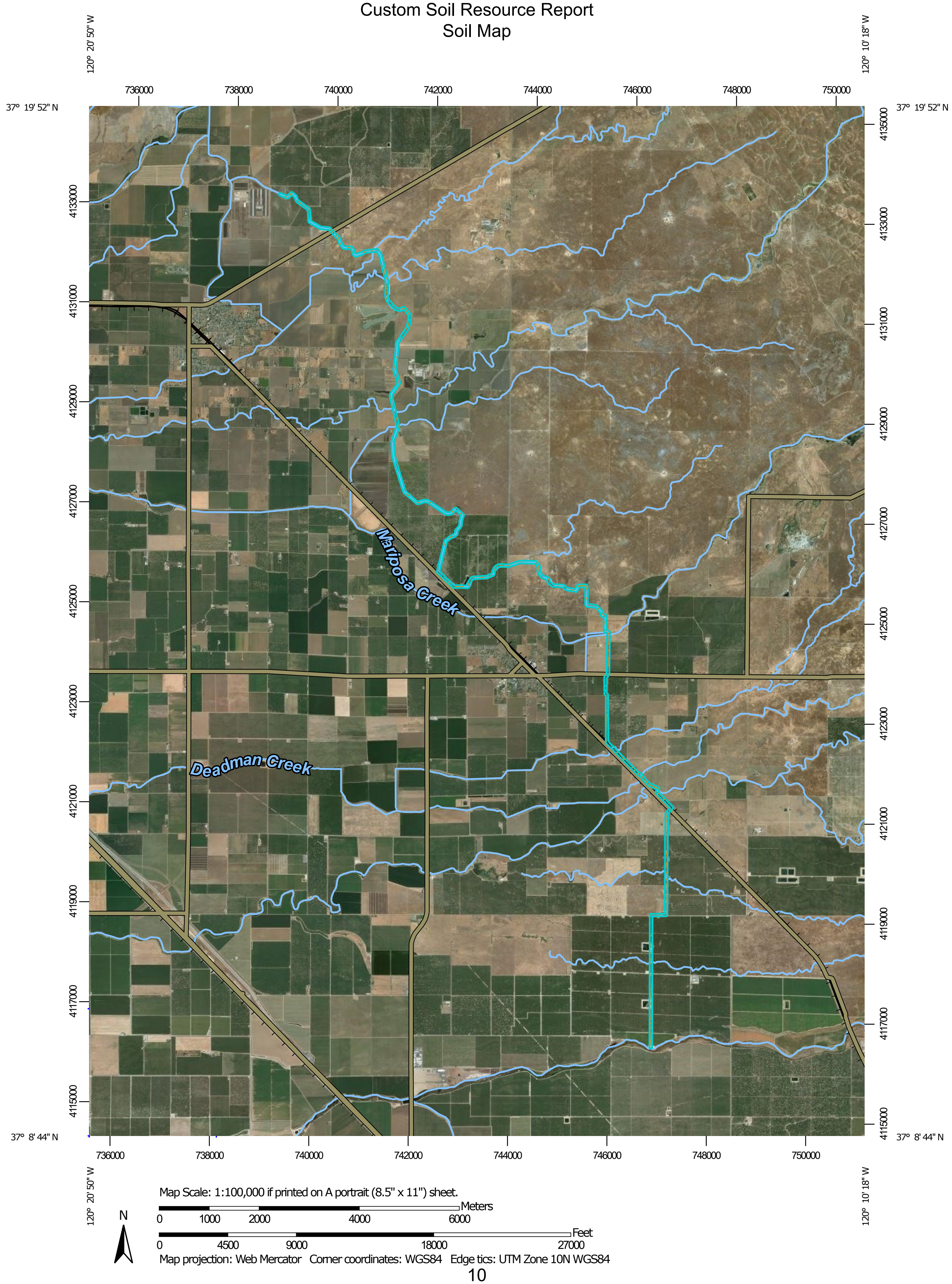
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:100,000 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 4500, 9000, 18000, 27000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Madera Area, California
Survey Area Data: Version 14, Jun 1, 2020

Soil Survey Area: Merced Area, California
Survey Area Data: Version 15, May 29, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 21, 2015—Mar 11, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GvB	Greenfield sandy loam, moderately deep and deep over hardpan, 3 to 8 percent slopes	0.1	0.0%
MaA	Madera fine sandy loam, 0 to 3 percent slopes	0.0	0.0%
Rh	Riverwash	2.1	0.6%
Subtotals for Soil Survey Area		**2.2**	**0.6%**
Totals for Area of Interest		**341.1**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2HB	Hopeton clay, 0 to 8 percent slopes	5.0	1.5%
3HA	Hopeton clay loam, 0 to 3 percent slopes	1.4	0.4%
AaA	Alamo clay, 0 to 1 percent slopes	2.3	0.7%
BcA	Bear Creek loam, 0 to 3 percent slopes	0.1	0.0%
BnA	Burchell silty clay loam, 0 to 1 percent slopes	2.1	0.6%
GfA	Greenfield sandy loam, deep over hardpan, 0 to 3 percent slopes	2.4	0.7%
HeA	Hanford sandy loam, 0 to 1 percent slopes	1.0	0.3%
HrA	Honcut fine sandy loam, 0 to 1 percent slopes	2.7	0.8%
HtA	Honcut silt loam, 0 to 1 percent slopes	3.0	0.9%
KaB	Keyes gravelly clay loam, 0 to 8 percent slopes	4.2	1.2%
KbB	Keyes gravelly loam, 0 to 8 percent slopes	4.8	1.4%
KcB	Keyes-Pentz gravelly loam, 0 to 8 percent slopes	23.2	6.8%
MaA	Madera fine sandy loam, 0 to 3 percent slopes	3.2	0.9%
MbA	Madera loam, 0 to 1 percent slopes	6.7	2.0%
MdA	Madera sandy loam, 0 to 3 percent slopes	1.0	0.3%
MdB	Madera sandy loam, 3 to 8 percent slopes	4.1	1.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MeA	Marguerite loam, 0 to 1 percent slopes	3.3	1.0%
MgA	Marguerite silty clay loam, deep over hardpan, 0 to 1 percent slopes	4.0	1.2%
PaA	Pachappa fine sandy loam, 0 to 1 percent slopes	3.3	1.0%
PkB	Pentz gravelly loam, 0 to 8 percent slopes	6.9	2.0%
PoD	Peters cobbly clay, 8 to 30 percent slopes	0.1	0.0%
PwA	Porterville clay, o to 3 percent slopes	39.9	11.7%
PwB	Porterville clay, 3 to 8 percent slopes	0.6	0.2%
RaA	Raynor clay, 0 to 3 percent slopes	38.2	11.2%
RaB	Raynor clay, 3 to 8 percent slopes	0.7	0.2%
RbA	Raynor cobbly clay, 0 to 3 percent slopes	23.0	6.7%
RbB	Raynor cobbly clay, 3 to 8 percent slopes	9.6	2.8%
ReB	Redding gravelly loam, 0 to 8 percent slopes, dry	26.4	7.7%
RtA	Ryer silt loam, 0 to 3 percent slopes	1.2	0.4%
ScA	San Joaquin sandy loam, 0 to 3 percent slopes, MLRA 17	28.2	8.3%
ScB	San Joaquin sandy loam, 3 to 8 percent slopes	8.8	2.6%
SdA	San Joaquin-Alamo complex, 0 to 3 percent slopes	3.0	0.9%
SgA	Seville clay, 0 to 3 percent slopes	10.3	3.0%
TuA	Tujunga sand, 0 to 3 percent slopes	1.4	0.4%
W	Water	0.8	0.2%
WkB	Whitney sandy loam, 3 to 8 percent slopes	15.1	4.4%
WmB2	Whitney and Rocklin soils, 3 to 8 percent slopes, eroded	2.5	0.7%
WrA	Wyman loam, 0 to 3 percent slopes	8.0	2.3%
WsA	Wyman loam, deep over hardpan, 0 to 3 percent slopes	19.4	5.7%
YcA	Yokohl loam, 0 to 3 percent slopes	4.8	1.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
YdA	Yolo loam, 0 to 5 percent slopes, dry, MLRA 17	8.6	2.5%
YeA	Yolo loam, deep over hardpan, 0 to 1 percent slopes	3.6	1.0%
Subtotals for Soil Survey Area		**338.9**	**99.4%**
Totals for Area of Interest		**341.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Madera Area, California

GvB—Greenfield sandy loam, moderately deep and deep over hardpan, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: hk7m
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 23 inches: sandy loam
H2 - 23 to 40 inches: sandy loam
H3 - 40 to 60 inches: cemented

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

San joaquin

Percent of map unit: 5 percent
Hydric soil rating: No

MaA—Madera fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hk8f
Elevation: 20 to 250 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Madera and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madera

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 18 inches: sandy clay loam
H3 - 18 to 25 inches: clay
H4 - 25 to 28 inches: indurated
H5 - 28 to 60 inches: stratified coarse sandy loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 25 to 28 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Cometa
Percent of map unit: 5 percent
Hydric soil rating: No

Rocklin
Percent of map unit: 5 percent
Hydric soil rating: No

San joaquin
Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, ponded
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Rh—Riverwash

Map Unit Composition
Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting
Landform: Flood plains
Parent material: Sandy and gravelly alluvium

Typical profile
H1 - 0 to 6 inches: sand
H2 - 6 to 60 inches: stratified coarse sand to sandy loam

Properties and qualities
Slope: 0 to 1 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone

Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

Merced Area, California

2HB—Hopeton clay, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjqn
Elevation: 50 to 300 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 150 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hopeton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hopeton

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: clay
H2 - 12 to 27 inches: clay
H3 - 27 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Redding

Percent of map unit: 10 percent
Hydric soil rating: No

Corning

Percent of map unit: 5 percent
Hydric soil rating: No

3HA—Hopeton clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjqp
Elevation: 50 to 300 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 150 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Hopeton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hopeton

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: clay loam
H2 - 12 to 27 inches: clay
H3 - 27 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Redding

Percent of map unit: 10 percent
Hydric soil rating: No

Corning

Percent of map unit: 5 percent
Hydric soil rating: No

AaA—Alamo clay, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjqz
Elevation: 50 to 500 feet
Mean annual precipitation: 10 to 22 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Alamo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alamo

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 8 inches: clay
H2 - 8 to 20 inches: clay
H3 - 20 to 25 inches: indurated

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 12 to 24 inches to duripan
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches

Frequency of flooding: OccasionalNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups
Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

San joaquin
Percent of map unit: 10 percent
Hydric soil rating: No

Madera
Percent of map unit: 5 percent
Hydric soil rating: No

BcA—Bear Creek loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: hjrg
Elevation: 100 to 500 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Bear creek and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bear Creek

Setting
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile
H1 - 0 to 15 inches: loam
H2 - 15 to 43 inches: clay loam
H3 - 43 to 59 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Peters

Percent of map unit: 5 percent
Hydric soil rating: No

Redding

Percent of map unit: 5 percent
Hydric soil rating: No

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

BnA—Burchell silty clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjrq
Elevation: 10 to 50 feet
Mean annual precipitation: 13 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 255 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Burchell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burchell

Setting

Landform: Fan remnants

Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

H1 - 0 to 20 inches: silty clay loam
H2 - 20 to 45 inches: silty clay loam
H3 - 45 to 60 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

Lewis

Percent of map unit: 5 percent
Hydric soil rating: No

Landlow

Percent of map unit: 5 percent
Hydric soil rating: No

GfA—Greenfield sandy loam, deep over hardpan, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjtp
Elevation: 300 to 700 feet
Mean annual precipitation: 7 to 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 250 to 300 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 40 inches: sandy loam
H3 - 40 to 48 inches: indurated
H4 - 48 to 60 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 0 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Snelling

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

Borden

Percent of map unit: 5 percent
Hydric soil rating: No

HeA—Hanford sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjtx
Elevation: 150 to 900 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hanford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hanford

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Dinuba

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

Grangeville

Percent of map unit: 5 percent
Hydric soil rating: No

HrA—Honcut fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjv6
Elevation: 2,000 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Honcut and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Honcut

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and metamorphic rock

Typical profile

H1 - 0 to 20 inches: fine sandy loam
H2 - 20 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Ryer

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

HtA—Honcut silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjv8
Elevation: 2,000 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Honcut and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Honcut

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and metamorphic rock

Typical profile

H1 - 0 to 20 inches: silt loam
H2 - 20 to 60 inches: stratified loam to silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Ryer

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

KaB—Keyes gravelly clay loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjvg
Elevation: 250 to 600 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Keyes and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keyes

Setting

Landform: Fan remnants

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Tuffaceous gravelly alluvium derived from andesite

Typical profile

H1 - 0 to 8 inches: gravelly clay loam
H2 - 8 to 12 inches: gravelly clay loam
H3 - 12 to 16 inches: gravelly clay
H4 - 16 to 30 inches: indurated
H5 - 30 to 60 inches: stratified very gravelly loamy coarse sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches; 10 to 20 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Corning

Percent of map unit: 5 percent
Hydric soil rating: No

Redding

Percent of map unit: 5 percent
Hydric soil rating: No

Pentz

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

KbB—Keyes gravelly loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjvh
Elevation: 250 to 600 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Keyes and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keyes

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Tuffaceous gravelly alluvium derived from andesite

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 12 inches: gravelly clay loam
H3 - 12 to 16 inches: gravelly clay
H4 - 16 to 30 inches: indurated
H5 - 30 to 60 inches: stratified very gravelly loamy coarse sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches; 10 to 20 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

Redding

Percent of map unit: 5 percent
Hydric soil rating: No

Corning

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

KcB—Keyes-Pentz gravelly loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjvk
Elevation: 110 to 600 feet
Mean annual precipitation: 12 to 22 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Keyes and similar soils: 50 percent
Pentz and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keyes

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Tuffaceous gravelly alluvium derived from andesite

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 12 inches: gravelly clay loam
H3 - 12 to 16 inches: gravelly clay
H4 - 16 to 30 inches: indurated

H5 - 30 to 60 inches: stratified very gravelly loamy coarse sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches; 10 to 20 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Pentz

Setting

Landform: Hillslopes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Tuffaceous loamy residuum weathered from volcanic sandstone

Typical profile

H1 - 0 to 16 inches: gravelly loam
H2 - 16 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Redding

Percent of map unit: 10 percent
Hydric soil rating: No

Corning

Percent of map unit: 9 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

MaA—Madera fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjw1
Elevation: 20 to 250 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Madera and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madera

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 12 inches: fine sandy loam
H2 - 12 to 20 inches: sandy clay loam
H3 - 20 to 28 inches: clay
H4 - 28 to 40 inches: indurated
H5 - 40 to 60 inches: stratified coarse sandy loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Rocklin
Percent of map unit: 5 percent
Hydric soil rating: No

Whitney
Percent of map unit: 5 percent
Hydric soil rating: No

Alamo
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

MbA—Madera loam, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: hjw2
Elevation: 20 to 250 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Madera and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madera

Setting
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 20 inches: sandy clay loam
H3 - 20 to 28 inches: clay
H4 - 28 to 40 inches: indurated
H5 - 40 to 60 inches: stratified coarse sandy loam to clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Rocklin

Percent of map unit: 5 percent
Hydric soil rating: No

Alamo

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Whitney

Percent of map unit: 5 percent
Hydric soil rating: No

MdA—Madera sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjw4
Elevation: 20 to 250 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Madera and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madera

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 20 inches: sandy clay loam
H3 - 20 to 28 inches: clay
H4 - 28 to 40 inches: indurated
H5 - 40 to 60 inches: stratified coarse sandy loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Whitney

Percent of map unit: 5 percent
Hydric soil rating: No

Rocklin

Percent of map unit: 5 percent
Hydric soil rating: No

Alamo

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

MdB—Madera sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjw5
Elevation: 20 to 250 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Madera and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madera

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 20 inches: sandy clay loam
H3 - 20 to 28 inches: clay
H4 - 28 to 40 inches: indurated
H5 - 40 to 60 inches: stratified coarse sandy loam to clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Alamo

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Rocklin

Percent of map unit: 5 percent
Hydric soil rating: No

Whitney

Percent of map unit: 5 percent
Hydric soil rating: No

MeA—Marguerite loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjw6
Elevation: 30 to 600 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 260 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Marguerite and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marguerite

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic rock

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 30 inches: clay loam
H3 - 30 to 60 inches: stratified gravelly fine sandy loam to gravelly loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

Yolo

Percent of map unit: 5 percent
Hydric soil rating: No

Burchell

Percent of map unit: 5 percent
Hydric soil rating: No

MgA—Marguerite silty clay loam, deep over hardpan, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjw8
Elevation: 50 to 600 feet
Mean annual precipitation: 10 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Marguerite and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marguerite

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from metamorphic rock

Typical profile

H1 - 0 to 10 inches: silty clay loam
H2 - 10 to 48 inches: clay loam
H3 - 48 to 60 inches: cemented

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

Burchell

Percent of map unit: 5 percent
Hydric soil rating: No

Yolo

Percent of map unit: 5 percent
Hydric soil rating: No

PaA—Pachappa fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjwp
Elevation: 1,000 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pachappa and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pachappa

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 28 inches: loam
H3 - 28 to 60 inches: stratified loamy sand to fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Borden

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

PkB—Pentz gravelly loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjwz
Elevation: 110 to 600 feet
Mean annual precipitation: 12 to 22 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Pentz and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pentz

Setting

Landform: Hillslopes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Tuffaceous loamy residuum weathered from volcanic sandstone

Typical profile

H1 - 0 to 16 inches: gravelly loam
H2 - 16 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Peters

Percent of map unit: 5 percent

Hydric soil rating: No

Amador

Percent of map unit: 5 percent
Hydric soil rating: No

Raynor

Percent of map unit: 5 percent
Hydric soil rating: No

PoD—Peters cobbly clay, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: hjx7
Elevation: 120 to 1,200 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Peters and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peters

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 6 inches: cobbly clay
H2 - 6 to 18 inches: clay
H3 - 18 to 59 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: 12 to 24 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

Amador

Percent of map unit: 5 percent
Hydric soil rating: No

Raynor

Percent of map unit: 5 percent
Hydric soil rating: No

PwA—Porterville clay, o to 3 percent slopes

Map Unit Setting

National map unit symbol: hjxf
Elevation: 50 to 300 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 150 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Porterville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Porterville

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 13 inches: clay
H2 - 13 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Daulton

Percent of map unit: 5 percent
Hydric soil rating: No

Hornitos

Percent of map unit: 5 percent
Hydric soil rating: No

Seville

Percent of map unit: 5 percent
Hydric soil rating: No

PwB—Porterville clay, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjxg
Elevation: 50 to 300 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 150 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Porterville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Porterville

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile
H1 - 0 to 13 inches: clay
H2 - 13 to 60 inches: clay

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Hornitos
Percent of map unit: 5 percent
Hydric soil rating: No

Daulton
Percent of map unit: 5 percent
Hydric soil rating: No

Seville
Percent of map unit: 5 percent
Hydric soil rating: No

RaA—Raynor clay, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: hjxl
Elevation: 300 to 850 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 to 300 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Raynor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 12 inches: clay
H2 - 12 to 39 inches: clay
H3 - 39 to 59 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 39 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Peters

Percent of map unit: 5 percent
Hydric soil rating: No

Amador

Percent of map unit: 5 percent
Hydric soil rating: No

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

RaB—Raynor clay, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjxm
Elevation: 300 to 850 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Raynor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 12 inches: clay
H2 - 12 to 39 inches: clay
H3 - 39 to 59 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 39 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

Peters

Percent of map unit: 5 percent
Hydric soil rating: No

Amador

Percent of map unit: 5 percent
Hydric soil rating: No

RbA—Raynor cobbly clay, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjxp
Elevation: 300 to 2,500 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 260 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Raynor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 12 inches: cobbly clay
H2 - 12 to 42 inches: clay
H3 - 42 to 59 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Amador
Percent of map unit: 5 percent
Hydric soil rating: No

Peters
Percent of map unit: 5 percent
Hydric soil rating: No

Pentz
Percent of map unit: 5 percent
Hydric soil rating: No

RbB—Raynor cobbly clay, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: hjxq
Elevation: 300 to 2,500 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 260 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition
Raynor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 12 inches: cobbly clay
H2 - 12 to 42 inches: clay

H3 - 42 to 59 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Amador

Percent of map unit: 5 percent
Hydric soil rating: No

Pentz

Percent of map unit: 5 percent
Hydric soil rating: No

Peters

Percent of map unit: 5 percent
Hydric soil rating: No

ReB—Redding gravelly loam, 0 to 8 percent slopes, dry

Map Unit Setting

National map unit symbol: 2w8bm
Elevation: 90 to 750 feet
Mean annual precipitation: 12 to 21 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 255 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Redding, gravelly loam, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Redding, Gravelly Loam

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from igneous, metamorphic and sedimentary rock over clayey alluvium derived from igneous, metamorphic and sedimentary rock over cemented alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 5 inches: gravelly loam
BA - 5 to 17 inches: gravelly loam
2Bt - 17 to 22 inches: clay
2Btqm - 22 to 60 inches: cemented gravelly material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches; 20 to 39 inches to duripan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 5 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Keyes, fiine sandy loam

Percent of map unit: 10 percent
Landform: Fan remnants
Hydric soil rating: No

Peters, clay

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 2 percent
Landform: Fan remnants
Microfeatures of landform position: Vernal pools

Hydric soil rating: Yes

Pentz, loam

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, summit
Hydric soil rating: No

RtA—Ryer silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjyd
Elevation: 40 to 500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 255 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ryer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ryer

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Basic alluvium derived from igneous rock

Typical profile

H1 - 0 to 20 inches: silt loam
H2 - 20 to 64 inches: clay loam
H3 - 64 to 84 inches: stratified sandy loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

Honcut

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

ScA—San Joaquin sandy loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2vncw
Elevation: 90 to 520 feet
Mean annual precipitation: 9 to 17 inches
Mean annual air temperature: 62 to 64 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

San joaquin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Joaquin

Setting

Landform: Terraces, fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

Ap - 0 to 9 inches: sandy loam
Bt1 - 9 to 15 inches: sandy clay loam
2Bt2 - 15 to 21 inches: clay
2Bkqm - 21 to 37 inches: cemented material
2C - 37 to 79 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 19 to 25 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 8 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Snelling

Percent of map unit: 5 percent
Landform: Terraces, fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Alamo

Percent of map unit: 4 percent
Landform: Terraces, fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, tread
Microfeatures of landform position: Open depressions, open depressions
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, hydric

Percent of map unit: 1 percent
Landform: Terraces, open depressions on fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, tread
Microfeatures of landform position: Open depressions
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

ScB—San Joaquin sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjyk
Elevation: 20 to 500 feet
Mean annual precipitation: 10 to 22 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

San joaquin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Joaquin

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 15 inches: sandy clay loam
H3 - 15 to 21 inches: clay loam
H4 - 21 to 37 inches: indurated
H5 - 37 to 60 inches: stratified sandy loam to loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Snelling

Percent of map unit: 5 percent
Hydric soil rating: No

Montpellier

Percent of map unit: 5 percent
Hydric soil rating: No

Alamo

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

SdA—San Joaquin-Alamo complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjyl
Elevation: 20 to 500 feet
Mean annual precipitation: 10 to 22 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

San joaquin and similar soils: 50 percent
Alamo and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Joaquin

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 15 inches: sandy clay loam
H3 - 15 to 21 inches: clay loam
H4 - 21 to 37 inches: indurated
H5 - 37 to 60 inches: stratified sandy loam to loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan

Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Alamo

Setting
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile
H1 - 0 to 8 inches: clay
H2 - 8 to 20 inches: clay
H3 - 20 to 25 inches: indurated

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: 12 to 24 inches to duripan
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups
Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Montpellier
Percent of map unit: 10 percent
Hydric soil rating: No

Snelling
Percent of map unit: 10 percent

Hydric soil rating: No

SgA—Seville clay, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hjyq
Elevation: 300 to 500 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Seville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Seville

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basic alluvium derived from igneous rock

Typical profile

H1 - 0 to 8 inches: clay
H2 - 8 to 24 inches: clay
H3 - 24 to 48 inches: cemented
H4 - 48 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Raynor
Percent of map unit: 5 percent
Hydric soil rating: No

Hopeton
Percent of map unit: 5 percent
Hydric soil rating: No

Porterville
Percent of map unit: 5 percent
Hydric soil rating: No

TuA—Tujunga sand, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: hjzm
Elevation: 10 to 1,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 250 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Tujunga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from granite

Typical profile
H1 - 0 to 48 inches: sand
H2 - 48 to 60 inches: stratified gravelly sand to gravelly loamy sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups
Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hanford
Percent of map unit: 5 percent
Hydric soil rating: No

Grangeville
Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield
Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WkB—Whitney sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: hk07
Elevation: 200 to 500 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Whitney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitney

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 15 inches: sandy loam
H2 - 15 to 27 inches: fine sandy loam
H3 - 27 to 59 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Rocklin

Percent of map unit: 10 percent
Hydric soil rating: No

Montpellier

Percent of map unit: 5 percent
Hydric soil rating: No

WmB2—Whitney and Rocklin soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hk0c
Elevation: 200 to 1,500 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Whitney and similar soils: 50 percent
Rocklin and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitney

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 15 inches: fine sandy loam
H2 - 15 to 27 inches: fine sandy loam
H3 - 27 to 59 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rocklin

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 24 inches: loam
H3 - 24 to 28 inches: indurated
H4 - 28 to 60 inches: stratified coarse sandy loam to fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Montpellier

Percent of map unit: 10 percent
Hydric soil rating: No

WrA—Wyman loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hk0j
Elevation: 300 to 2,500 feet
Mean annual precipitation: 9 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wyman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyman

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from volcanic rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 41 inches: clay loam
H3 - 41 to 60 inches: stratified silt loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Porterville

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

San joaquin

Percent of map unit: 5 percent
Hydric soil rating: No

WsA—Wyman loam, deep over hardpan, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hk0k
Elevation: 50 to 600 feet
Mean annual precipitation: 10 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wyman and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyman

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from volcanic rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 40 inches: clay loam
H3 - 40 to 60 inches: cemented

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

San joaquin

Percent of map unit: 5 percent
Hydric soil rating: No

Porterville

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

YcA—Yokohl loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hk0p
Elevation: 500 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Yokohl and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yokohl

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 19 inches: clay
H3 - 19 to 48 inches: indurated
H4 - 48 to 60 inches: stratified sandy loam to gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 20 inches to duripan
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Porterville

Percent of map unit: 5 percent
Hydric soil rating: No

Wyman

Percent of map unit: 5 percent
Hydric soil rating: No

Honcut

Percent of map unit: 5 percent
Hydric soil rating: No

YdA—Yolo loam, 0 to 5 percent slopes, dry, MLRA 17

Map Unit Setting

National map unit symbol: 2w89v
Elevation: 120 to 370 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 220 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Yolo, dry, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo, Dry

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from slate

Typical profile

Ap - 0 to 13 inches: loam
C1 - 13 to 25 inches: loam
C2 - 25 to 60 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Marguerite

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

Burchell

Percent of map unit: 5 percent
Hydric soil rating: No

YeA—Yolo loam, deep over hardpan, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hk0s
Elevation: 2,000 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Yolo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 20 inches: loam
H2 - 20 to 40 inches: loam
H3 - 40 to 60 inches: cemented

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

Burchell

Percent of map unit: 5 percent
Hydric soil rating: No

Marguerite

Percent of map unit: 5 percent
Hydric soil rating: No

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Appendix C

Cultural Resources Report

Cultural Resources Identification and Evaluation Report for the Le Grand-Athlone Water District Intertie Project in Merced County, California

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March 2022

Acronyms and Abbreviations

AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AD	anno domini
APE	area of potential effect(s)
B.A.	Bachelor of Arts
B.C.	before common era
BLM	Bureau of Land Management
CA	California
CAL	Calibrated
CALTRANS	California Department of Transportation
CCIC	Central California Information Center
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
EIR	Environmental Impact Report
GIS	geographic information system
GLO	Bureau of Land Management General Land Office
LGAWD	Le Grand Athlone Water District
M.A.	Master of Arts
MID	Merced Irrigation District
MND	Mitigated Negative Declaration
NAHC	Native American Heritage Commission
ND	Negative Declaration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOP	Notification of Preparation
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PRC	Public Resources Code
Project	Merced Irrigation District Canal Intertie Project
SHPO	California State Historic Preservation Officer
SLF	Sacred Lands File
TCR	tribal cultural resource(s)
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Management Summary

Le Grand-Athlone Water District (LGAWD) Board of Directors, in a joint effort with Merced Irrigation District (MID), proposes to construct the Le Grand-Athlone Water District Project for the Merced Irrigation District Intertie Canal Project (Project). MID's canal system provides the primary conveyance of surface water in the Merced Subbasin and is a critical part of infrastructure that will help the Merced Groundwater Subbasin reach sustainability through reduced reliance on groundwater pumping. The Project includes improvements, rehabilitation, and expanding the existing MID canal capacity along approximately 9.8 miles and constructing an approximately 4.9-mile-long new canal segment from MID Booster #3 to just north of the Chowchilla River.

The Project may affect waters of the United States (US) and as a result, the Project proponent must meet requirements of Sections 401 and 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act as well as Section 106 of the National Historic Preservation Act (NHPA), which requires that federal agencies "take into account" the effect of its undertakings on historic properties. The US Army Corps of Engineers (USACE) is a federal agency and since the Project is an "undertaking" as defined at 36 Code of Federal Regulations (CFR) §800.16(y), and the undertaking has the potential to cause effects on historic properties (36 CFR §800.3[a]), it is necessary to identify cultural resources within the Area of Potential Effects (APE). This report has been prepared in accordance with the National Historic Preservation Act (NHPA), California Environmental Quality Act (CEQA), and the County guidelines as they pertain to the Project and cultural resources.

Prior to fieldwork, background research included a search of previously conducted cultural resources studies and findings at the Central California Information Center (CCIC). The records search included the APE and 0.5-mile radius surrounding. The results identified three previously recorded historic-era cultural resources within the APE and one cultural resource with the 0.5-mile radius.

The NAHC SLF records search resulted in negative findings within the search area. The NAHC did provide a list of Native American contacts to be contacted for additional outreach regarding the Project area. This list has been included in the appendices for use by the lead agency for background information in completing Native American consultation.

An intensive pedestrian survey was conducted in September 2022 by Kleinfelder. Twenty-seven new historic-era cultural and built environment resources were identified, and three previously recorded resource was updated within the APE. All resources were recorded on Department of Parks and Recreation (DPR) 523-series forms and evaluated for inclusion in National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR).

One cultural resource, the Merced Irrigation District (P-24-001909), which includes the Le Grand Canal, was identified as eligible for the NRHP and CRHR is a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA. The proposed Project will result in physical changes to the Le Grand Canal, which will include widening and extending the existing canal. However, these actions will not result in a significant loss of historical material that will compromise the ability of the Merced Irrigation District to convey its historic significance. There will be no significant change to the overall appearance, route, or function of the recorded portion of the Le Grand Canal or the larger Merced Irrigation District, despite the extension of the existing canal. As such, Kleinfelder recommends a finding of no adverse effect to historic properties pursuant to 36 CFR § 800.5 and no significant impact for the purposes of CEQA.

Based upon the background research and survey results, Kleinfelder considers the APE to have low sensitivity for cultural resources and the following measures are recommended prior to construction:

- If archaeological resources are encountered, all ground-disturbing work at the find location plus a reasonable buffer zone must be immediately suspended, the approving County department contacted, and a qualified professional archaeologist will be retained to analyze the significance of the find and formulate further mitigation (e.g., Project relocation, excavation plan, and protective cover) in consultation with culturally affiliated tribes or other descendant groups, where applicable.
- Pursuant to California Health and Safety Code §7050.5, if known or suspected Native American or other human remains are encountered, all ground-disturbing work must cease in the vicinity of the discovery, and the County Coroner shall be contacted. The respectful treatment and disposition of remains and associated grave offerings shall be in accordance with Public Resource Code (PRC) §5097.98. The applicant and successors in interest are ultimately responsible for ensuring compliance with this condition.
- In the event of Project redesign extending beyond the current APE surveys shall be required to assess these areas for the presence of cultural resources. Any newly discovered or previously recorded sites within the additional survey areas shall be recorded (or updated) on appropriate DPR 523-series forms. If avoidance of these resources is not feasible, then an evaluation and/or data recovery program shall be drafted and implemented.

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Appendices

1.0 Introduction

The following provides an overview of the Le Grand-Athlone Water District Intertie Project (Project) description, background and objectives, location, and Area of Potential Effect (APE).

1.1 Description

Le Grand-Athlone Water District (LGAWD) Board of Directors, in a joint effort with Merced Irrigation District (MID), proposes to construct the Le Grand-Athlone Water District for the Merced Irrigation District Intertie Canal Project (Project). MID's canal system provides the primary conveyance of surface water in the Merced Subbasin and is a critical part of infrastructure that will help the Merced Groundwater Subbasin reach sustainability through reduced reliance on groundwater pumping. The Project includes improvements, rehabilitation, and expanding the existing MID canal capacity along approximately 9.8 miles and constructing an approximately 4.9-mile-long new canal segment from MID Booster #3 to just north of the Chowchilla River. The new and existing canal would have a width of approximately 40 feet in diameter. The Project APE would include these 9.8- and 4.9-mile stretches where work would be completed, as well as a 50-foot buffer on each side of the outside of the canal.

The Project would be completed in three phases. Phase 1 would result in the construction of a new approximately 2.4-mile intertie canal from Mariposa Creek to Dutchman Creek. Phase 2 would result in the expansion of existing canal facilities from a point of the Le Grand Canal approximately 1.8 miles northeast of Planada and running approximately 9.8 miles to the Fancher Lateral at Mariposa Creek. Phase 3 would result in the installation of a new intertie pump station and the construction of a new approximately 2.5-mile canal pipeline that would cross under the Santa Fe Railroad and run underground until it reaches Earl Road. At this point, a surface canal would connect to the pipeline and run to the Chowchilla River, completing the Project.

Phases 1 and 3 would result in approximately 4.9 miles of new canal facilities. The new canal would create a way for flood flows that would otherwise be lost to be captured and recharged in the area, introducing a new surface water supply source. The new canal would cross Mariposa, Little Deadman, Deadman, and Dutchman creeks. To cross these creeks, the Project would result in the construction of multiple new canal siphon structures. In addition, the Project would construct numerous new culverts under roadways that the Project would cross, as well as jack and bore activities to install steel casing under the Santa Fe Railroad. Where the Project would cross under roadways, a partial lane-split road closure would be used. Phases 1 and 3 would last approximately 18 months and have a crew of 8-10 workers, while Phase 2 would last approximately 18 months with a crew of 4-10 workers.

1.2 Project Purpose and Need

The Merced Subbasin is considered to be in critical overdraft and the Project would decrease reliance on groundwater pumping, energy consumption, and subsidence in the southern Merced Subbasin, while creating a new surface water supply, optimizing recharge, and also providing direct benefits to underrepresented communities in the Le Grand-Athlone area and the southern Merced Subbasin.

1.3 Area of Potential Effects

The APE measures approximately 14.71 miles long (321 acres) and includes the 9.8- and 4.9-mile stretches where canal improvements and new construction will be completed, as well as a 50-foot buffer on each side of the outside of the canal. The APE includes all access and staging areas. The maximum vertical APE extends to 15 feet below the current ground surface.

1.4 Background and Objectives

The purpose of this assessment is to inventory the APE for potential cultural resources that may be present and identify measures to avoid or mitigate potential impacts to such resources. Cultural resources include archaeological, architectural history, and Native American (tribal) cultural resources.

Kleinfelder conducted a cultural resources literature search through the California Historical Resources Information System (CHRIS) records search with the Central California Information Center (CCIC) to assess potential presence of cultural resources within the APE and a 0.5-mile radius around the APE. The records review and literature search included reviews of historical maps, previous survey reports, and registers of historical resources. A Sacred Lands File (SLF) search was conducted with the Native American Heritage Commission (NAHC). Once background research had been completed, Kleinfelder completed an intensive pedestrian survey of the APE in order to identify and/or update cultural resources within the APE. The Project has been conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA).

2.0 Regulatory Context

The following section provides the federal, State of California (State), and local laws, regulations, and ordinances that are applicable to cultural resources compliance on the Project.

2.1 Section 106 of the National Historic Preservation Act

Section 106 of the NHPA (36 CFR §800) requires that projects undertaken by federal agencies (and/or federally funded projects or projects requiring federal approval) consider the effects of their actions on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP). To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological and architectural properties) must be inventoried and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, consultants in support of the agency or project proponent may be delegated all or portions of the Section 106 process. The Project is subject to Section 106 because it will require a U.S. Army Corps Section 404 permit. The Section 106 process includes four primary steps, listed below.

1. Initiation of consultation with consulting parties (36 CFR §800.3).
2. Identification and evaluation of historic properties within the APE (36 CFR §800.4).
3. Assessment of adverse effects on historic properties within the APE (36 CFR §800.5). If there are historic properties that will be affected, consult with the California State Historic Preservation Officer (SHPO) regarding adverse effects, both direct and indirect, on historic properties. If there are no historic properties that will be affected, implementation of the project in accordance with the findings of no adverse effect shall proceed (36 CFR 36 §800.5[d][1]).
4. Resolve adverse effects on historic properties within the APE (36 CFR 800.6). Continue consultation among the federal agency and consulting parties to avoid and mitigate adverse effects. The Advisory Council on Historic Preservation (ACHP) provides comments to head of the federal agency, and the ACHP comments must be considered when final agency decision on the undertaking is made (move forward with the project, stop pursuant to mitigation, step back through Section 106 process) (36 CFR 800.7).

National Register of Historic Places Criteria for Evaluation

The significance of cultural resources is determined using the NRHP's four Criteria for Evaluation (Criteria A-D) at 36 CFR 60.4, which state that a historic property is any site, building, structure, or object that:

A. Is associated with events that made a significant contribution to the broad patterns of our history (Criterion A);
B. Is associated with the lives of persons significant to our past (Criterion B);
C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or,
D. Has yielded, or may be likely to yield, information important in prehistory or history (Criterion D).

If the SHPO determines that a cultural resource is eligible for inclusion in the NRHP, then it is automatically eligible for the California Register of Historic Resources (CRHR). If a resource does not have the level of integrity necessitated by the NRHP, it may still be eligible for the CRHR, which allows for a lower level of integrity.

NRHP Seven Aspects of Integrity

Cultural resources integrity is determined using the NRHP's seven aspects of integrity at 36 CFR 60.4, which state that a historic property must not only be shown to be significant under the NRHP criteria, but it also must retain historic integrity. The seven aspects of integrity include location, design, setting, materials, workmanship, feeling, and association. A property must meet one or more of the Criteria for Evaluation before a determination can be made about its integrity.

2.2 California Environmental Quality Act of 1970, as Amended

CEQA requires State and local agencies to identify and reduce, if feasible, the significant, negative environmental impacts of land use decisions.

CEQA Guidelines: Title 14 California Code of Regulations (CCR) Section 1427

This section of CEQA recognizes that California's archaeological resources are endangered by urban development; the legislature finds that these resources need preserving; it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any such materials from a cave.

CEQA Guidelines: Title 14 CCR Section 15064.4 subsection (b)

This section of CEQA defines "historical resource," addresses reburial options for Native American remains, and presents the preferred mitigation of historical resources.

CEQA Guidelines: Title 14 CCR Section 15064.5

This section of CEQA identifies which resources are considered cultural resources, as stated below.

- Resource(s) listed or eligible for listing on the CRHR (Title 14 CCR Section 15064.5(a)(1).
- Resource(s) either listed in the NRHP or in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant," (Title 14 CCR Section 15064.5(a)(2)).
- Resources identified as significant in a historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code (PRC) [Title 14 CCR Section 15065.5(a)(2)].

In addition, Subdivision (g) provides the guidelines referenced below regarding historical surveys.

A resource identified as significant in a historical survey may be listed in the CRHR if the survey meets all the following criteria:

- The survey has been or will be included in the State Historic Resources Inventory,
- The survey and the survey documents were prepared in accordance with procedures and requirements of the California Office of Historic Preservation (OHP),
- The resource is evaluated and determined by OHP to have a significance rating of Category 1 to 5 on the DPR Historic Resources Inventory Form,

- If the survey is five years or older at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historic resources that have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminished the significance of the resource, and
- Resources identified during such surveys are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise.
- A final category of “historical resources” may be determined at the discretion of the lead agency when: Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, education, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency’s determination is supported by substantial evidence in light of the whole record [Title 14 CCR Section 15064.5(a)(3)].

When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within a project, the lead agency shall work with the appropriate Native Americans as identified by NAHC. An applicant may develop an agreement for treating or disposing of, with appropriate dignity; the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by NAHC (Title 14 CCR Section 15064.5(d)).

CEQA Guidelines: Title 14 CCR Section 15064.5(b)
Section 15124(b) addresses mitigation, and states that the preferred mitigation for historical resources is treatment in a manner consistent with Secretary’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings. The preferred mitigation for archaeological sites is preservation in place.

CEQA Guidelines: Title 14 CCR Section 15064.7 “Thresholds of Significance”
This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term “cumulatively significant”.

CEQA Guidelines: Title 14 CCR Section 15126.4 “Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects”, sub-section (b) “Mitigation Measures Related to Impacts on Historical Resources”
Subsection (b) discusses:

- Impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource,
- Documentation as a mitigation measure, and
- Mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible; data recovery must be conducted in accordance with an adopted data recovery plan.

CEQA Appendix G Section V

This appendix is a checklist that identifies potential impacts to historical and archaeological resources, and/or human remains. The checklist includes the following questions, which are used to determine if a potential project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5,
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5,
- Disturb any human remains, including those interred outside of formal cemeteries.

Questions on the checklist are answered to assess whether impacts associated with a project would be potentially significant, less than significant with mitigation, less than significant, or have no impact. The final determination of project-related impacts is made by the lead agency on a project.

CEQA Assembly Bill 52 –Tribal Consultation and Tribal Cultural Resources

Assembly Bill (AB) 52 amended CEQA to address California Native American tribal concerns regarding how cultural resources of importance to tribes are treated under CEQA. CEQA now specifies that a project that may cause a substantial adverse change in the significance of a "tribal cultural resource" [as defined in PRC 21074(a)] is a project that may have a significant effect on the environment. According to AB 52, tribes may have expertise in tribal history and "tribal knowledge about land and tribal cultural resources (TCR) at issue should be included in environmental assessments for projects that may have a significant impact on those resources."

The AB 52 process entails the following:

- The CEQA lead agency must begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if the tribe has requested such notification to the lead agency, in writing. The notification request requires that the lead agency inform these tribes of proposed projects in the geographic area provided by the representative tribe; and within set timeframes. Specifically, the lead state agency is required to notify tribe(s) that have requested project notification under AB 52 within 15 days of determining there is a project; the tribe(s) then have 30 days to respond to this notification and request consultation: upon receipt of a request for consultation the lead agency must then initiate consultation with the tribe(s) within 30 days.
- AB 52 applies to the following CEQA documents: Negative Declaration (ND), Mitigated Negative Declaration (MND), or Notification of Preparation (NOP) of an Environmental Impact Report (EIR). Such documents cannot be released for public review before tribal consultation has concluded and shall not contain any confidential information that the Tribe has requested be omitted from public review.

AB 52 further defines the following legislative terms:

Public Resource Code (PRC) 21074 (TCR): The statute identifies TCR as a separate and distinct category of resource, separate from a historical resource. New PRC Section 21074 further defines a TCR as any of the following under its subsections (a) through (c):

a) Sites, features, places, and objects with cultural value to descendant communities or cultural landscapes that are any of the following:

    - Listed on the CRHR.
    - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
    - Deemed to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

b) Sacred places, including, but not limited to, Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines that meet either of the following criteria:

    - Listed on the California NAHC's SLF pursuant to Section 5097.94 or 5097.96 and a California Native American tribe has submitted sufficient evidence to the lead agency demonstrating that significance to the California Native American tribe or contain known graves and cemeteries of California Native Americans.
    - Listed or determined pursuant to criteria set forth in subdivision (g) of Section 5024.1 to be eligible for listing in the CRHR.

c) A cultural landscape is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

d) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 also may be a TCR if it conforms with the criteria of subdivision (a).

CEQA Historical Resources

CEQA defines historically significant resources as "resources listed or eligible for listing in the California Register of Historical Resources (CRHR)" (PRC Section 5024.1). A cultural resource may be considered historically significant if the resource is 45 years old or older; possesses integrity of location, design, setting, materials, workmanship, feeling, and association; and meets any of the following criteria for listing on the CRHR:

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 construction, 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 (PRC Section 5024.1).

Cultural resources are buildings, sites, landscapes, traditional cultural properties, structures, or objects that may have historical, architectural, cultural, or scientific importance. CEQA states that if a project will have a significant impact on important cultural resources, deemed "historically significant," then project alternatives and mitigation measures must be considered. Additionally, any proposed project that may affect historically significant cultural resources must be submitted to the SHPO for review and comment prior to project approval by the responsible agency and prior to construction.

Public Resources Codes

The following provides a summary of California PRC that apply to cultural resources.

PRC Section 5020.1

This section defines several terms, including those provided below.

> "Historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.
>
> "Substantial adverse change" means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired.

PRC Section 5024.1

This section establishes the CRHR. A resource may be listed as a historical resource in the CRHR if it meets the NRHP criteria or the following state criteria:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage,
- is associated with the lives of persons important in our past,
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values, or
- has yielded, or may be likely to yield, information important in prehistory or history.

PRC Section 5097.5

This section states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the State, or any city, county, district, authority or public corporation, or any agency thereof.

PRC Section 5097.98

This section discusses the procedures that need to be followed upon the discovery of Native American human remains. NAHC, upon notification of the discovery of human remains by the County coroner, is required to notify those persons it believes to be most likely descended from the deceased Native American. It enables the descendant to inspect the site of the discovery of the Native American human remains and to recommend to the landowner (or person responsible for the excavation) means of treating, with dignity, the human remains and any associated grave goods.

PRC Sections 5097.99, 5097.991

These sections establish that it is a felony to obtain or possess Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions. The sections also mandate that it is the policy of the State to repatriate Native American remains and associated grave goods.

PRC Section 21083.2

This section states that under CEQA, the lead agency is responsible for determining whether a project may have a significant effect on historical and archaeological resources. Section 21083.2 states that if the lead agency determines that the project may have a significant effect on "unique" archaeological resources, an EIR shall be prepared to address these resources. A unique archaeological resource is an 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 the resource meets one of the following criteria:

- contains information needed to answer important research questions and that a demonstrable public interest exists in that information,
- has a special and particular quality, such as being the oldest or best example of its type, and/or
- is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require that reasonable efforts be taken to preserve these resources in place or provide conditions or mitigation measures.

PRC Section 21084.1

This section sets forth that a project that may cause a significant adverse change in a significant historical resource is a project that may be considered to have adverse effects on the environment. Historical resources not listed on the CRHR or other local lists may still be considered historical resources at the discretion of the lead agency on the project.

Senate Concurrent Resolution Number 43

This resolution requires state agencies to cooperate with archaeological survey and excavation programs, and to preserve known archaeological resources whenever reasonable.

Senate Bill 18 (Burton 2004)

This bill required protection and preservation of Native American traditional cultural places during city and county general plan development.

Health and Safety Code Section 7050.5

This code establishes that any person who knowingly mutilates, disinters, wantonly disturbs, or willfully removes any human remains in or from any location without authority of the law is guilty of a misdemeanor. It further defines procedures for the discovery and treatment of Native American remains.

Health and Safety Code Sections 8010-8011

This code is intended to provide consistent state policy to ensure that all California Native American human remains and cultural materials are treated with dignity and respect. The code extends policy coverage to non-federally recognized tribes, as well as federally recognized groups.

California Penal Code Section 622.5

This code states that anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.

3.0 Natural and Cultural Context

This section presents background information pertaining to the natural and cultural context of the APE, as well as an overview of regional prehistory, ethnography, and history.

3.1 Natural Context

The project is located in Merced County, in the San Joaquin Basin of the Central Valley of California. Merced County is approximately 1,934.97 square miles in area and is comprised primarily of agricultural lands and small- to medium-sized communities. The San Joaquin Basin, a portion of the greater Central Valley of California, stretches north to south from the Sacramento-San Joaquin River Delta to the Tehachapi Mountains and west to east from the California Coast Ranges to the Sierra Nevada foothills; it is known as one of the more notable structural depressions in the world (USGS 2022).

The local climate, classified as semi-arid, is characterized by hot, dry summers and cool, mild winters. The majority of rainfall occurs between November and March, though average monthly precipitation during these months rarely breaks three inches.

3.2 Prehistoric Context

The prehistory of the Central Valley has been divided into five periods based on stylistically distinct artifact types and other cultural patterns combined with radiocarbon dates. The periods are: Paleo-Indian (11,550 to 8,550 cal B.C.), Lower Archaic (8,550 to 5,550 cal B.C.), Middle Archaic (5,550 to 550 cal B.C.), Upper Archaic (550 cal B.C. to cal A.D. 1100), and Emergent Occupation (cal A.D. 1000 to Historic) (Rosenthal et al. 2007).

3.2.1 Paleo-Indian Period (11,550 to 8,550 cal B.C.)

The Paleo-Indian period spans the terminal Pleistocene and early Holocene. During the terminal Pleistocene, much of the northern hemisphere was covered by large ice sheets, and there were at least 42 glaciated mountain ranges in western North America (Grayson 2011:121). At the end of the Pleistocene, temperatures warmed, glaciers melted, and ice sheets retreated (Meltzer 2009). The end of the Pleistocene also coincides with the extinction of 35 genera of mammals and 20 genera of birds in North America alone (Meltzer 2009:44). The earliest securely dated and widely accepted sites that provide evidence for human occupation in the Americas are Monte Verde, Chile, and the Paisley Caves, Oregon (Grayson 2011). Monte Verde is a habitation site dated to approximately 12,500 cal B.C. and the Paisley Caves are a series of rock shelters that contained stone tools, Pleistocene megafauna, and coprolites containing human DNA that have been dated to approximately 12,200 cal B.C. (Jenkins et al. 2012). Both these sites suggest that people were in the Americas before the emergence of Clovis technology (Grayson 2011:63).

Clovis points date from approximately 11,550 to 10,800 cal B.C. (Beck and Jones 2010; Haynes 2002; Waters and Stafford 2007) and basally thinned and fluted variants persist until approximately 9,550 cal B.C. (Fiedel 1999). They are lanceolate bifaces approximately 7 to 10 centimeters long that tend to be thinned by overshot flaking and exhibit basal thinning flutes on each face that extend one-third to two-thirds the lengths of the points (Haynes 2002:82). Clovis assemblages are most often associated with hunting large mammals such as mammoth and bison, with plants and small mammals making up minor portions of the subsistence remains at archaeological sites associated with the Clovis period (Haynes and Hutson 2013). Although peoples utilizing Clovis points were the first to colonize some areas, they may not have been first in the western United States (Beck and Jones 2010; Fiedel and Morrow 2012). Western Stemmed Tradition (WST) points date from approximately 11,240 to 7,000 cal B.C. (Beck and Jones 2010 and 2012). They are lanceolate, sometimes shouldered bifaces measuring approximately 4 to 8 centimeters long that tend to exhibit broad collateral flaking terminating at the midline. WST assemblages are most often associated with hunting small-to-medium mammals such as deer, pronghorn, jackrabbits, and aquatic resources such as fish and mollusks (Grayson 2011; Hockett 2007; Pinson 2007). WST points, crescents, and some fluted projectile points all occur in relatively high density at Tulare Lake in Kings County, located approximately 40 miles southeast of the APE.

3.2.2 Lower Archaic Period (8,550 – 5,550 cal B.C.)

Climate change at the end of the Pleistocene and during the Middle Holocene caused a significant amount of sediment deposition in the Central Valley and buried many of the earliest sites. As a result, archaeological deposits from this period are rare and usually restricted to isolated finds (Rosenthal et al. 2007). Temporally diagnostic Lower Archaic artifacts are stemmed and concave base projectile points and crescents. Subsistence remains recovered from CA-KER-113 near Buena Vista Lake in Kern County indicate freshwater fish and mussels, waterfowl, and large-mammals contributed to the diet of Lower Archaic foragers. Large projectile points also suggest large-mammal hunting was an important economic pursuit, while an abundance of milling equipment found in the Coast Range foothills and Sierra Nevada suggest acorn and pine nuts were important seasonal resources (Rosenthal et al. 2007).

3.2.3 Middle Archaic (5,550 – 550 B.C.)

Climate continued to change during the Middle Archaic period and became warmer and drier. The Valley traditions are characterized by a variety of pounding, scraping, chopping, and milling tools, and archaeobotanical assemblages from foothill sites such as CA-CAL-789 and CA-FRE-61 indicate that these tools were used to process acorn and pine nuts (Rosenthal et al. 2007). A variety of notched, stemmed, leaf, and concave base projectile points are associated with Middle Archaic foothill traditions and exhibit a high degree of regional morphological variability (Rosenthal et al. 2007). Assemblages associated with foothill traditions tend to be entirely comprised of utilitarian flaked and groundstone items manufactured from local materials, valley traditions contain an abundant amount of nonutilitarian artifacts and traded materials from distant sources (Rosenthal et al. 2007). Increased residential stability is evident in assemblages associated with valley traditions such as those at sites CA-SJO-112 and CA-SAC-107 that reflect year-round occupations along rivers and other waterways. Artifacts include contracting-stemmed and leaf-shaped projectile points, mortars and pestles, twisted cordage, twined basketry, simple pottery, stone plummets, and shell beads (Rosenthal et al. 2007). The presence of bone gorges, composite bone hooks, barbed spears, and large quantities of fish remains in archaeological sites suggest fishing was also becoming an increasingly important economic strategy (Rosenthal et al. 2007). Faunal assemblages indicate a continued reliance on elk, mule deer, pronghorn, rabbits, waterfowl and other birds, and rodents (Rosenthal et al. 2007).

3.2.4 Upper Archaic (550 cal. B.C – cal. A.D. 1100)

The climate during the Upper Archaic period became cooler and wetter. Archaeological assemblages from this time period are more visible than the preceding periods and reflect a blossoming of cultural diversity and complexity. Emerging specialists manufactured a variety of goods such as *Olivella* beads, *Haliotis* ornaments, obsidian trade bifaces, and stone plummets

(Rosenthal et al. 2007). Subsistence remains from sites such as CA-KER-39 and CA-KER-116 reflect the exploitation of both aquatic and terrestrial resources and the occupation of year-round villages with a variety of residential features (Rosenthal et al. 2007). Villages increased in number and size and large mounded villages begin to develop (Rosenthal et al. 2007).

3.2.5 Emergent Occupation (cal. A.D. 1000 to Historic)

The climate during the Emergent period was relatively stable with occasional drought and flood events. Cultural diversity and complexity continued to intensify, and two broad phases are recognized: The Upper and Lower (Rosenthal et al. 2007). The Lower Emergent is characterized by a variety of unique nonutilitarian items, including banjo-type *Haliotis* ornaments, bird bone whistles, soapstone pipes, and *Olivella* sequin beads (Rosenthal et al. 2007:158). The Upper Emergent is characterized by small corner- and side-notched arrow points, *Olivella* lipped and clam disk beads, and hopper mortars (Rosenthal et al. 2007). Villages from the Upper Emergent phase can often be associated with known ethnographic settlements (Rosenthal et al. 2007). Desert Side-notched and Cottonwood points become relatively widespread throughout California during the Upper Emergent phase. In the western San Joaquin Valley, the Panoche Side-notched arrow point is a regional variant of the Desert Side-notched that was in use approximately 500 years ago (Rosenthal et al. 2007).

The introduction of the bow and arrow approximately cal A.D. 1000 to 1300 (Bennyhoff 1994) caused several significant changes to technological organization, hunting strategies, and social structure. As the bow and arrow replaced the atlatl and dart, projectile points became lighter and smaller to adapt to the new technology. Hunters could produce more arrowheads with less material than dart points, hunt individually instead of in groups, and fire at a faster rate of speed with less chance of spooking game.

3.3 Ethnographic Context

The APE falls within territory ethnographically attributed to the Northern Valley Yokuts, which were comprised of approximately 60 tribelets, each with a few hundred to several thousand members, living throughout the San Joaquin Valley. The Northern Valley Yokuts occupied an area straddling the San Joaquin River, south of the Mokelumne River, east of the Diablo Range, and north of the sharp bend that the San Joaquin River takes to the northeast (Wallace 1978).

The tribelets established permanent villages near perennial waterways and subsisted on the rich and diverse flora and fauna found in the environment through fishing, hunting, fowling, and intensive plant collecting (Moratto 1984). The San Joaquin River, and the myriad sloughs and channels that branch from it, was the center of the Northern Valley Yokuts territory, representing the northern portion of the greater Yokuts territory that encompassed an estimated population of 31,400 at the time of European contact (Wallace 1978: 462). When the Spaniards first arrived in the valley, they found a population that had flourished, many Northern Valley Yokuts villages having been described as being well stocked with both food and people. The population, however, was not evenly distributed across the valley but instead clustered along the San Joaquin River and its many tributaries (Wallace 1978).

The APE is within the ethnographic territory of the Chauchila tribelet of the Northern Valley Yokuts (Wallace 1978:462). The Chauchila triblet lived in the plains along the channels of the Chowchilla River (Kroeber 1925: 484-485). The Chauchila tribelet was likely largely populated and quite warlike (ibid.)

Linguistically, Yokuts is a single Penutian language with a large number of local dialects (Golla 2011). Northern Valley dialects were spoken along the San Joaquin River and in the vicinity of Merced; three Northern Valley dialects are known including *Chawcilla*, *Ta-kin*, and *Nopthrinthre* (ibid).

As a result of exploration and Spanish colonial expansion into the Delta and lower San Joaquin Valley in the 1770s, Yokuts populations were reduced, and their settlement patterns were disrupted (Moratto 1984; Wallace 1978). At first, the Yokuts reportedly greeted Spanish soldiers or Franciscan padres warmly but, beginning around 1805, as more people were drawn into the mission system and local populations began to diminish, the Franciscan padres began to forcefully proselytize among the tribes located farther inland and tensions grew. Spanish soldiers began to pursue runaway neophytes, many of whom were likely forced against their will into the missions, and the Yokuts began to launch raiding parties on Franciscan cattle herds and horses. Several exploration expeditions were launched by the Franciscans to attempt to identify a location for a new inland mission to help quell hostilities in the region, but they were never able to establish a new mission in the Central Valley (Wallace 1978).

An epidemic disease, likely malaria, began to spread in 1833 and had an even more devastating impact on the Yokuts people, reducing the population in some places by as much as 75 percent by 1846 and destroying entire communities. The traditional lifeways of the Yokuts people were destroyed by the influx of Americans in 1848; while there was no gold to be had in the San Joaquin Valley, thousands of prospectors passed through it and the rich soil soon attracted farmers, who forced off or killed many indigenous peoples who remained on the land (Moratto 1984; Wallace 1978). All of these factors contributed to a distinct lack of ethnographic information regarding the Northern Valley Yokuts. By the time that intensive academic study of indigenous populations began in California, few of the native groups that made up the Northern Valley Yokuts remained and those which survived had scant information to share regarding their traditional lifeways (Wallace 1978). Today, descendants of the Northern Valley Yokuts continue to live in and around the San Joaquin Valley and despite more than a century of adversity, they continue to engage in traditional cultural practices and advocate for the preservation of their heritage.

3.4 Historic Context

The following historic context presents an overview of the regional history of the APE and identifies historical themes by which historical resources within the APE can be evaluated.

3.4.1 European and American Exploration and Colonization

European and American colonizers first began visiting the area that became Merced County in the nineteenth century. Jedediah Smith led a small trapping expedition from Salt Lake City to the San Joaquin Valley in 1827 and 1828 and John Frémont crossed Madera County and Merced County in 1844 (Mintier Hanrish et. al. 2013).

After Mexico achieved independence from Spain in 1821, the Mexican government seized ownership of church properties through the Secularization Act of 1833, and lands were redistributed to soldiers and influential Mexican citizens as ranchos through a tribute system. California became a territory of the United States with the end of the Mexican-American War and signing of the Treaty of Guadalupe Hidalgo in 1848. Terms of the treaty brought about the creation of the Lands Commission, in response to the Homestead Act of 1851 that was adopted as a means of validating and settling land ownership claims throughout the state. Few Mexican ranchos remained intact because of legal costs and the difficulty of producing sufficient evidence to prove title claims. Much of the land that once constituted rancho holdings became available for settlement by immigrants to California. With the discovery of gold at Sutter's Mill in 1848, the California Gold Rush era resulted in an influx of fortune seekers to California. In 1850, California became a state. The State of California was initially divided into 27 counties, some of which were later subdivided into other counties including Merced.

3.4.2 Merced County

Merced County was initially formed in 1855 from portions of Fresno County and Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land that comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874, much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the late 19th century in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company, it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton).

U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

3.4.3 Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history of irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures" (Caltrans et al. 2000) and **"**Historical Resources Inventory and Evaluation Report, Atwater-Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I, resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al. 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al. 2000).

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2007).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2007).

3.4.4 Agriculture in the San Joaquin Valley

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

3.4.5 Historic Period Roads

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the US quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobiles. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by the California Department of Transportation (Caltrans). They suggested three primary themes by which roads and highways in California can be evaluated: Roads and highways as reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

4.0 Background Research

The methods and results of the records search, historical map review, and NAHC consultation are described in detail below.

4.1 Records Search Results

A records search of the APE and a 0.5-mile buffer was conducted by the CCIC on August 28, 2021 (I.C. File number 118761). The purpose of the record search was to identify if any prehistory and/or historic-period cultural resources and studies had been previously documented in the APE and/or the surrounding 0.5-mile radius in order to better understand the archaeological sensitivity of the area.

Three previously recorded cultural resources on file with the CCIC were identified within the APE (Table 1). One additional previously recorded resource was located within a half mile of the APE (Table 2). Five previous cultural resources studies were identified within the APE and an additional four previous studies were identified within a half mile of the APE (Table 3).

Table 1. Previously Recorded Cultural Resources within the APE

Primary No.	Trinomial	Type	Description	Eligibility Status
P-24-000608	CA-MER-000635H	Historic	The Le Grand Canal	Not eligible (6Y)
P-24-001881	N/A	Historic	Burlington Northern/Santa Fe Railroad	Not eligible (6Y)
P-24-001909	N/A	Historic	Merced Irrigation District	Eligible, NRHP Criteria A, C, and D

<u>P-24-000608</u>

P-24-000608/CA-MER-000365H is the Le Grand Canal, constructed between 1922 and 1927. The Le Grand Canal was originally recorded on April 18, 1999, by Wendy Pierce, R. Bethard, T. Overly, and N. Stevens of the Archaeological Research Center near a segment of the Le Grand Canal. No recommendation of eligibility was made (Pierce et al. 1999). In July of 2000, Bryan Larson and Chris Cannon of JRP Historical Consulting Services recorded segments of the Le Grand Canal as P-24-001887 (later corrected to be P-24-000608/CA-MER-000365H by the CCIC) (2007). Larson and Cannon recommended that the Le Grand Canal was not eligible for the NRHP or the CRHR under any criteria (Larson and Cannon 2000).

<u>P-24-001881</u>

This resource consists of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad. Frank Lortie with Caltrans recorded the site in 2002 as a standard, 16-foot-wide railroad track resting on a 3.5-foot-tall crushed rock ballast. Lortie recommended that the resource was not eligible for the NRHP or the CRHR under any criteria (Lortie 2002). In 2009, Josh Smallwood of CRM Tech visited the resource and found it as described in 2002 (Smallwood 2009). The resource was again recorded in 2018 by J. Wisely of Far Western Anthropological Research Group, Inc (Wisely 2018).

P-24-001909

This historic-era resource consists of the Merced Irrigation District. Elements of this district including Melvin Canal Creek, Main Ashe Lateral, East Ashe Lateral, Canal Creek Lateral Headgate, Bear Creek, Meadowbrook Lateral, Black Rascal Creek, Hess Lateral, Buhach Lateral, Drainage Ditch, Henderson Lateral, Mason/Curtis Lateral, Livingston Canal, and Livingston Canal Headgate were recorded by Meta Bunse and Steven J. Melvin in December 2006 and January 2007 (Bunse and Melvin 2007). In 2010, Michael H. Dice of Michal Bradman Associates recorded the Merced Irrigation District as a whole and recommended that the district was eligible for the NRHP under criteria A, C, and D but did not fully specify the contributing and non-contributing elements to the district (Dice 2010).

Table 2. Previously Recorded Cultural Resources within 0.5 Mile of the APE

Primary No.	Trinomial	Type	Name/Description	Eligibility Status
P-24-000610	CA-MER-367	Historic	Unnamed canal/irrigation ditch	Unknown

Table 3. Studies Conducted within the APE and 0.5 Mile of the APE

Report No.	Date	Author	Title	Relation to the APE
ME-02930	1996	Jensen, Peter	Archaeological Inventory Survey: Tracy to Fresno Longhaul Fiberoptics Data Transmission Line, Portions of Fresno, Madera, Merced, Stanislaus, and San Joaquin Counties, California.	Within
ME-03628	1999	Pierce, W.	An Archaeological Survey Report for a Proposed Rehabilitation of State Route 140 Between Highway 99 and the Mariposa County Line, Merced County, California (10-MER-140, KP.6/80.9, PM 35.8/50.3).	Within
ME-03995	2000	Nelson, W. J.	Cultural Resource Survey for the Level (3) Communications Long Haul Fiber Optics Project; Segment WS 04: Sacramento to Bakersfield.	Within
ME-04058	1999	Gerry, R.	Letter Regarding Pacific Bell Wireless Site CV-535-04 Cultural Resources Assessment, Mission Avenue, Merced County	Outside
ME-04849	2002	Creighton, W.	Clamper: Documentation of Monuments and Plaques Representing Estanislao Chapter No. 58 E Clampus Vitus	Outside
ME-06955	2009	Tang, B.	Historic Property Survey Report, 10-Merced-BNSF RR, PM 1039.9 to 1056.4, Le Grand to Merced, CA Double Track Project. [includes HRER—Tang and Smallwood, 2009; and ASR—Hogan and Smallwood, 2009]	Within
ME-07399	2010	Kaijankoski, P.	Letter Report Re: Fresno Reliability Transmission Project	Within
ME-08189	2013	Bassett, E.	Cultural Resources Inventory Report LeGrand-Chowchilla 115 kV Reliability Project, Merced and Madera Counties, California.	Outside
ME-08824	2017	Zelazo, E.	Finding of No Adverse Effect without Standard Conditions for the Burchell Avenue Bridge Replacement Project, Merced County, California	Outside

4.2 Historical Map Review

Kleinfelder reviewed historical maps depicting features such as towns, roads, buildings, and creeks to provide additional information regarding the potential for the presence of historic-era cultural resources within the APE. Historic maps are available at several online repositories, in particular the U.S. Geological Survey (USGS) repository, the David Rumsey Map Collection, and the U.S. Department of the Interior Bureau of Land Management (BLM) General Land Office (GLO) Records. The following sources were consulted during the historical map review:

- Planada, Calif. 1:13,680 scale topographic quadrangle (USGS 1918a)
- Le Grand, Calif. 1:125,000 scale topographic quadrangle (USGS 1918b)
- Athlone, Calif. 1:62,500 scale topographic quadrangle (USGS 1942)
- Le Grand, Calif. 1:62,500 scale topographic quadrangle (USGS 1946)
- Planada, Calif. 1:24,000 scale topographic quadrangle (USGS 1948)
- Le Grand, Calif. 1:24,000 scale topographic quadrangle (USGS 1961)
- Historic Aerial of the APE (1946, NETR 2021)
- Township 7 South, Range 15 East, Mount Diablo Meridian (GLO Plat, BLM 1854a)
- Township 8 South, Range 16 East, Mount Diablo Meridian (GLO Plat, BLM 1854b)
- Township 8 South, Range 15 East, Mount Diablo Meridian (GLO Plat, BLM 1854c)
- Township 9 South, Range 16 East, Mount Diablo Meridian (GLO Plat, BLM 1854d)

The following summarizes the results of the historic map review of the APE:

The 1854 GLO Plats depict Miles's Creek, Owen's Creek, the Mariposa River, and Deadman's Creek intersecting the APE along with several unnamed drainages. No buildings, structures, or other locations of previous historic activities were noted. (BLM 1854a-d).

The 1918 Planda, Calif. quadrangle depicts Merced Rd. in the current location of E. Childs Avenue. No structures are shown within the APE but three are depicted between 400 to 875 feet outside of the APE (USGS 1918a).

The 1918 Athlone, Calif. quadrangle depicts the following roads within the APE: two unnamed roads following the modern-day alignments of S. Fresno Road and Jordan Road; the Plainsberg and Buchanan Hollow Rd., following the current alignment of Le Grand Road; Sharon Rd. (now S. Santa Fe Avenue); Athlone and Buchanan Hollow Rd. (on the alignment of present-day Buchanan Hollow Road); an unnamed dirt road (on the alignment of Earl Road); and five additional unnamed dirt roads. A segment of the Atchison, Topeka, and Santa Fe Railroad and channelized segments of Deadman and Dutchman creeks are also depicted within the APE. A structure is also depicted approximately 315 feet outside the APE (USGS 1918b).

The Le Grand Canal is shown on topographic maps from 1946, and 1948 (USGS 1946, 1947, and 1948) and historic aerial imagery from 1946 (NETR 2021). A 1946 topographic map depicts a windmill located within 350 feet of the APE and an unnamed dirt road within the APE (USGS 1946). The windmill is also shown on a 1946 historic aerial imagery (NETR 2021). One structure is depicted within the APE south of Le Grand Road. A road following the current alignment of S. Ipsen Avenue is also shown (USGS 1946). 1946 aerial photographs depict bridges spanning the Le Grand Canal on Cunningham Road, Dump Yard Road, S. Fresno Road, and Jordan Road (NETR

2021). A 1947 topographic map depicts Cunningham Road in its current alignment and a north-south trending powerline to the east (USGS 1947).

A 1948 topographic map depicts the Le Grand Canal in its current alignment. Two unnamed dirt canal access roads are depicted on the west side of the canal. E. Mission Avenue and State Route 140 are also depicted in their current alignments (USGS 1948). Both roads are also shown on a 1946 historic aerial photograph (NETR 2021). A bridge spanning the canal was shown but is no longer standing (NETR 2021).

A 1961 topographic map depicts a north-to-south-trending road on the east side of the Le Grand Canal. A pumphouse is also mapped east of S. Cunningham Road, which is still in use today (USGS 1961) and is also shown on a 1946 aerial photograph (NETR 2021).

4.3 Native American Heritage Commission Consultation

On August 20, 2021, Kleinfelder requested from the California Native American Heritage Commission (NAHC) a search of their Sacred Land Files (SLF). The NAHC responded on October 9, 2021, with a list of Native American contacts affiliated with the region to contact for additional information. Their SLF files resulted in negative findings within the vicinity of the APE. Kleinfelder completed no further Native American outreach, as it is the responsibility of the lead federal agency to conduct Section 106 Native American consultation and of the lead state agency to complete CEQA Assembly Bill 52 (AB 52) tribal consultation. The NAHC Native American contacts list is provided in Appendix C.

5.0 Field Methods and Results

Between September 20, 2021, and September 29, 2021, Kleinfelder archaeologists Zack Stake, and Nick Lucatorto, under the direction of senior archaeologist Jessica Neal and senior architectural historian Justin Castells, completed an intensive pedestrian survey of the APE. The survey was completed using 5- to 15-meter-spaced transects. Close inspection was given to all exposed ground soils and cut banks for the presence of archaeological materials. In addition, built environment resources constructed in or before 1976 were documented. The APE was photographed using a high-resolution digital camera (see Appendix B, Survey Photographs) and field observations were captured in written notes. Locational data were collected with Environmental Systems Research Institute Arc Collector application on Apple devices.

The APE was accessible by foot and 100 percent of the APE was surveyed. Ground visibility varied between zero and 100 percent. Soils varied but were predominantly tan sandy loam. Vegetation consisted of almond trees, cottonwood, willow, Persian silk trees, peach trees, locust, oak, walnut, water reeds, cattail, non-native grasses, star thistle, blackberry, datura, sagebrush, rabbit brush, and Maltese star thistle.

5.1 Observed Resources

Kleinfelder identified three previously recorded cultural resources and 27 newly recorded cultural resources within the APE. The resources are summarized in tables 4 and 5 below.

Table 4. Previously Recorded Resources Observed during Survey

Resource Number	Description
P-24-000608	P-24-00608 (CA-MER-00365H) consists of the Le Grand Canal. Kleinfelder surveyed an unrecorded 9.8-mile-long segment of the Le Grand Canal located between 10N 4133265 mN, 738887 mE and 10N 4124688 mN, 745689 mE. The recorded segment of canal is primarily unlined with the exception of intermittent concrete lining and riprap. The recorded segment is generally approximately 50 feet wide. It features several related structures including pumping stations, weirs, sluice gates, culverts, and pipes. The canal and its associated features appear in good condition.
P-24-001881	P-24-001881 consists of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad. Kleinfelder surveyed two unrecorded segments of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad between 10N 4125776 mN, 742271 mE and 10N 4125479 mN, 742577 mE. The recorded segment is comprised of a standard gauge single track line with wooden ties and crushed rock ballast. The alignment is approximately 20 feet wide. Associated features include a concrete single-span bridge located over a ditch. The historical material of the recorded segment has been largely replaced due to regular maintenance and repairs; however, the alignment appears to be unchanged.
P-24-001909	P-24-001909 consists of the Merced Irrigation District. The portion within the APE consists of the recorded portion of the Le Grand Canal, newly recorded resources LG-26, LG-27, LG-28, LG-29, LG-30, LG-31, LG-32, LG-33, LG-34, and LG-35 and their associated features including pumping stations, weirs, sluice gates, culverts, and pipes.

Table 5. Newly Recorded Resources in the APE

Resource Number	Description
LG-01	LG-01 consists of a recorded segment of a graded dirt road constructed ca. 1922-1927. The road follows the course of the southwest bank of the Le Grand Canal between Hayden Road and California Highway 140. The recorded segment is approximately 15 feet wide and 4,970 feet long. LG-01 is visible on historic aerials form 1945 and appears essentially the same as it does today. The USGS map from 1948 identifies the road as an unimproved road (USGS 1948). The road is located adjacent to a pumping station associated with the Le Grand Canal and was likely constructed for the operation and maintenance of the pumping station.
LG-02	LG-02 consists of a two-lane asphalt-paved portion of California Highway 140 initially constructed in ca. 1922. The recorded segment is approximately 35 feet wide and has a northeast-southwest alignment. The highway crosses over the Le Grand Canal via a culvert. While the alignment appears to be unaltered from its historic path, the materials comprising the road are non-historic due to continued maintenance over time. California Highway 140, also known as the All-Year Highway, was constructed to provide access to Yosemite Valley year-round (National Park Service 2021). A highway map of the State of California in 1922 depicts the route as paved from Merced to the Mariposa County line, after which it is depicted as graded but not paved to Yosemite (California Highway Commission 1922). By 1934, the entire expanse from Merced to Yosemite was completely paved (California Department of Public Works, Division of Highways 1934). California Highway 140 is visible on the 1946 aerial and appears as a two-lane concrete roadway. By 1958, it appears that the road was widened and paved with asphalt (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-03	LG-03 consists of two interrelated features: a bridge spanning the Le Grand Canal (Feature 1) and a recorded segment of East Childs Avenue. The road alignment was constructed prior to 1918 and previously identified as "Merced Road" (USGS 1918b), however; the bridge was likely initially constructed concurrent to the Le Grand Canal ca. 1922-1927. The bridge is a single-span concrete bridge with non-historic metal railings that facilitates East Childs Avenue crossing the Le Grand Canal. The bridge is approximately 40 feet by 30 feet. A tag reading "09383 1 X 1 14" was observed on the bridge. East Childs Avenue is a two-lane asphalt road with an east-west orientation. The recorded segment is approximately 20 feet wide and 220 feet long. The road and bridge appear essentially the same in the historic aerials from 1945 as they do today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-04	LG-04 is an approximately 15-foot-wide graded dirt road constructed ca. 1922-1927 running roughly north-south on the west side of the Le Grand Canal. LG-04 was depicted as an unnamed, unfinished road on a historic topographic map from 1948 (USGS 1948) and is visible in the 1946 historic aerials (NETR 2021). The road was likely constructed concurrent with the Le Grand Canal, ca. 1922-1927.
LG-06	LG-06 consists of two features: Feature 1 is a bridge spanning the Le Grand Canal (P-24-000806) and Feature 2 is a segment of East Mission Avenue composed of dirt. The bridge is a single-span concrete bridge with metal guard rails constructed prior to 1946 (NETR 2021). It is approximately 25 feet wide and 45 feet long. The recorded segment of East Mission Avenue is composed of a graded dirt road approximately 20 feet wide that was constructed prior to 1918 (USGS 1918b). It has an east-west orientation and appears to have been constructed to provide access to local agricultural properties and homes.

Resource Number	Description
LG-07	LG-07 consists of two features: Feature 1 is an approximately 12-foot-wide and 25-foot-long wooden bridge constructed ca. 1922-1927 spanning the Le Grand Canal. Feature 2 is a segment of Dump Yard Road which consists of a graded dirt road with a north-south orientation constructed ca. 1919 (USGS 1919). The recorded segment is approximately 25 feet wide and 305 feet long. LG-07 is visible in the 1946 historic aerial and appears essentially the same as it does today, however the road is bisected immediately north of the recorded segment by a retention pond constructed between 1959 and 1998 (NETR 2021).
LG-10	LG-10 consist of a segment of South Fresno Road constructed prior to 1918. The road is a graded gravel road with a north-south alignment. The recorded segment is approximately 25 feet wide and 456 feet long. The recorded segment spans the Le Grand Canal via a culvert which would have been constructed concurrent with the canal ca. 1922-1927. The road appears on the 1918 USGS map and is depicted as a light duty road (USGS 1918a).
LG-11	LG-11 consists of a recorded segment of Le Grand Road constructed prior to 1918 (USGS 1918). The recorded segment of Le Grand Road consists of a two-lane asphalt highway with an east-west alignment. The recorded segment is approximately 30 feet wide and 450 feet long. LG-11 is visible in the 1946 historic aerial as an unpaved road and appears to have been paved between 1946 and 1951 (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-12	LG-12 consists of a graded dirt and gravel road constructed prior to 1918 (USGS 1918a). The recorded segment is approximately 6 feet wide and 370 feet long. The 1918 USGS map depicts it as a light duty road and it is visible on historic aerials from 1946 appearing essentially the same as it does today (USGS 1918, NETR 2021).
LG-15	LG-15 consists of a segment of South Ipsen Avenue constructed prior to 1946 (USGS 1946). The recorded segment of South Ipsen Avenue is comprised of a two-lane asphalt road with a northeast-southwest alignment. It is approximately 15 feet wide and 230 feet long. The road is visible on historic aerials from 1946 and appears essentially the same as it does today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-16	LG-16 consists of a segment of South Santa Fe Avenue constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with a northwest-southeast orientation. The recorded segment is approximately 25 feet wide and 255 feet long. It was identified as “Sharon Road” on the 1918 USGS map and depicted as a light duty road (USGS 1918a). Between 1918 and 1946, the road was upgraded to a secondary highway (USGS 1946) and appears on historic aerials essential the same as it does today (NETR 2021). By 1961, the road had been relabeled as “Santa Fe Avenue” (USGS 1961). The road appears to have been initially constructed as a service road for the adjacent Santa Fe Railroad alignment. While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including paving between 1959 and 1998 (NETR 2021) and repaving resulting in the loss of historical materials.
LG-17	LG-17 consists of a recorded segment of Buchanan Road constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with an east-west alignment. The recorded segment is approximately 20 feet wide and 320 feet long. It was identified as “Athelone and Buchanan Road” on the 1918 USGS map and depicted as a light duty road (USGS 1918a). It is visible on the 1946 historic aerials and appears essentially the same as its current appearance (NETR 2021). By 1961, the road was renamed “Buchanan Road” (USGS 1961). While the alignment of the road appears unchanged, it appears to have

Resource Number	Description
	been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-18	LG-18 consists of a recorded segment of Earl Road constructed prior to 1946 (USGS 1946). It is comprised of an approximately 15-foot-wide and 5,280-foot-long asphalt road with a north-south alignment. It is depicted on the 1946 USGS map as an unpaved road (USGS 1946) and appears as such in historical aerials from that time (NETR 2021). By 1961, it had likely been paved and was upgraded to a light duty road (USGS 1961). It appears today as it likely did in 1961; however, the asphalt has significantly deteriorated.
LG-20	LG-20 consists of a recorded segment of an unnamed graded dirt road constructed prior to 1946 (USGS 1946). The road is approximately 20 feet wide and 4,845 feet long and has an east-west alignment. The road appears on the 1946 USGS map as an unimproved road (USGS 1946). Historic aerials form 1946 depict the road essentially the same as it appears today (NETR 2021).
LG-22	LG-22 consists of two features. Feature 1 is a concrete bridge spanning the Le Grand Canal constructed ca. 1922-1927 and Feature 2 is a recorded portion of Jordan Road constructed prior to 1918 (USGS 1918a). The bridge is single span and is constructed of concrete. It is approximately 23 feet wide and 20 feet long. The recoded section of Jordan Road is comprised of an asphalt roadway with an east-west orientation measuring approximately 15 feet wide and 490 feet long. The roadway is depicted in the 1918 USGS map as a light duty roadway (USGS 1918a). The bridge was constructed concurrent with the Le Grand Canal ca. 1922-1927. Both the road and the bridge appear in historic aerial images from 1946 and appear essentially the same as the way they appear today (NETR 2021).
LG-23	LG-23 consists of the recorded segment of an unnamed graded dirt road constructed prior to 1946 (NETR 2021). The recorded segment is approximately 15 feet wide and 5,280 feet long. The road generally has a north-south alignment which follows the contours of the Le Grand Canal located adjacent to the road to the east. The road first appears on USGS maps in 1961 and is depicted as an unimproved road (USGS 1961).
LG-24	LG-24 consists of the recorded segment of South Cunningham Road constructed prior to 1946 (NETR 2021). The recorded segment of South Cunningham Road consists of a two-lane asphalt road with a north-south alignment. The recorded segment is approximately 24 feet wide and 270 feet long. The road is depicted on the 1947 USGS map as a secondary highway (USGS 1947). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.
LG-26	LG-26 consists of the recorded segment of an unnamed ditch constructed between 1959 and 1998 (NETR 2021). The ditch is approximately 15 feet wide and 435 feet long. It has a northwest-southeast orientation before gradually curving to a northeast-southwest orientation. Based on its proximity to neighboring orchards, the ditch was likely constructed to support agriculture.
LG-27	LG-27 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 14 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate. The canal has a north-south alignment before transitioning to a northeast-southwest alignment. This segment was observed on a historic topographic map from 1961 (USGS 1961).
LG-28	LG-28 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 20 feet wide. The canal segment connects directly to the Le Grand Canal. The canal has an east-west alignment before transitioning into a north-south alignment where it transitions into an irregular

Resource Number	Description
	alignment and feeds into additional irrigation canals. The canal segment is observed on a historic topographic map from 1948 (USGS 1948).
LG-29	LG-29 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 12 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate and has a north-south alignment. The canal was observed on a historic topographic map from 1961 (USGS 1961).
LG-30	LG-30 consists of the recorded segment of a channelized section of Miles Creek constructed ca. 1946 (NETR 2021). The channel runs northeast to southwest and bisects the Le Grand Canal. It features a concrete weir flanked by rip rap where the channel meets the canal on the northeast bank.
LG-31	LG-31 consists of the recorded segment of the Ivett Lateral, an earthen irrigation lateral canal constructed prior to 1946 (NETR 2021). The recorded segment is approximately 35 feet wide and 95 feet long. It has an east-west alignment and joins the Le Grand Canal at a cement-lined sluice culvert inlet. A tag reading "089596 R 24 L 07 00 U" was observed on the sluice gate. The canal is flanked by dirt access roads. The lateral was observed on a historic topographic map from 1961 (USGS1961).
LG-32	LG-32 consists of a segment of earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The recorded section has an east-west alignment approximately 24 feet wide. The canal intersects with the La Grand canal by a wood sluice gate and culvert. The canal was observed on a historic topographic map from 1961 (USGS 1961).
LG-33	LG-33 consists of a recorded portion of the Parker Lateral constructed prior to 1946 (NETR 2021). The recorded portion of the Parker Lateral is an earthen branch irrigation canal with an east-west orientation. The canal intersects with the Le Grand Canal via a metal sluice gate and concrete culvert on the west bank of the Le Grand Canal. The recorded section of the Parker Lateral is approximately 16 feet wide.
LG-34	LG-34 consists of a recoded segment of an earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. It is observed in the historic topographic map from 1961 (USGS 1961).
LG-35	LG-35 consists of a segment of earthen canal constructed ca. 1946. The recorded segment of the canal is approximately 20 feet wide and 200 feet long. It has an east-west orientation and connects with the Le Grand Canal via wooden sluice on the west terminus. The canal first appears of the USGS map from 1946 (USGS 1946) and is visible on historic aerials from 1945 (NETR 2021).

6.0 Evaluations

A summary of the evaluations of the previously recorded and newly recorded resources within the APE are included in the table below (Table 6). Evaluations of each resource under NRHP and CRHR criteria are included on the DPR forms in Appendix E.

Table 6. Summary of Recommended Site Eligibility

Resource Number	Description	Individual Eligibility Recommendation
P-24-000608	Le Grand Canal	This resource was previously recommended as not eligible for the CRHR or the NRHP in 2000 (Larson and Cannon 2000). Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Le Grand Canal is not individually eligible for the NRHP or the CRHR under any criteria. Kleinfelder does, however, recommended the Le Grand Canal as a contributor to the Merced Irrigation District (P-24-001909).
P-24-001881	Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad	This resource was previously recommended not eligible for the NRHP or the CRHR under any criteria (Lortie 2002). Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad is not eligible for the NRHP or the CRHR under any criteria.
P-24-001909	Merced Irrigation District	Several potential contributing resources are located within the APE: the Le Grand Canal, LG-26, LG-27, LG-28, LG-29, LG-30, LG-31, LG-32, LG-33, LG-34, and LG-35. These contributing resources are not individually eligible for the NRHP or the CRHR, but are contributors to the Merced Irrigation District.
LG-01	Recorded segment of a graded dirt road constructed ca. 1922-1927	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-01 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-02	Recorded segment of California Highway 140 initially constructed in ca. 1922	This resource does meet NRHP Criterion A or CRHR Criterion 1 at the national level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. California Highway 140 was constructed to provide better all-year access to Yosemite National Park. It is indicative of the growing interest in automobile leisure during the early- and mid-twentieth century and the increasing important of the National Parks. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because California Highway 140 does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-03	Recorded segment of East Childs	This resource does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a

Resource Number	Description	Individual Eligibility Recommendation
	Avenue constructed prior to 1918 and an associated bridge	significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Planada and Merced. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because East Childs Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-04	Graded dirt road constructed ca. 1922-1927	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-04 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-06	Recorded segment of East Mission Avenue constructed prior to 1918 and an associated bridge	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-06 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-07	Recorded segment of Dump Yard Road constructed ca. 1922-1927 and an associated bridge	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-07 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-10	Recorded segment of South Fresno Road constructed prior to 1918	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-10 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-11	Recorded segment of Le Grand Road constructed prior to 1918	This resource does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because Le Grand Road does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-12	Recorded segment of an unnamed dirt and gravel road	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-12 is not a historic

Resource Number	Description	Individual Eligibility Recommendation
	constructed prior to 1918	property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-15	Recorded segment of South Ipsen Avenue constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-15 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-16	Recorded segment of South Santa Fe Avenue constructed prior to 1918	This resource does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was a major route connecting the community of Le Grand with Planada, predating 1918, and followed the alignment of the Burlington Northern-Santa Fe Railroad. While the fact that it followed the railroad alignment is not significant, the road was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand and Planada. However, this resource does not retain integrity of design, materials, workmanship, feeling, and association. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance. Because South Santa Fe Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-17	Recorded segment of Buchannan Road constructed prior to 1918	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-17 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-18	Recorded segment of Earl Road constructed prior to 1918	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-18 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-20	Recorded segment of an unnamed graded dirt road constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-20 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-22	Recorded segment of Jordan Road constructed ca. 1946 and an associated bridge	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-22 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-23	Recorded segment of an unnamed graded dirt road constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-23 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-24	Recorded segment of South	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-24 is not a historic

Resource Number	Description	Individual Eligibility Recommendation
	Cunningham Road constructed prior to 1946	property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-26	Recorded segment of a ditch constructed between 1959 and 1998	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-25 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-27	Recoded segment of an earthen branch irrigation canal segment constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-27 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-28	Recoded segment of an earthen branch irrigation canal segment constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-28 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-29	Recoded segment of an earthen branch irrigation canal segment constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-29 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-30	Recoded segment of a channelized section of Miles Creek constructed ca. 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-30 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-31	Recorded segment of the Ivett Lateral constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-31 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-32	Recorded segment of earthen branch irrigation canal constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-32 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-33	Recorded segment of the Parker Lateral constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-33 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-34	Recoded segment of an earthen branch irrigation canal constructed prior to 1946	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-34 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
LG-35	Recoded segment of an earthen branch irrigation canal	This resource does not meet any of the criteria for inclusion on the CRHR or the NRHP. Therefore, LG-35 is not a historic

Resource Number	Description	Individual Eligibility Recommendation
	constructed prior to 1946	property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

Four newly recorded resources (LG-02, LG-03, LG-11, and LG-16) were recommended by Kleinfelder as individually eligible for the CRHR and the NRHP. However, all four resources lacked sufficient historic integrity to convey their historic significance and, therefore, are not considered historic properties for the purposes of Section 106 or historical resources for the purposes of CEQA.

One previously recorded historic resource, the Merced Irrigation District (P-24-001909), was previously recommended as eligible for the NRHP as a historic district. A historic district is a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. The individual elements that comprise a historic district may not be eligible as a historic property or a historical resource on their own, but when taken into the larger context of a district they may be considered a contributor to the historical significance of the district. The Le Grand Canal, while not individually eligible for the CRHR or the NRHP, is recommended as a contributor to the Merced Irrigation District (P-24-001909). The Merced Irrigation District (P-24-001909), which includes the Le Grand Canal, is a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA.

7.0 Finding of Effect

Section 106 of the NHPA and its implementing regulations require Federal agencies to consider the effects of undertakings on historic properties. An effect is defined as an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register (36 CFR 800.16[i])." In the event that an undertaking will have an effect on a historic property, the nature of the effect must be assessed.

One previously recorded historic property, the Merced Irrigation District (P-24-001909), was previously recommended as eligible for the NRHP as a historic district and is located within the APE.

7.1 Application of the Criteria of Adverse Effect

Undertakings that will have an effect on historic properties must be further assessed to characterize the nature of the affect (e.g., adverse, neutral, beneficial, etc.). Specific criteria for determining whether an undertaking would adversely affect a historic property are provided in 36 CFR 800.5. An effect is considered adverse when it directly diminishes the integrity of a property's location, design, setting, materials, workmanship, feeling or association. Examples of adverse effects cited in 36 CFR 800.5 include the following:

i. Physical destruction of or damage to all or part of the property;

ii. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties and applicable guidelines;

iii. Removal of a property from its historic location;

iv. Change in the character of a property's use or physical features within the property's setting that contribute to its historic significance;

v. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

vi. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance; and

vii. Transfer, lease or sale of property out of Federal ownership and control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

If a historic property would be adversely affected by the undertaking, then prudent and reasonable measures to avoid, reduce, or otherwise compensate for the effect must be taken. Alternatively, the lead Federal agency may conclude, in consultation with the SHPO, that a "no adverse effect" determination is appropriate under circumstances where the undertaking would not diminish the integrity of the historic property.

7.2 Significant Impacts Under CEQA

According to CEQA, a project that has been determined to conform with the Secretary of the Interior's Standards for the Treatment of Historic Properties can generally be considered to be a project that will not cause a significant impact (14 CCR Section 15126.4(b)(1)). In the case of historic built environment resources, a significant impact is a substantial adverse change to the historic integrity of a resource. A substantial adverse change includes demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired. The significance of a historical resource is materially impaired when a project:

> (A) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
>
> (B) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a County Register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
>
> (C) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

7.3 Findings

The Project includes improvements, rehabilitation, and expanding of the existing Le Grand Canal including constructing approximately 4.9 miles of a new canal segment from MID Booster #3 to the Chowchilla River and increasing the existing canal width.

The Merced Irrigation District (P-24-001909) includes approximately 825 miles of irrigation systems, of which the recorded portion of the Le Grand Canal in the APE comprises approximately 9.8 miles. While not all the irrigation systems and associated features within the MID are considered contributors to the historical district, elements constructed during its period of significance (1919-1939) are all considered potential contributors to the district's historical significance. The Le Grand Canal, which was constructed between 1922 and 1927, contributes to the historical significance of the Merced Irrigation District (P-24-001909).

The proposed Project will result in physical changes to the Le Grand Canal, which will include widening and extending the existing canal. However, these actions will not result in a significant loss of historical material that will compromise the ability of the Merced Irrigation District (P-24-001909) to convey its historic significance. There will be no significant change to the overall appearance, route, or function of the recorded portion of the Le Grand Canal or the larger Merced Irrigation District (P-24-001909), despite the extension of the existing canal. The portion of the Merced Irrigation District (P-24-001909) that will be modified as part of this Project is a relatively small portion of a much larger resource and will not result in a substantial change to the overall appearance or function of the historic district. The district will still be recognizable as an early twentieth-century irrigation district and its association with farming in the San Joaquin Valley and statewide irrigation projects that occurred during the early twentieth century will not be compromised by this Project.

Based on the current understanding of the proposed Project, Kleinfelder recommends a finding of no adverse effect to historic properties pursuant to 36 CFR § 800.5 and no significant impact for the purposes of CEQA.

8.0 Conclusion and Recommendations

The following provides the conclusions of the cultural resource inventory and recommendations for the APE.

8.1 Conclusion

The cultural resource inventory of the APE included a review of the natural and cultural environment including the prehistory, ethnography, and history; a review of historic maps; record search results from the CCIC; consultation with the NAHC; and a pedestrian survey. As a result of survey efforts, Kleinfelder identified 27 newly recorded cultural resources and three previously recorded cultural resources within the APE. Of the 27 newly recorded resources, four resources (LG-02, LG-03, LG-11, and LG-16) were recommended by Kleinfelder as individually eligible for the CRHR and the NRHP. However, all four resources lacked sufficient historic integrity to convey their historic significance and, therefore, are not considered historic properties for the purposes of Section 106 or historical resources for the purposes of CEQA. Only the Merced Irrigation District (P-24-001909) is considered a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA. While not considered individually eligible for either the CRHR or the NRHP, the Le Grand Canal (P-24-000608 [CA-MER-00365H]) was identified by Kleinfelder as a contributor to the Merced Irrigation District (P-24-001909) historic district.

Based on the current understanding of the proposed Project, Kleinfelder recommends a finding of no adverse effect to historic properties pursuant to 36 CFR § 800.5 and no significant impact for the purposes of CEQA.

8.2 Recommendations

Based upon the background research and survey results, the APE has a low sensitivity for buried cultural resources and the following is recommended:

- If archaeological resources are encountered, all ground-disturbing work at the find location plus a reasonable buffer zone must be immediately suspended, the approving County department contacted, and a qualified professional archaeologist will be retained to analyze the significance of the find and formulate further mitigation (e.g., Project relocation, excavation plan, and protective cover) in consultation with culturally affiliated tribes or other descendant groups, where applicable.
- Pursuant to California Health and Safety Code §7050.5, if known or suspected Native American or other human remains are encountered, all ground-disturbing work must cease in the vicinity of the discovery, and the County Coroner shall be contacted. The respectful treatment and disposition of remains and associated grave offerings shall be in accordance with Public Resource Code (PRC) §5097.98. The applicant and successors in interest are ultimately responsible for ensuring compliance with this condition.
- In the event of Project redesign extending beyond the current APE surveys shall be required to assess these areas for the presence of cultural resources. Any newly discovered or previously recorded sites within the additional survey areas shall be recorded (or updated) on appropriate DPR 523-series forms. If avoidance of these resources is not feasible, then an evaluation and/or data recovery program shall be drafted and implemented.

9.0 Preparers' Qualifications

Kleinfelder senior archaeologist Jessica Neal contributed to this report. She has a Bachelor of Science degree in anthropology from Loyola University Chicago and a Master of Arts degree in Maritime Archaeology from the University of Southern Denmark. She is a registered professional archaeologist (#17230) and a member of the Society for California Archaeology. She meets the Secretary of the Interior's Standards for prehistoric and historical archaeology. Ms. Neal has nine years of experience in cultural resources management, including project management, personnel management, field survey, excavation and data recovery, laboratory analysis, collections management, and geographic information system (GIS) applications in environmental planning. She has experience in preparation of archaeological research, built environment, and archaeological evaluations for inclusion in the NRHP and CRHR, and survey, testing, excavation, and monitoring reports pursuant to the requirements of CEQA, Section 106 of the NHPA, and the National Environmental Policy Act (NEPA).

Kleinfelder senior architectural historian Justin Castells contributed to this report. He is an architectural historian who exceeds the Secretary of the Interior's Professional Qualification Standards in architectural history and history. Justin has a M.A. in History and over fourteen years of professional experience in historic preservation and cultural resources management. Justin has worked on assessments for properties based on local, CRHR, and NRHP criteria. He has prepared technical reports in compliance with NEPA, CEQA, and Section 106 and 110 of the NHPA. He has completed work for various federal, state, and local agencies.

Kleinfelder archaeologist Zack Starke contributed to this report. He has Bachelor of Arts degrees in history and anthropology from the University of California, Davis and a Master of Arts degree in Historic Archaeology from the University of Denver. He meets the Secretary of the Interior's Standards for prehistoric and historical archaeology. Mr. Starke has 3 years of experience in cultural resource management including field survey, construction monitoring, laboratory analysis, personnel management, collections management, and GIS application in environmental planning. He has prepared technical reports in compliance with NEPA, CEQA, and Section 106 and 110 of the NHPA. He has completed work for various federal, state, and local agencies.

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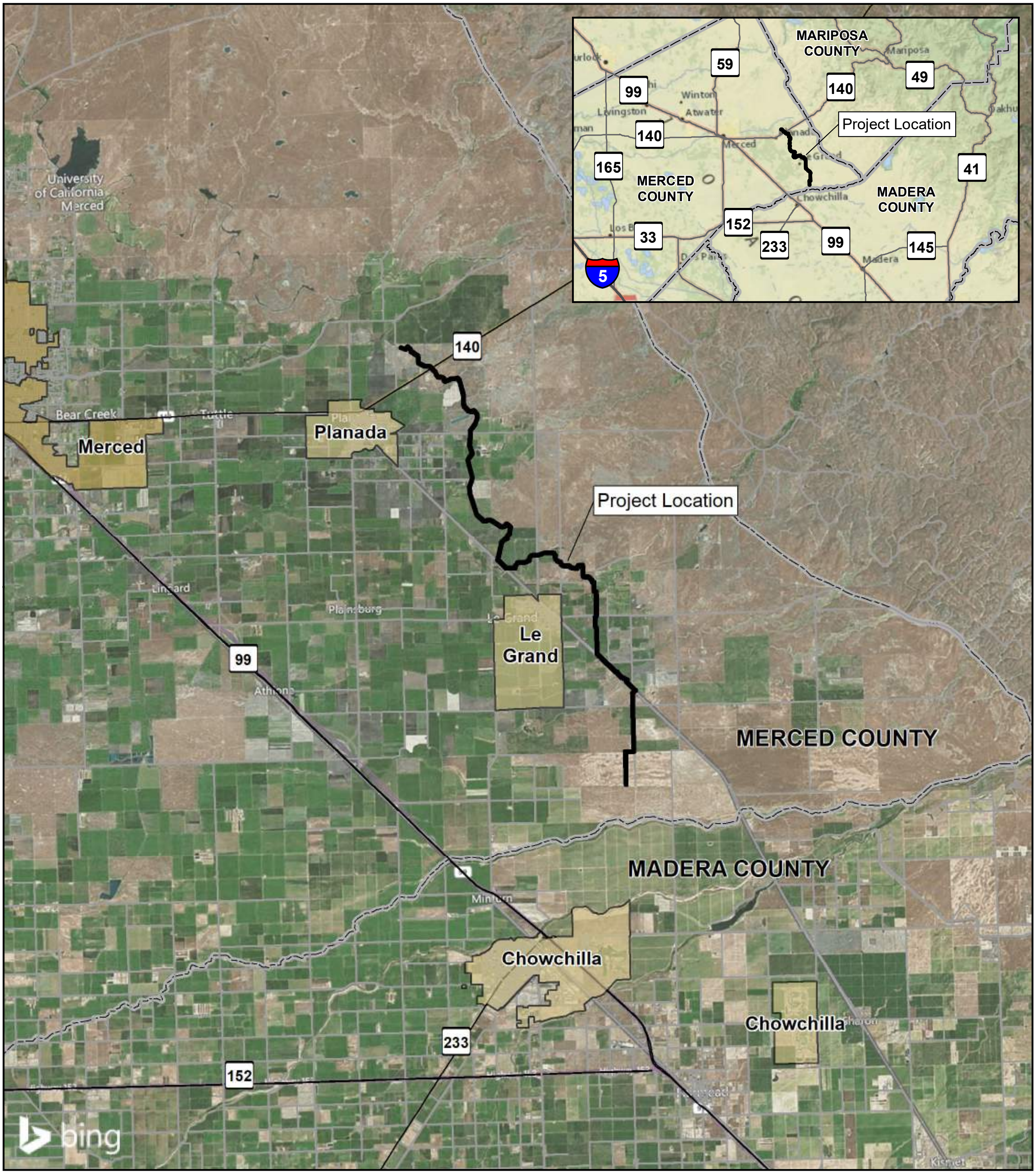
Appendix A

FIGURES



Source: Bing Maps

0 1.5 3 Miles
0 2.5 5 Kilometers

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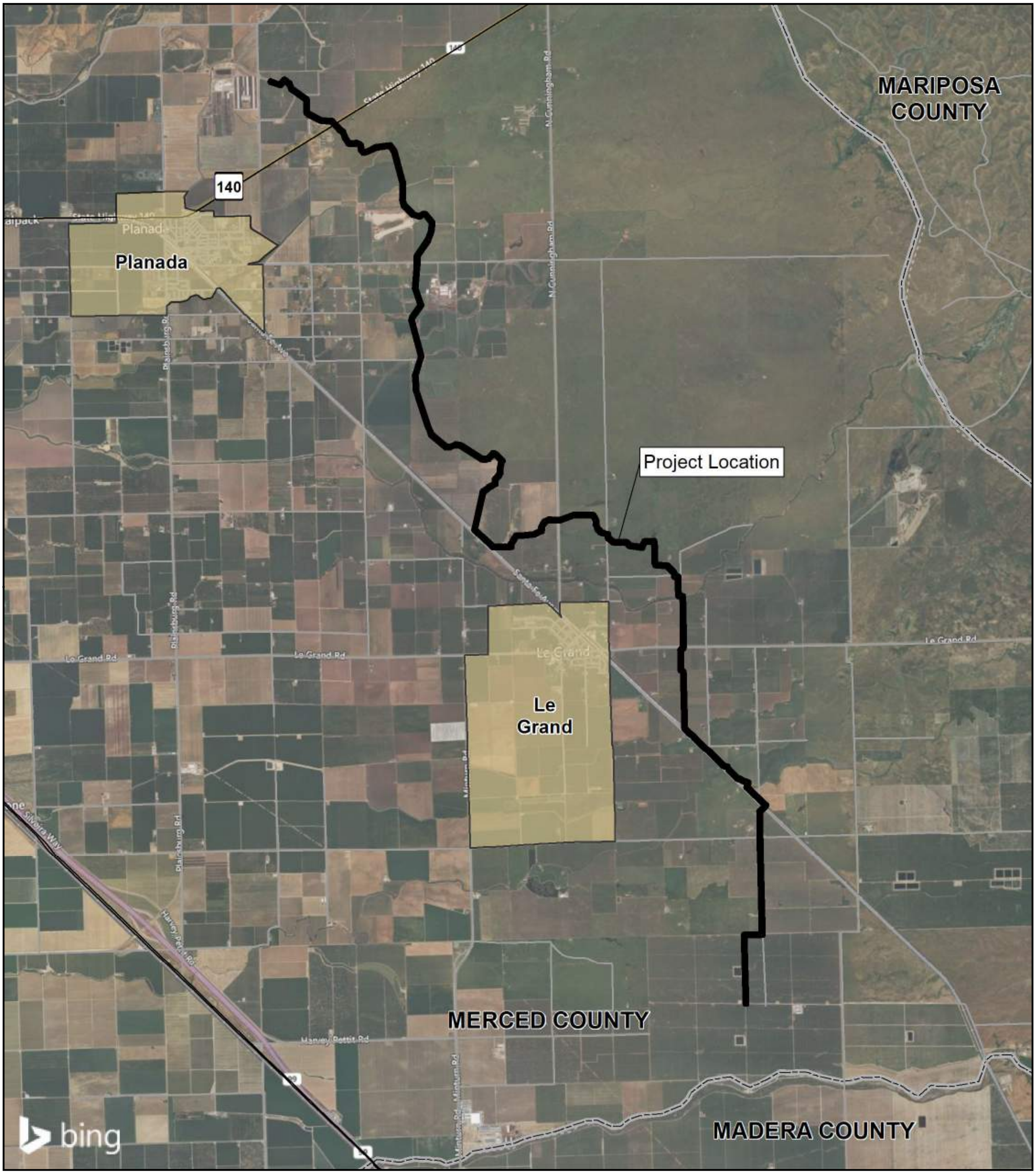
Scale 1:190,080
1 in = 3 miles

Regional Vicinity
Le Grand Project
Merced County, California

KLEINFELDER
Bright People. Right Solutions.



Created By: C BARKERSWITZER Document Path: \\azrgisstorp01\GIS_Projects\Client\GANDA\Other_Cult\20221536_Le_Grand\Le_Grand_APE.mxd

Source: Bing Maps

0 1 2 Miles

0 1.5 3 Kilometers

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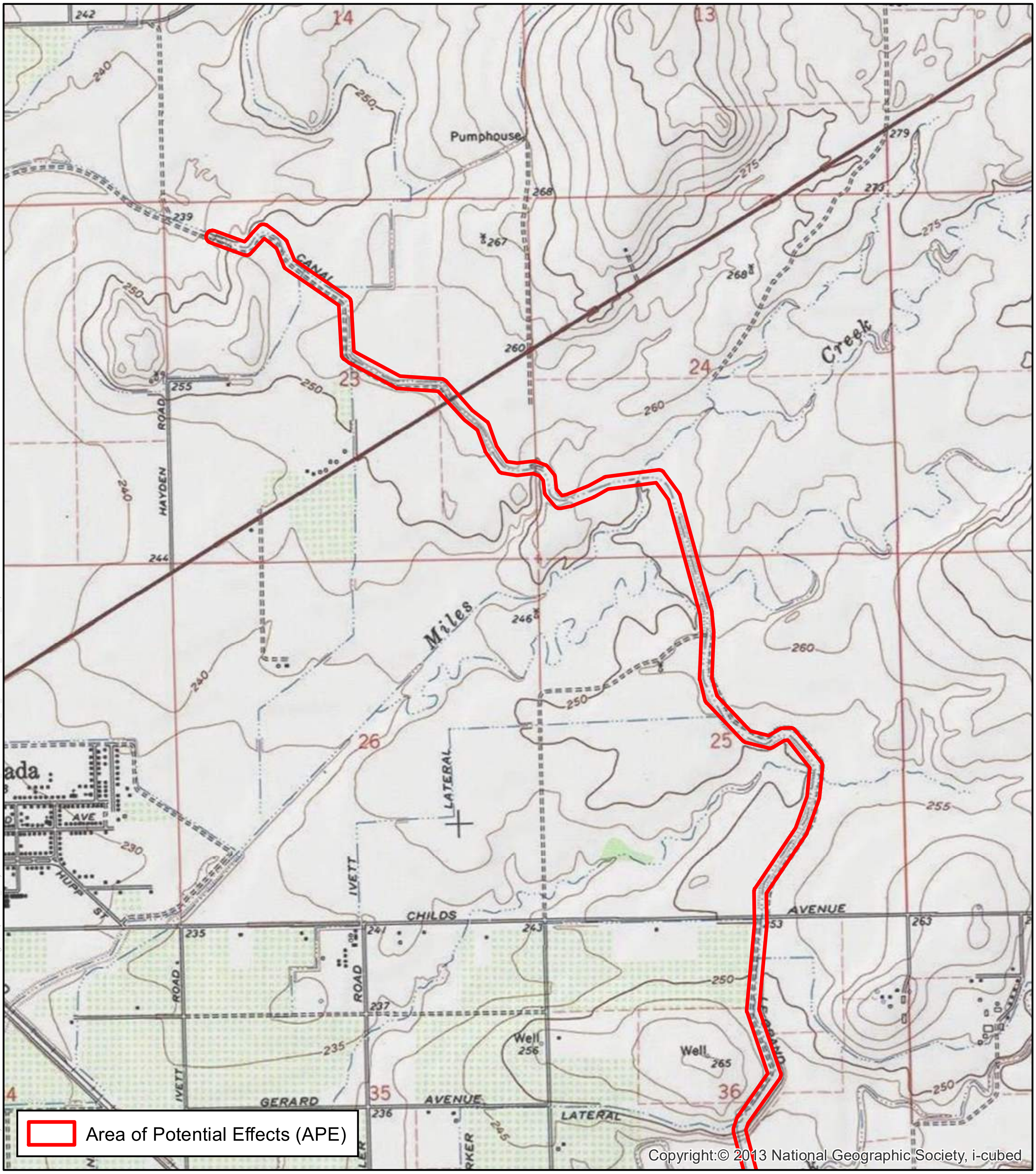
Scale 1:90,000

Area of Potential Effect (APE)
Le Grand Project
Merced County, California

KLEINFELDER
Bright People. Right Solutions.



USGS 7.5' Quad: PLANADA (1973)

Legal Description: T07S, R15E, SEC 14, 15, 22-26, 36;
T07S, R16E, SEC 30, 31

0 1,000 2,000 Feet

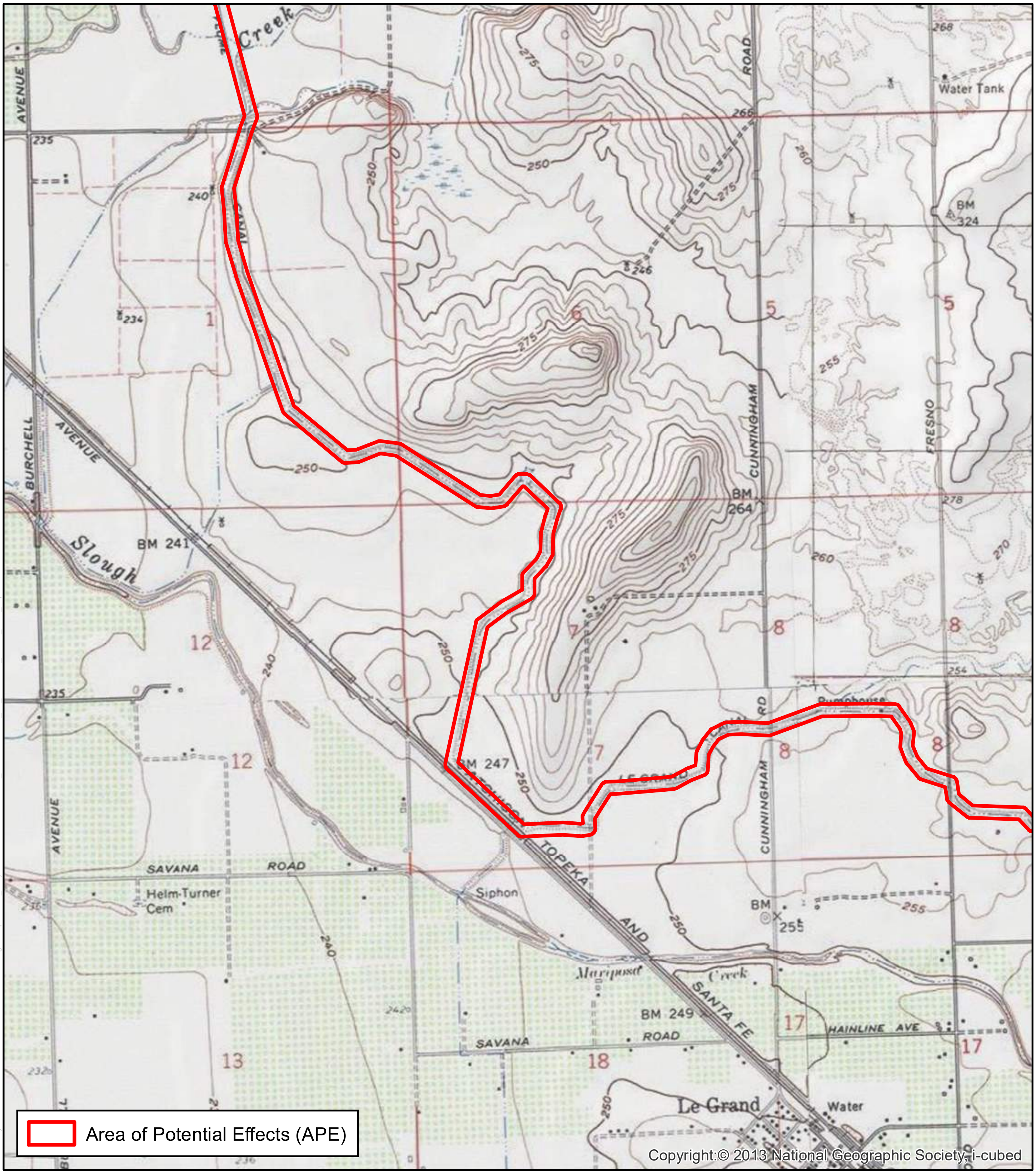
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Area of Potential Effect (APE)
Le Grand Project
Merced County, California
Page 1 of 4

KLEINFELDER
Bright People. Right Solutions.



USGS 7.5' Quad: LE GRAND (1981), OWENS RESERVOIR (1978); PLAINSBURG (1976), PLANADA (1973)
Legal Description: T07S, R16E, SEC 31, 36;
T08S, R15E, SEC 1, 12, 13; T08S, R16E, SEC 6-8, 17, 18

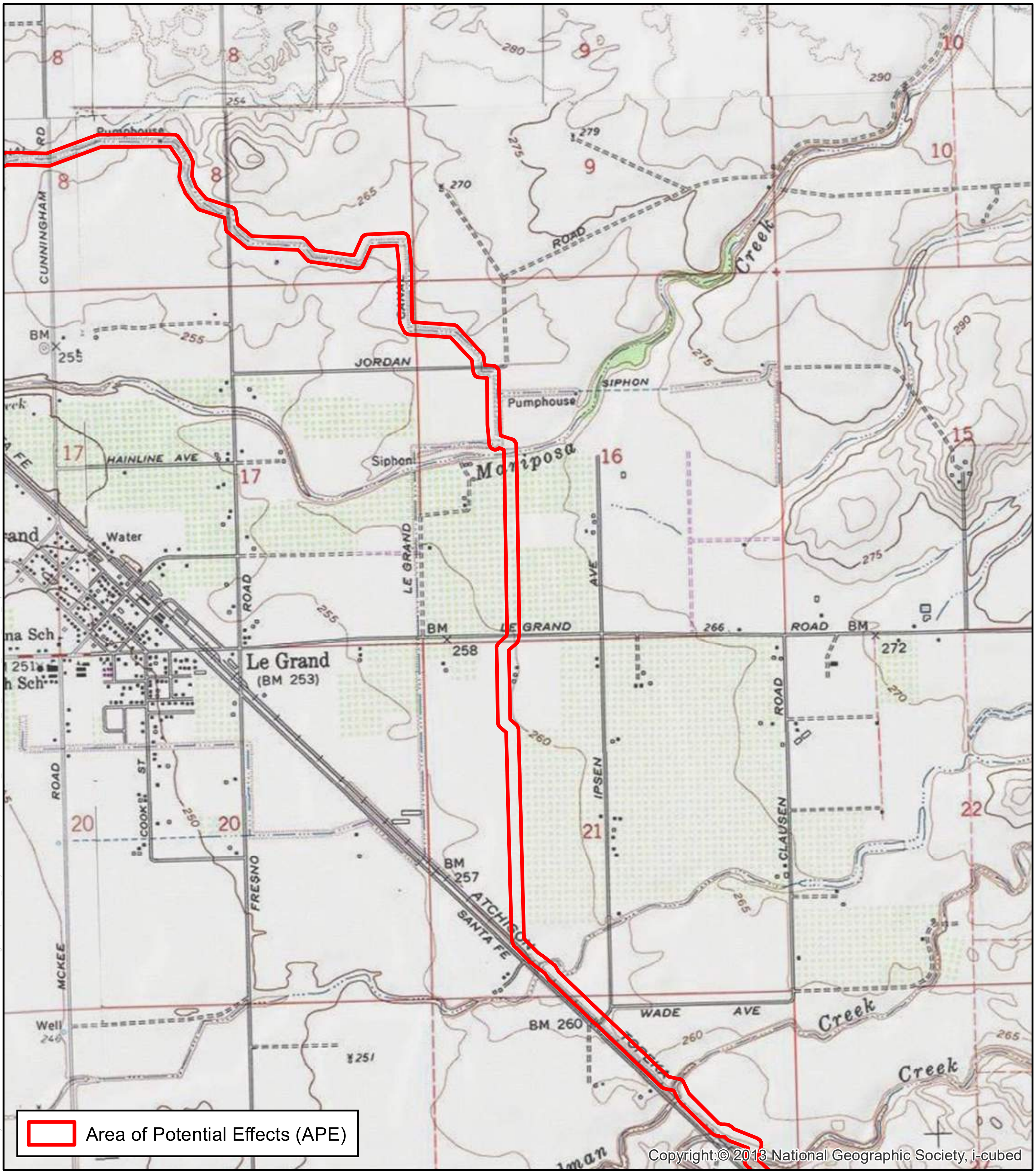
0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Area of Potential Effect (APE)
Le Grand Project
Merced County, California
Page 2 of 4

KLEINFELDER
Bright People. Right Solutions.



USGS 7.5' Quad: LE GRAND (1981), OWENS RESERVOIR (1978); PLAINSBURG (1976), PLANADA (1973)
Legal Description: T08S, R16E, SEC 8, 9, 16, 17, 20-22, 27-29

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Area of Potential Effect (APE)
Le Grand Project
Merced County, California
Page 3 of 4

KLEINFELDER
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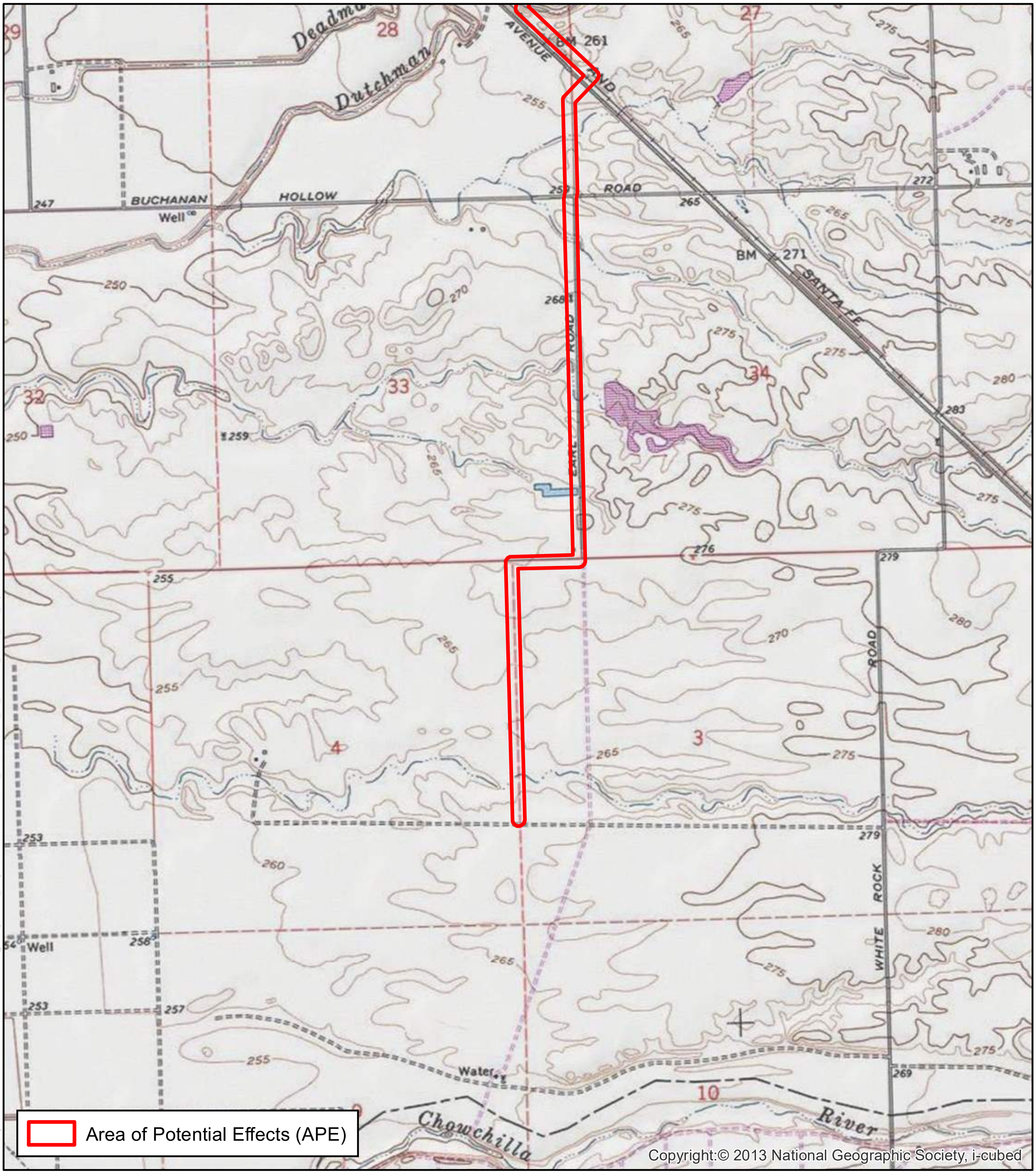

Area of Potential Effects (APE)

USGS 7.5' Quad: LE GRAND (1981)

Legal Description: T08S, R16E, SEC 27, 28, 33, 34;
T09S, R16E, SEC 3, 4

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Area of Potential Effect (APE)
Le Grand Project
Merced County, California
Page 4 of 4

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Appendix B

SURVEY PHOTOGRAPHS

Overview of the northern portion of the APE, facing norwest.

Overview of the northern portion of the APE, facing norwest.

Overview of southern portion of the APE, facing East.

Overview of southern portion of the APE, facing North.

Appendix C

NATIVE AMERICAN HERITAGE COMMISSION CONSULTATION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

STATE OF CALIFORNIA **Gavin Newsom, *Governor***

NATIVE AMERICAN HERITAGE COMMISSION

October 9, 2021

JNeal
Kleinfelder

Via Email to: jneal@kleinfelder.com

Re: Le Grand Athlone Water District Intertie Project, Madera and Merced Counties

Dear Mr. /Ms. Neal:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions, please contact me at my email address: Katy.Sanchez@nahc.ca.gov.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Environmental Planner

Attachment

Native American Heritage Commission
Native American Contacts List
October 9, 2021

Amah Mutsun Tribal Band
Valentin Lopez, Chairperson
P.O. Box 5272 — Ohlone/Costanoan, North Valley Yokuts
Galt ,CA 95632
vlopez@amahmutsun.org
(916) 743-5833

North Fork Rancheria of Mono Indians
Elaine Bethel Fink, Chairperson
P.O .Box 929 — Mono
North Fork ,CA 93643
efink@nfr-nsn.gov
(559) 877-5531
(559) 877-2467 Fax

Chicken Ranch Rancheria of Me-Wuk Indians
Lloyd Mathiesen, Chairperson
P.O. Box 1159 — Miwok - Me-wuk
Jamestown ,CA 95327
lmathiesen@crtribal.com
(209) 984-9066
(209) 984-9269

North Valley Yokuts Tribe
Katherine Erolinda Perez, Chairperson
P.O. Box 717 — Ohlone/Costanoan, Northern Valley Yokuts, Bay Miwok
Linden ,CA 95236
canutes@verizon.net
(209) 887-3415

Dumna Wo-Wah Tribal Goverment
Robert Ledger Sr., Chairperson
2191 West Pico Ave. — Dumna/Foothill Yokuts, Mono
Fresno ,CA 93705
ledgerrobert@ymail.com
(559) 540-6346

Picayune Rancheria of Chukchansi Indians
Claudia Gonzales, Chairwoman
P.O. Box 2226 — Chukchansi / Yokut
Oakhurst ,CA 93644
cgonzales@chukchansitribe.net
(559) 412-5590

Muwekma Ohlone Indian Tribe of the SF Bay Area
Monica Arellano, Vice Chairwoman
20885 Redwood Road, Suite 232 — Ohlone / Costanoan
Castro Valley ,CA 94546
marellano@muwekma.org
(408) 205-9714

Santa Rosa Rancheria Tachi Yokut Tribe
Leo Sisco, Chairperson
P.O. Box 8 — Tache, Tachi, Yokut
Lemoore ,CA 93245
(559) 924-1278
(559) 924-3583 Fax

Nashville Enterprise Miwok-Maidu-Nishinam Tribe
Cosme A. Valdez, Chairperson
P.O. Box 580986 — Miwok
Elk Grove ,CA 95758-001
valdezcome@comcast.net
(916) 429-8047 Voice/Fax
(916) 396-1173 Cell

Southern Sierra Miwuk Nation
Sandra Chapman, Chairperson
P.O. Box 186 — Miwok, Pauite, Northern Valley Yokut
Mariposa ,CA 95338
(559) 580-7871
sandra47roy@gmail.com

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Native American Heritage Commission
Native American Contacts List
October 9, 2021

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589 Yokuts
Porterville ,CA 93258
neil.peyron@tulerivertribe-nsn.gov
(559) 781-4271
(559) 781-4610 Fax

Tuolumne Band of Me-Wuk Indians
Andrea Reich, Chairperson
P.O. Box 699 Me-Wuk - Miwok
Tuolumne ,CA 95379
andrea@mewuk.com
(209) 928-5300 Office
(209) 928-1677 Fax

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Appendix D

RECORDS SEARCH RESULTS

CENTRAL CALIFORNIA INFORMATION CENTER

California Historical Resources Information System

Department of Anthropology – California State University, Stanislaus

One University Circle, Turlock, California 95382

(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 8/27/2021

Records Search File No.: 11876I
Access Agreement: #63
Project: Le Grand Athlone Water District Intertie Project

Jessica Neal
Kleinfelder
435 Lincoln Way
Auburn, CA 95603
618-771-6093 jneal@kleinfelder.com

Billing address: 1 Saunders Ave.
San Anselmo, CA 94960
415-458-5803

Dear Ms. Neal:

The Central California Information Center received your record search request for the project area referenced above, located on the Le grand, Owns Reservoir, Plainsburg and Planada 7.5' quadrangles in Merced County. The following reflects the results of the records search for the project study area and radius:

As per data currently available at the CCaIC, the locations of resources/reports are provided in the following format: ☐ custom GIS maps ☒ GIS Data/shape files ☐ hand-drawn maps

Summary Data:

Resources within the project area:	3: P-24-000608, 1881, 1909
Resources within the 1/2-mile radius:	1: P-24-000610
Reports within the project area:	5: ME-02930, 3628, 3995, 6955, 7399
Reports within the 1/2-mile radius:	4: ME-04058, 4849, 8189, 8824

Resource Database Printout (list): ☐ enclosed ☒ not requested ☐ nothing listed

Resource Database Printout (details): ☒ enclosed ☐ not requested ☐ nothing listed

Resource Digital Database Records: ☐ enclosed ☒ not requested ☐ nothing listed

Report Database Printout (list): ☐ enclosed ☒ not requested ☐ nothing listed

Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies:	☒ enclosed	☐ not requested	☐ nothing listed
OHP Historic Properties Directory: New Excel File: Built Environment Resource Directory (BERD) Dated 12/17/2019 P-24-000608, 1881	☒ enclosed	☐ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Maps:	☐ enclosed	☒ not requested	☐ nothing listed
Local Inventories:	☐ enclosed	☒ not requested	☐ nothing listed
GLO and/or Rancho Plat Maps:	☐ enclosed	☒ not requested	☐ nothing listed

Shipwreck Inventory: ☒ not available at CCIC; please go to
http://shipwrecks.slc.ca.gov/ShipwrecksDatabase/Shipwrecks_Database.asp

Soil Survey Maps: ☒ not available at CCIC; please go to

http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS

Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Note: Billing will be transmitted separately via email by our Financial Services office *($653.90), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

Sincerely,

E. A. Greathouse

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

* Invoice Request sent to: ARBilling@csustan.edu, CSU Stanislaus Financial Services

Resource Detail: P-24-000608

Identifying information

Primary No.: P-24-000608
Trinomial: CA-MER-000365H
Name: Le Grand Canal
Other IDs:

Type	*Name*
Other	Also P-24-001887, CA-MER-457H
Resource Name	Le Grand Canal

Cross-refs: See also 24-001887
Is an element of district 24-001909

Attributes

Resource type: Structure
Age: Historic
Information base: Survey
Attribute codes: HP20 (Canal/aqueduct) - canal
Disclosure: Unrestricted
Collections: No
Accession no(s):
Facility:

General notes

Accidentally given a second set of numbers: P-24-001887, CA-MER-457H. SEE THIS OTHER RECORD AS WELL.

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
4/18/1999	Wendy Pierce, R. Bethard, T. Overly, N. Stevens	Archaeological Research Center	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
ME-03628	1999	An Archaeological Survey Report for a Proposed Rehabilitation of State Route 140 Between Highway 99 and the Mariposa County Line, Merced County, California (10-MER-140, KP 57.6/80.9, PM 35.8/50.3).	Archaeological Research Center, CSU Sacramento; for Caltrans District 10
ME-04294	2001	Letter Report: Archaeological Survey and Assessment of the Fairfield Canal and Le Grand Canal Located in the Western Project Area of the Merced University Community Plan (Hunt Farms and Flying M Ranch), Merced County, California	William Self Associates
ME-07959	2007	Historical Resources Inventory and Evaluation Report, Atwater-Merced Expressway Project, Merced California.	JRP Historical Consulting, LLC. For Merced County Association of Governments

Location information

County: Merced
USGS quad(s): Planada
Address:
PLSS: T7S R15E NE¼ of SE¼ of Sec. 23 MDBM
UTMs: Zone 10 740040mE 4132340mN NAD27

Management status

Resource Detail: P-24-000608

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	5/21/2019	rhards	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.
Record status:			

Resource Detail: P-24-000610

Identifying information

Primary No.: P-24-000610
Trinomial: CA-MER-000367H
Name: Unnamed canal/Irrigation Ditch
Other IDs:

Type	*Name*
Resource Name	Unnamed canal/Irrigation Ditch

Cross-refs:

Attributes

Resource type: Structure
Age: Historic
Information base: Survey
Attribute codes: HP20 (Canal/aqueduct) - Canal
Disclosure: Unrestricted
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
4/18/1999	Wendy Pierce, R. Bethard, . Overly N. Stevens	Archaeological Research Center, CSUS	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
ME-03628	1999	An Archaeological Survey Report for a Proposed Rehabilitation of State Route 140 Between Highway 99 and the Mariposa County Line, Merced County, California (10-MER-140, KP 57.6/80.9, PM 35.8/50.3).	Archaeological Research Center, CSU Sacramento; for Caltrans District 10

Location information

County: Merced
USGS quad(s): Planada
Address:
PLSS: T7S R15E NW¼ of SE¼ of Sec. 23 MDBM
UTMs: Zone 10 739620mE 4132090mN NAD27

Management status

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	11/29/2018	rhards	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.

Record status:

Resource Detail: P-24-001881

Identifying information

Primary No.: P-24-001881
Trinomial:
Name: Burlington Northern Santa Fe Railroad; Atchison, Topeka & Santa Fe Railroad
Other IDs:

Type	Name
Resource Name	Burlington Northern Santa Fe Railroad
Resource Name	Atchison, Topeka & Santa Fe Railroad
OHP Property Numb	130531
OHP PRN	FHWA050324D

Cross-refs: Extends into another county as 39-000112

Attributes

Resource type: Structure
Age: Historic
Information base: Survey
Attribute codes: HP11 (Engineering structure) - Engineering Structure (Railroad line); HP37 (Highway/trail) - Railroad
Disclosure: Unrestricted
Collections: No
Accession no(s):
Facility:

General notes

F. Lortie (Caltrans) recording of 8/15/2002: HPDF entry Prop. #130531, status code 6Y.

Recording events

Date	Recorder(s)	Affiliation	Notes
2/2/2009	J. Smallwood	CRM Tech	Double Track ATSF RR
8/15/2002	F. Lortie	Caltrans District 10	Merced 59 Widening Project 10-MER-59, PM 15.3/16.6
5/23/2018	Wisely	Far Western	

Associated reports

Report No.	Year	Title	Affiliation
ME-06955	2009	Historic Property Survey Report, 10-Merced-BNSF RR, PM 1039.9 to 1056.4, Le Grand to Merced, CA Double Track Project. [includes HRER--Tang and Smallwood, 2009; and ASR--Hogan and Smallwood, 2009]	CRM TECH; for State of California Dept. of Transportation, Division of Rail
ME-07352	2005	16th Street/Olive Avenue Widening Project, Merced County, California, 10-MER-59, P.M. 15.3/16.6, OE5900; Initial Study with Proposed Mitigated Negative Declaration/Environmental Assessment.	U. S. DOT, FHWA, and Caltrans
ME-08026	2005	Historic Resource Evaluation Report for the Road Widening Project, State Route 59, Merced 10-MER-59, PM 15.3/16.6 (KP 24.6/26.7) Merced County, EA 10-0E5900.	(By and for) Caltrans District 10
ME-08988	2019	Archaeological Survey Report for Director's Orders Hazard Tree Removal in District 10, Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus and Tuolumne Counties, CA	Far Western Anthropological Research Group, Inc. for Caltrans

Location information

County: Merced
USGS quad(s): Atwater, Le Grand, Merced, Plainsburg, Planada
Address:
PLSS: T7S R14E Sec. 19 MDBM
T7S R14E Sec. 20 MDBM

	T7S R14E Sec. 25 MDBM
	T7S R14E Sec. 26 MDBM
	T7S R14E Sec. 27 MDBM
	T7S R14E Sec. 28 MDBM
	T7S R14E Sec. 29 MDBM
	T7S R15E Sec. 27 MDBM
	T7S R15E Sec. 28 MDBM
	T7S R15E Sec. 29 MDBM
	T7S R15E Sec. 30 MDBM
	T7S R15E Sec. 34 MDBM
	T7S R15E Sec. 35 MDBM
	T8S R15E Sec. 1 MDBM
	T8S R15E Sec. 2 MDBM
	T8S R15E Sec. 12 MDBM
	T8S R15E Sec. 29 MDBM
	T8S R16E Sec. 7 MDBM
	T8S R16E Sec. 17 MDBM
	T8S R16E Sec. 18 MDBM
	T8S R16E Sec. 20 MDBM
	T8S R16E Sec. 21 MDBM
	T7S R13E SE¼ of SE¼ of Sec. 14 MDBM
	T7S R13E SW¼ of SW¼ of Sec. 13 MDBM
	T7S R13E NW¼ of NW¼ of Sec. 24 MDBM
UTMs:	Zone 10 745878mE 4122346mN NAD27
	Zone 10 723222mE 4132128mN NAD27

Management status

Database record metadata

	Date	*User*	
Entered:	8/13/2012	ccic-admin	
Last modified:	5/10/2019	EGreathouse	
IC actions:	*Date*	*User*	*Action taken*
	11/10/2014	Anthro	Edit by RH
	5/10/2019	EGreathouse	eg
Record status:			

Resource Detail: P-24-001909

Identifying information

Primary No.:	P-24-001909	
Trinomial:		
Name:	Merced Irrigation District (proposed historic district)	
Other IDs:	*Type*	*Name*
	Resource Name	Merced Irrigation District (proposed historic district)

Cross-refs: Extends into another county as 22-003197
Is a district with element 24-000085
Is a district with element 24-000086
Is a district with element 24-000088
Is a district with element 24-000090
Is a district with element 24-000091
Is a district with element 24-000092
Is a district with element 24-000096
Is a district with element 24-000488
Is a district with element 24-000552
Is a district with element 24-000574
Is a district with element 24-000581
Is a district with element 24-000606
Is a district with element 24-000607
Is a district with element 24-000608
Is a district with element 24-001679
Is a district with element 24-001771
Is a district with element 24-001783
Is a district with element 24-001882
Is a district with element 24-001883
Is a district with element 24-001884
Is a district with element 24-001885
Is a district with element 24-001886
Is a district with element 24-001887
Is a district with element 24-001888
Is a district with element 24-001889
Is a district with element 24-001890
Is a district with element 24-001891
Is a district with element 24-001899
Is a district with element 24-001911
Is a district with element 24-002046
Is a district with element 24-002047
Is a district with element 24-002048
Is a district with element 24-002050
Is a district with element 24-002051
Is a district with element 24-002195
Is a district with element 24-002196

Attributes

Resource type: District
Age: Historic
Information base: Survey
Attribute codes: HP11 (Engineering structure) - Eng. Structures; HP20 (Canal/aqueduct) - Canals; HP21 (Dam) - Dams; HP22 (Lake/river/reservoir) - Lakes (reservoirs)
Disclosure: Unrestricted
Collections: No
Accession no(s):
Facility:

General notes

This district is comprised of numerous individual water conveyance & storage structures & features. The boundaries of District are inexactly defined.

Resource Detail: P-24-001909

Recording events

Date	Recorder(s)	Affiliation	Notes
1/29/2011	Shannon L. Loftus	ACE Environmental	Update, commentary on original record; but her project is specific to Cressey 7.5'
10/10/2010	Michael H. Dice	Michael Brandman Associates	Primary record
11/10/2010	Michael H. Dice	Michael Brandman Associates	BSO record, attached to Primary record
1/22/2007	M. Bunse, S. J. Melvin	JRP Historical Consulting	Update and added contributors (received at the CCaIC after the 2010 record by MBA)

Associated reports

Report No.	Year	Title	Affiliation
ME-06468	2007	Archaeological Survey Report for the Atwater-Merced Expressway Project, Merced County, California	Far Western Anthropological Research Group, Inc.
ME-07488	2011	Cultural Resource Records Search and Site Survey, Vista Tower Site, Livingston High School, 1617 Main Street, Livingston, Merced County, California	ACE Environmental, LLC
ME-07704	2011	Section 106 Cultural Resources Assessment for the Garibaldi Lateral and McCoy Lateral Project, Merced Irrigation District, County of Merced, California (Revised).	Michael Brandman Associates; for MID; Fremming, Parson, and Pecchenino Consulting Civil Engineers; BUR also in consultation?
ME-07959	2007	Historical Resources Inventory and Evaluation Report, Atwater-Merced Expressway Project, Merced California.	JRP Historical Consulting, LLC. For Merced County Association of Governments
ME-08192	2015	Department of Water Resources Archaeological Survey and Cultural Resources Inventory Report, Merced River Ranch Dredger Tailings Screening Project, Merced County, California.	California Department of Water Resources, Division of Environmental Services
ME-08548	2016	Cultural Resources Inventory for the Merced Service Center Project, Merced County, California.	Applied EarthWorks, Inc. for PG&E
ME-08598	2016	Finding of Effect Yosemite Lake Estates Project Near Merced, Merced County, California	LSA Associates, Inc. for 5Gs Corporation
ME-08678	2015	Phase I Cultural Resources Inventory, U.S. Department of Agriculture Wells Survey, Tract #103280, Roy and Dana Richards Property, Merced County, California	UltraSystems Environmental Inc. for California State Farm Agency Office
ME-09003	2019	Cultural and Paleontoloical Resource Inventory and Effects Assessment for the Merced Landfill Pipeline Project, Merced County, California	Natural Investigations Company for Ascent Environmental, Inc.
ME-09006	2017	Section 106 Cultural Resources Assessment, Atwater Drain Project, Merced Irrigation District, Merced County, California; BOR Reclamation Project Tracking Number 12-SCAO-136	FirstCarbon Solutions for Merced Irrigation District and Quad Knopf, Inc.
ME-09007	2017	Section 106 Cultural Resources Assessment, McCoy Lateral Relining Project, Merced Irrigation District, Merced County, California; BOR Reclamation Project Tracking Number 12-SCAO-136	First Carbon Solutions for Merced Irrigation District and Quad Knopf, Inc.
ME-09008	2016	Section 106 Cultural Resources Assessment, Highway 59 and Gallo Bridge Weather and Gauge Station Project, Merced Irrigation District, Merced County, California; Project #15-SCAO-225	FirstCarbon Solutions for Merced Irrigation District and Quad Knopf, Inc.
ME-09257	2021	Archaeological Survey Report for the Merced 140/165 Mobility Improvements Project,	California Department of Transportation

Resource Detail: P-24-001909

Merced County, California, 10-MER-140 P.M.
16.0/16.5 & 10MER-165 P.M. 26.6/27.1, E.A.
10-1H020, I.D. 10-1700-0175

Location information

County: Merced

USGS quad(s): Atwater, Coulterville, Cressey, Denair, El Nido, Gustine, Le Grand, Merced, Merced Falls, Penon Blanco Peak, Plainsburg, Planada, Sandy Mush, Snelling, Stevinson, Turlock, Turlock Lake, Turner Ranch, Winton, Yosemite Lake

Address:

PLSS: T8S R9E Sec. MDBM
T3S R16E Sec. MDBM

UTMs:

Management status

Database record metadata

	Date	*User*	
Entered:	10/25/2012	ccic-admin	
Last modified:	12/2/2020	egreathouse	
IC actions:	*Date*	*User*	*Action taken*
	9/29/2014	Anthro	HB
	10/2/2014	Anthro	HB

Record status:

Report Detail: ME-02930

Identifiers

Report No.:	ME-02930	
Other IDs:	*Type*	*Name*
	NADB-R	1366248
Cross-refs:	Extends into another county as SJ-02930 Extends into another county as ST-02930	

Citation information

Author(s): Jensen, Peter

Year: 1996 (Dec)

Title: Archaeological Inventory Survey; Tracy to Fresno Longhaul Fiberoptics Data Transmission Line, Portions of Fresno, Madera, Merced, Stanislaus, and San Joaquin Counties, California.

Affliliation: Jensen & Associates; for North State Resources, Inc.

No. pages: 39

No. maps:

Attributes: Archaeological, Architectural/Historical, Field study

Inventory size: Not given

Disclosure: Not for publication

Collections: No

General notes

Associated resources

Primary No.	Trinomial	Name
P-39-000088		Lateral 5 West, Banta Carbona Ir
P-39-000098	CA-SJO-000292H	Western Pacific Railroad/Union
P-39-000104		Upper Main Canal, West Side Irri

No. resources: 3

Has informals: No

Location information

County(ies): Merced

USGS quad(s): Atwater, Brush Lake, Ceres, Cressey, Denair, Le Grand, Merced, Midway, Plainsburg, Planada, Ripon, Riverbank, Salida, Tracy , Turlock, Vernalis, Westley, Winton

Address:

PLSS:

Database record metadata

	Date	User
Entered:	10/2/2013	jay
Last modified:	1/22/2020	egreathouse

IC actions:	*Date*	*User*	*Action taken*
	10/2/2013	jay	Appended records from CCIC NADB database
	1/22/2020	egreathouse	eg

Record status:

Report Detail: ME-03628

Identifiers

Report No.: ME-03628

Other IDs:

Type	*Name*
NADB-R	1363588
Caltrans	06A0182, Task order 07

Cross-refs:

Citation information

Author(s): Pierce, W.

Year: 1999 (Jun)

Title: An Archaeological Survey Report for a Proposed Rehabilitation of State Route 140 Between Highway 99 and the Mariposa County Line, Merced County, California (10-MER-140, KP 57.6/80.9, PM 35.8/50.3).

Affliliation: Archaeological Research Center, CSU Sacramento; for Caltrans District 10

No. pages: 28

No. maps:

Attributes: Archaeological, Architectural/Historical, Field study

Inventory size: 14.5 Miles

Disclosure: Not for publication

Collections: No

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-24-000606	CA-MER-000363H	Fairfield Canal
P-24-000607	CA-MER-000364	Hartley/Doane Lateral
P-24-000608	CA-MER-000365H	Le Grand Canal
P-24-000609	CA-MER-000366H	Planada Canal
P-24-000610	CA-MER-000367H	Unnamed canal/Irrigation Ditch

No. resources: 5

Has informals: No

Location information

County(ies): Merced

USGS quad(s): Merced, Owens Reservoir, Planada

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	10/2/2013	jay
Last modified:	8/26/2021	egreathouse

IC actions:	*Date*	*User*	*Action taken*
	10/2/2013	jay	Appended records from CCIC NADB database
	10/20/2016	EGreathouse	eg

Record status:

Report Detail: ME-03995

Identifiers

Report No.: ME-03995

Other IDs:

Type	Name
NADB-R	1366234

Cross-refs: Extends into another county as SJ-03995
Extends into another county as ST-03995

Citation information

Author(s): Nelson, W. J.

Year: 2000 (Jun)

Title: Cultural Resource Survey for the Level (3) Communications Long Haul Fiber Optics Project; Segment WS04: Sacramento to Bakersfield.

Affliliation: Far Western Anthropological Research Group, Inc., for Parsons Brinckerhoff Network Services

No. pages: 128

No. maps:

Attributes: Archaeological, Architectural/historical, Field study

Inventory size: 280.2 Miles x 50 Feet

Disclosure: Not for publication

Collections: No

General notes

The original copies of the Tables pages are poor as over the years clients have replaced them with copies.

Associated resources

Primary No.	Trinomial	Name
P-39-000002	CA-SJO-000250H	Southern Pacific Railroad in San
P-39-000321	CA-SJO-000205H	BI-1
P-39-000354	CA-SJO-000241H	Permanente Metals Corp. Magn
P-50-000001	CA-STA-000350H	Southern Pacific Railroad line
P-50-000439		W. H. Breshears, Inc., Chevron

No. resources: 5

Has informals: No

Location information

County(ies): Merced

USGS quad(s): Arena, Atwater, Ceres, Cressey, Denair, Galt, Lathrop, Le Grand, Lodi North, Lodi South, Manteca, Merced, Plainsburg, Planada, Ripon, Riverbank, Salida, Stockton West, Turlock

Address:

PLSS:

Database record metadata

	Date	User
Entered:	10/2/2013	jay
Last modified:	7/19/2016	Anthro

IC actions:

Date	User	Action taken
10/2/2013	jay	Appended records from CCIC NADB database

Record status:

Report Detail: ME-04058

Identifiers

Report No.:	ME-04058	
Other IDs:	*Type*	*Name*
	NADB-R	1363993
Cross-refs:		

Citation information

Author(s):	R. Gerry
Year:	1999 (Mar)
Title:	Letter Regarding Pacific Bell Wireless Site CV-535-04 Cultural Resources Assessment, Mission Avenue, Merced County
Affliliation:	Peak & Associates, Inc.
No. pages:	7
No. maps:	
Attributes:	Archaeological, Architectural/Historical, Field study
Inventory size:	> 1 acre
Disclosure:	Not for publication
Collections:	No

General notes

Associated resources

No. resources:	0
Has informals:	No

Location information

County(ies):	Merced
USGS quad(s):	Planada
Address:	
PLSS:	

Database record metadata

	Date	*User*	
Entered:	10/2/2013	jay	
Last modified:	8/26/2021	egreathouse	
IC actions:	*Date*	*User*	*Action taken*
	10/2/2013	jay	Appended records from CCIC NADB database
	1/18/2017	Anthro	JS
Record status:			

Report Detail: ME-04849

Identifiers

Report No.: ME-04849

Other IDs:

Type	Name
NADB-R	1366219

Cross-refs: See also MP-04849
See also ST-04849
See also TO-04849

Citation information

Author(s): Creighton, W.

Year: 2002

Title: Clamper: Documentation of Monuments and Plaques Representing Estanislao Chapter No. 58 E Clampus Vitus

Affliliation: W. Creighton

No. pages: 51

No. maps:

Attributes: Architectural/Historical, Other research

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

Associated resources

No. resources: 0

Has informals: No

Location information

County(ies): Merced

USGS quad(s): Brush Lake, Cooperstown, Copper Mountain, Escalon, Hornitos, Knights Ferry, La Grange, Newman, Oakdale, Patterson, Riverbank, Salida, Waterford, Westley, Winton

Address:

PLSS:

Database record metadata

	Date	User
Entered:	10/2/2013	jay
Last modified:	1/24/2017	Anthro

IC actions:	Date	User	Action taken
	10/2/2013	jay	Appended records from CCIC NADB database
	1/24/2017	Anthro	JS

Record status:

Report Detail: ME-06955

Identifiers

Report No.: ME-06955

Other IDs:	*Type*	*Name*
	NADB-R	1367262

Cross-refs:

Citation information

Author(s): Tang, B.

Year: 2009 (Mar)

Title: Historic Property Survey Report, 10-Merced-BNSF RR, PM 1039.9 to 1056.4, Le Grand to Merced, CA Double Track Project. [includes HRER--Tang and Smallwood, 2009; and ASR--Hogan and Smallwood, 2009]

Affiliation: CRM TECH; for State of California Dept. of Transportation, Division of Rail

No. pages: 121

No. maps:

Attributes: Archaeological, Architectural/Historical, Field study

Inventory size: 16.5 Miles x 100 Feet

Disclosure: Not for publication

Collections: No

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-24-000648		Bridge 39-44
P-24-001877		Former Atchison, Topeka and S
P-24-001878		Former Site of Le Grand ATSF S
P-24-001879		CRM TECH 2312-3H; Former sit
P-24-001880		CRM Tech 2312-2H; Date Palms
P-24-001881		Burlington Northern Santa Fe Ra

No. resources: 6

Has informals: No

Location information

County(ies): Merced

USGS quad(s): Le Grand, Merced, Plainsburg, Planada

Address:

PLSS: T7S R14E Sec. 19, 20, 25-28 MDBM
T7S R15E Sec. 27-30, 34, 35 MDBM
T8S R15E Sec. 1, 2, 12, 29 MDBM
T8S R16E Sec. 7, 17, 18, 20, 21 MDBM

Database record metadata

	Date	*User*
Entered:	10/2/2013	jay
Last modified:	1/13/2017	Anthro

IC actions:	*Date*	*User*	*Action taken*
	10/2/2013	jay	Appended records from CCIC NADB database
	1/13/2017	Anthro	JS

Record status:

Report Detail: ME-07399

Identifiers

Report No.: ME-07399

Other IDs:	*Type*	*Name*
	NADB-R	1367740

Cross-refs:

Citation information

Author(s): Kaijankoski, P.
Year: 2010 (Jul)
Title: Letter Report Re: Fresno Reliability Transmission Project.
Affliliation: Far Western Anthropological Research Group, Inc.; for PG & E
No. pages: 43
No. maps:
Attributes: Archaeological, Architectural/Historical, Literature search
Inventory size: NA
Disclosure: Not for publication
Collections: No

General notes

No field survey

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Merced
USGS quad(s): Le Grand, Plainsburg
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	10/2/2013	jay
Last modified:	7/6/2017	Anthro

IC actions:	*Date*	*User*	*Action taken*
	10/2/2013	jay	Appended records from CCIC NADB database

Record status:

Report Detail: ME-08189

Identifiers

Report No.: ME-08189
Other IDs:
Cross-refs:

Citation information

Author(s): Bassett, E.
Year: 2013 (Feb)
Title: Cultural Resources Inventory Report LeGrand-Chowchilla 115 kV Reliability Project, Merced and Madera Counties, California.
Affiliation: Transcon Environmental for PG&E and California Public Utilities Commission
No. pages: 49
No. maps:
Attributes: Archaeological, Architectural/Historical, Field study
Inventory size: 239 Acres
Disclosure: Not for publication
Collections: No

General notes

A single prehistoric artifact was identified during the survey on the south bank of the Chowchilla River in Madera Co. Two additional features in Madera Co were noted but not recorded: a broken abutment of a concrete bridge and a rock alignment.

Associated resources

Primary No.	*Trinomial*	*Name*
P-24-000097		Southern Pacific Railroad line
P-24-001919	CA-MER-000475H	Urrutia Farm

No. resources: 2
Has informals: Yes

Location information

County(ies): Merced
USGS quad(s): Chowchilla, Le Grand, Plainsburg
Address:

Address	*City*	*Assessor's parcel no.*	*Zip code*

PLSS: T8S R15E Sec. 36 MDBM
T8S R16E Sec. 31, 32 MDBM
T9S R15E Sec. 1, 12, 13, 24 MDBM
T9S R16E Sec. 2, 3, 4, 5, 6, 7, 11, 14, 18, 19, 23, 29, 30 MDBM

Database record metadata

	Date	*User*
Entered:	9/28/2015	Anthro
Last modified:	10/13/2016	Anthro

IC actions:	*Date*	*User*	*Action taken*
	9/28/2015	Anthro	AA

Record status:

Report Detail: ME-08824

Identifiers

Report No.: ME-08824
Other IDs:
Cross-refs:

Citation information

Author(s): Zelazo, E.
Year: 2017 (Apr)
Title: Finding of No Adverse Effect without Standard Conditions for the Burchell Avenue Bridge Replacement Project, Merced County, California.
Affiliation: California Department of Transportation for Merced County DPW
No. pages: 28
No. maps:
Attributes: Management/planning
Inventory size: NA
Disclosure: Not for publication
Collections: No

General notes

References 4 resources NBNR: 8824-1, 1953 S. Burchell; 8824-2: Burchell Lateral; 8824-3: Concrete Siphon; 8824-4: Bridge 39C-0319

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Merced
USGS quad(s): Planada
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	8/15/2018	EGreathouse
Last modified:	8/15/2018	EGreathouse

IC actions:	*Date*	*User*	*Action taken*
	8/15/2018	EGreathouse	eg

Record status:

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-24-00608
HRI #
Trinomial CA-MER-000365H
Other Listings
Review Code ______ Reviewer ______ Date ______

*Resource Name or #: Le Grand Canal

P1. Other Identifier: Le Grand Canal

***P2. Location:** ☐ Not for Publication ☒ Unrestricted ***a. County** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Planada **Date** 1961 Photoinspected 1973 **T** 7S ; **R** 15E ; NE ¼ of SE ¼ of **Sec** 23 ; M. D. **B.M.**

c. Address__ City__ Zip

d. UTM: (Give more than one for large and/or linear resources) Zone 10 ; 740040 mE/ 4132340 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Le Grand canal is located at approximately PM 45.65 on State Route 140 in Merced County, about 2 1/10 miles west of the Mariposa County Line.

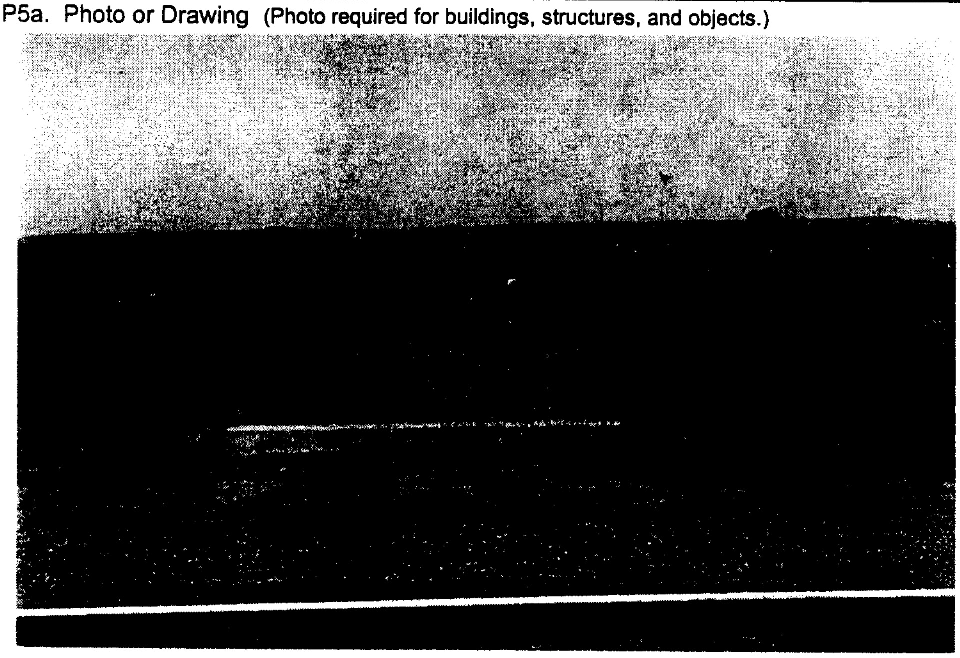
***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The canal is a currently used unlined ditch about five meters wide that runs under Highway 140 through a cement bulkhead with regulating gates. The Le Grand canal begins at Yosemite Lake, about seven miles to the northwest of where it crosses State Route 140 in Merced County. The canal continues south of the highway to the town of Le Grand. The portion recorded is at the intersection with Highway 140.

***P3b. Resource Attributes:** (List attributes and codes) HP20

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #)
View to the north of Le Grand canal. April 18, 1999, Acc# 99MER140R1-1.

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
Unknown

***P7. Owner and Address:**
Merced Irrigation District

***P8. Recorded by:** (Name, affiliation, and address)
Wendy Pierce, R. Bethard, T. Overly, N. Stevens, Archaeological Research Center 6000 J St. Sacramento, CA 95819-6106.

***P9. Date Recorded:** April 18, 1999

***P10. Survey Type:** Reconnaissance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
W. Pierce (1999). An Archaeological Survey Report for a Proposed Rehabilitation of State Route 140 Between Highway 99 and the Mariposa County Line, Merced County, California (10-MER-140, KP 57.6/80.9 [PM 35.8/50.3] EA 10-1A460K).

***Attachments:** NONE ☒Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☒Photograph Record ☐ Other (List)

*Required information

Resource Name or #: Le Grand canal

L1. Historic and/or Common Name: Le Grand canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** _

b. Location of point or segment:

The point of observation is where the canal enters the right-of-way of State Route 140 at PM 45.65.

USGS 7.5' Quad Planada Date 1961 Photoinspected 1973 T 7S; R 15E; NE ¼ of SE ¼ of Sec 23; M.D. B.M. UTM Zone 10; 740040 mE/ 4132340 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

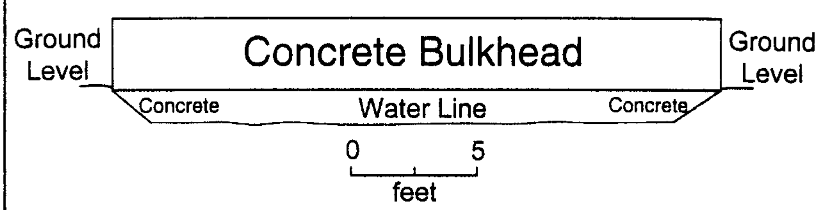
The Le Grand canal is a roughly U shaped unlined ditch which is 34.45' across. The cement bulkhead has a raised section in front that measures 9.51' across, 5.9" wide, and 6.69" from the top to the ground. There are two cement arms that angle north which are at ground level. These are 12.47' long. It is 3.94' to the water from the top of the bulkhead and 22.97' to the EOP. The sides of the canal slope at a 30 degree angle towards the water. There is a metal plate on each side of the road. The plate on the north side is stamped "081785X196" the south is marked "081848X". The portion recorded is at the intersection with Highway 140.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- **a. Top Width** 34.45'
- **b. Bottom Width** unknown
- **c. Height or Depth** unknown
- **d. Length of Segment** unknown

L5. Associated Resources: none

L4e. Sketch of Cross-Section (include scale) **Facing:** North



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The land is flat and cultivated for farming and orchards.

L8a. Photograph, Map or Drawing

L7. Integrity Considerations: The cement work looks modern and in good shape.

L8b. Description of Photo, Map, or Drawing (View, scale, etc.) _

L9. Remarks:

L10. Form Prepared by: (Name, affiliation, and address) Wendy Pierce, R. Bethard, T. Overly, N. Stevens. Archaeological Resource Center, CSUS 6000 J St. Sacramento, CA 95819-6106

11. Date: 4-18-99

State of California-- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-24-000608
HRI #
Trinomial CA-MER-000365H

Page 3 **of** 4 **Project Name** (Assigned by recorder) MER-140 **Year** 1999
Camera Format: Nikon Roll # MER-140-WP1
Film Type and Speed: 400 ASA Negatives Kept at: ARC-CSUS, Sacramento

Month	Day	Time	Exp. Frame	Subject/ Description	View Toward	Acc. #
4	17	11:40	4	Le Grand Canal, north side of road.	N	99MER140R1-1

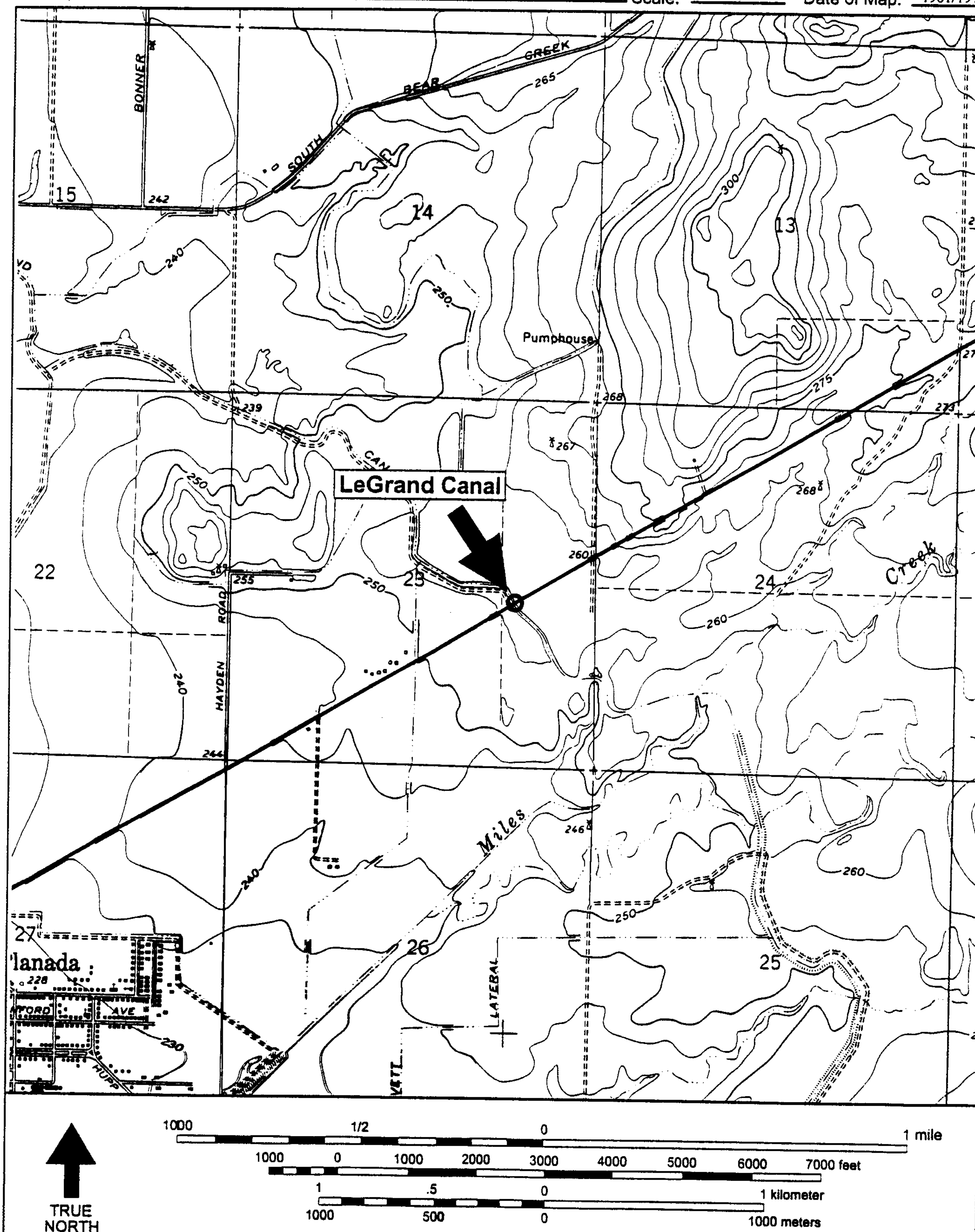
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P-24-000608
HRI#
Trinomial CA-MER-365H

Page 4 of 4 Resource Name or # (Assigned by recorder) LeGrand Canal

*Map Name: Planada, CA *Scale: 1:24,000 *Date of Map: 1961/1973



DPR 523J (1/95) *Required information

CONTINUATION SHEET

 ***Resource Name or #:** Burlington Northern/Santa Fe Railroad (UPDATE) 5/2019

***Recorded By:** J. Wisely, Far Western Anthropological Research Group, Inc. ***Date:** 5/23/2018

P2e. Location:
The linear resource extends approximately 0.7 miles north of Merced and runs approximately 16.8 miles southeast of Merced, between GIS Post Miles 37.29-43.43.

P3a. Description:
Originally recorded in 2002 by Caltrans, the linear resource is a section of the Burlington Northern-Santa Fe Railroad tracks. The standard single track line is 16 feet wide. The rails and wood ties rest on about 3.5 feet of crushed rock ballast. In 2009 Josh Smallwood, CRM TECH, visited the linear resource and found it as recorded in 2002, with the addition that the railroad remains active.

The resource was visited by Far Western for the 2018 Caltrans District 10 Hazard Tree Removal project, and found to be as previously recorded. The resource was examined within the Area of Potential Effects, 200 feet either side of the highway centerline. It extends northwest and southeast beyond the Area of Potential Effects.

Report Citation:
Parker, Ashley and Adrian Whitaker 2019. Director's Orders Hazard Tree Removal Survey and Site Assessment in District 10, TO11, in Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus, and Tuolumne Counties, California EA 10-1F6403. Far Western Anthropological Research Group. Inc. Davis, California.

HPDF Prop # 130531 OHP PRN # FHWA050324D

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-24-001881
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code Reviewer Date

Caltrans ID, County/Route/Postmile/EA: 10-MER-59, PM 15.3/16.6 **Map Ref. #** 12

***P1. Resource Name or #:** Burlington Northern/Santa Fe Railroad

Atwater 7.5'

***P2. Location: *a. County:** Merced **City:** Merced

T7S/R13E SE of SE 14S-14 SW of SW of S-13

***c. Address**: Approx. 1.75 miles northwest of downtown Merced where State Route 59 crosses the railroad tracks

***e. Assessor's Parcel Number**: Various

+ NW of NW of S-24

***P3a. Description:**

This is a section of the Burlington Northern-Santa Fe Railroad tracks. It is a standard gauge single track line that is 16 feet wide. The rails and wood ties rest on about 3.5 feet of crushed rock ballast. At the intersection of the tracks and State Route 59 there are two sets of automated electric signal lights with bells and traffic gates. These appear to be of standard design.

***P3b. Resource Attributes:** HP11 Engineering Structure (Railroad line)

***P4. Resources Present:** ☐Building ■Structure ☐Object ☐Site ☐District ☐Element of District ☐Other

P5a. Photo

(See continuation sheet.

P5b. Photo date:
August 14, 2002

***P6. Date Constructed/Sources:**
Original railroad construction 1895-1900; JRP Historical Consulting Services.

***P7. Owner and Address:**
Burlington Northern/Santa Fe Railroad

***P8. Recorded by:**
Frank Lortie, Caltrans
1120 N Street
Sacramento 94274

***P9. Date Recorded:**
August 15, 2002

***P11. Report Citation:**
Historic Resource Evaluation Report (HRER) for the State Route 59 Widening Project, Post Miles 15.3-16.6, Merced County (Caltrans 2005)

Attachments: ☐NONE ☐Location Map ☐Sketch Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other

State of California — The Resources Agency
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BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #:** 10-MER-59, Burlington Northern/Santa Fe Railroad. **Map Reference #** 12

B1. Historic name: Atcheson, Topeka, Santa Fe Railroad, Valley Division
B4. Present use: Railroad
***B5. Architectural Style:** Not applicable
***B6. Construction History:** 1895-early 1900s, Valley Division
***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features**
B9a. Architect: Not applicable **b. Builder:** Santa Fe Railroad
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A

The first railroad down the San Joaquin Valley was the Southern Pacific, or SP, (then called the Central Pacific) in the 1870s, and for the next three decades the SPRR enjoyed a monopoly on rail transportation from Bakersfield to Stockton. Around 1895 a group of San Francisco investors sought to end the SPRR's dominance in the valley by financing the construction of another railroad line (called the San Francisco & San Joaquin) running the length of the San Joaquin Valley. In 1898 the Santa Fe purchased the SF & SJ and proceeded to upgrade and expand the line, and called their route from Bakersfield to Stockton the "Valley Division." The rivalry between the SP and the Santa Fe settled into a coexistence and by the 1910s both railroads were operating successful freight and passenger service in the valley. From Stockton to Bakersfield both built depots for passengers. In the 1950s and 1960s the SP and the Santa Fe abandoned passenger service, and in the 1970s Amtrak was created to carry rail passengers. Amtrak now uses the BNSF tract for its line down the San Joaquin Valley. From all appearances the section of BNSF track within the Study Area is a product of upgrades and improvements to the point that the rails, ties and ballast are of recent vintage. The date of "1985" in impressed into the sides of the rails at several locations, and the ballast is clearly material that was place on the tract within the past 10 years. Most of the ties show signs of pressure treatment, a process that dates from around the late 1970s. While the alignment of the BNSF track is probably the same as it was when the line was built, the essential elements of a railroad track, the rails, ties and ballast, have been replaced with modern material. In addition, within the past ten years two automatic railroad crossing signal lights and traffic gates have been installed on both sides of the track. The integrity of the section of track in the Study Area has been substantially diminished. Under Criterion C the recent track and signal lights are of standard design and represent
(See Continuation Sheet)

B11. Additional Resource Attributes:

***B12. References:** JRP Historical Consulting Services, Burlington Northern/Santa Fe Railroad, June 2001: 15-18.

B13. Remarks:
***B14. Evaluator:** Frank Lortie Caltrans
*Date of Evaluation: 8/15/02

Site Plan.

(See site plan attached.)

(This space reserved for official comments.)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # P-24-001881
HRI#
Trinomial

■ Continuation ☐ Update

Resource Name or #: 10-MER-59, Burlington Northern/Santa Fe Railroad. **Map Reference #** 12

B10. Significance (continued):

nothing notable in terms of engineering or construction. Although the arrival of the Santa Fe probably offered some competition for the Southern Pacific, nothing in the historical record indicated that the Santa Fe had a significant impact on the economy or society in Merced from the late 1890s through the first decades of the twentieth century. Thus, this section of Santa Fe track is not eligible under Criterion A.

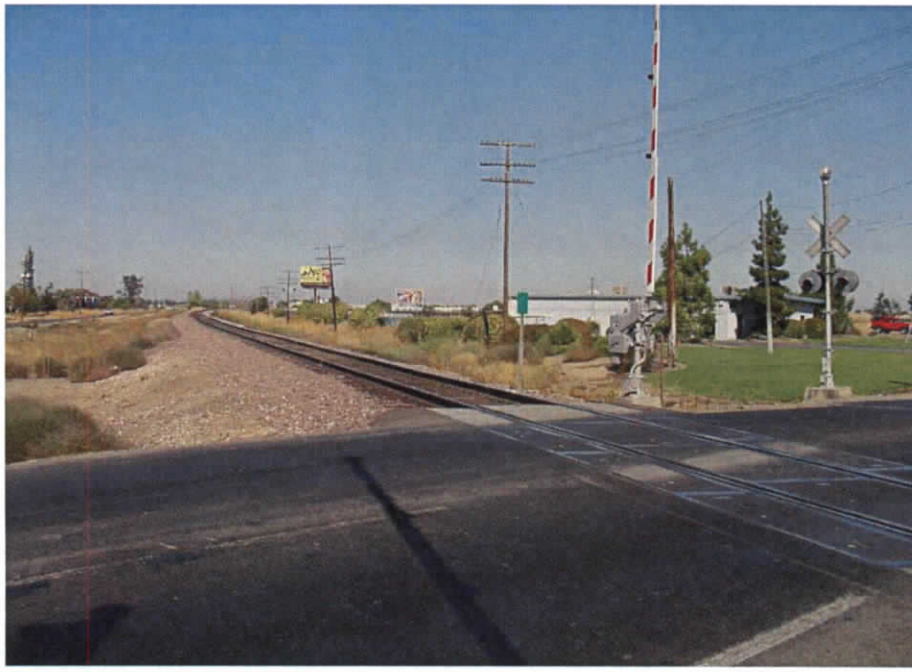
Therefore, the section of BNSF track in the Study Area does not appear to be eligible for the National Register. In addition, the section of BNSF track was evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, and it was determined not to be a historical resource for the purposes of CEQA

Intersection of Santa Fe RR and S.R. 59, looking north

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION CONTINUATION SHEET	Primary # P-24-001881 HRI# Trinomial

■ Continuation ☐ Update

Resource Name or #: 10-MER-59, Burlington Northern/Santa Fe Railroad. **Map Reference #** 12



Looking west-northwest at intersection of S.R. 59

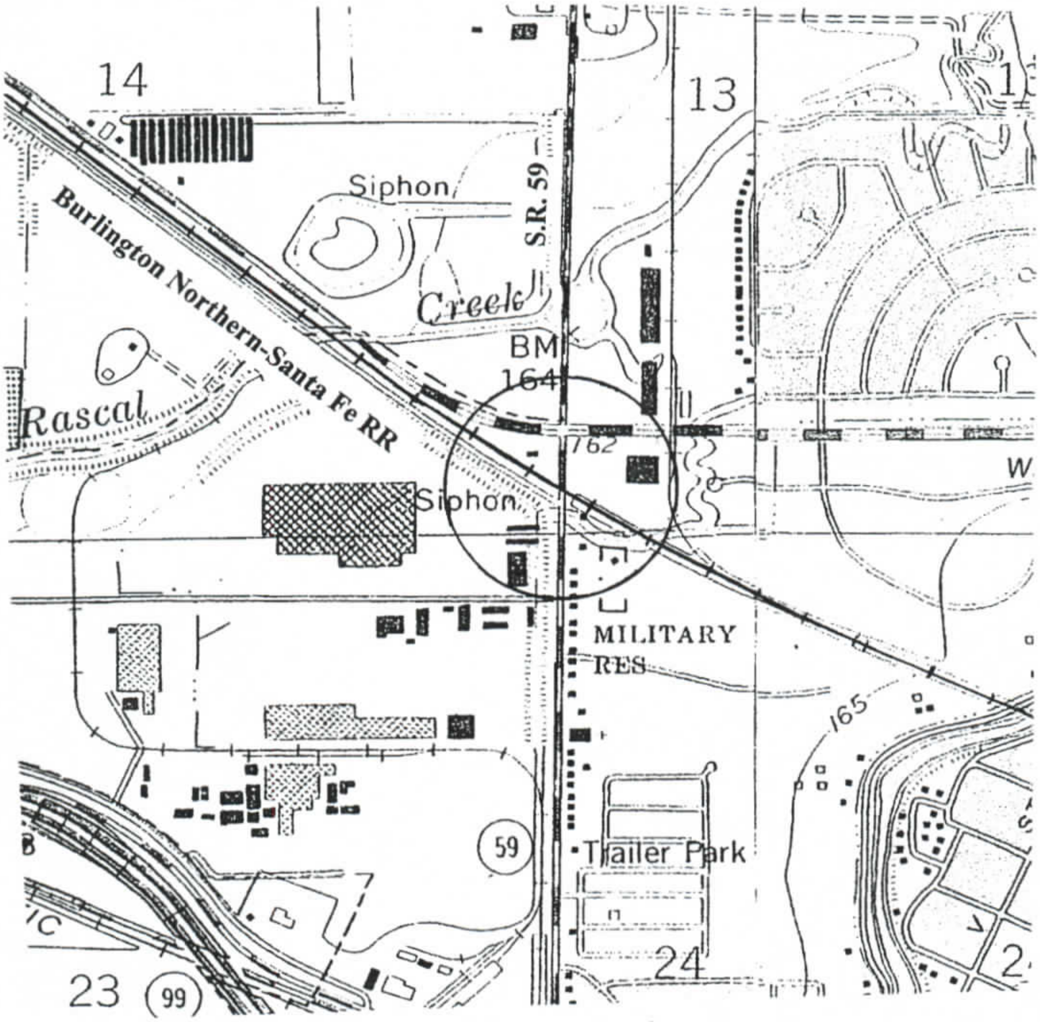
Looking west

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # P-24-001881
HRI#
Trinomial

■ Continuation □ Update

Resource Name or #: 10-MER-59, Burlington Northern/Santa Fe Railroad. **Map Reference #** 12



Atwater 7.5'

SITE PLAN

Burlington Northern-Santa Fe Railroad

10-MER-59

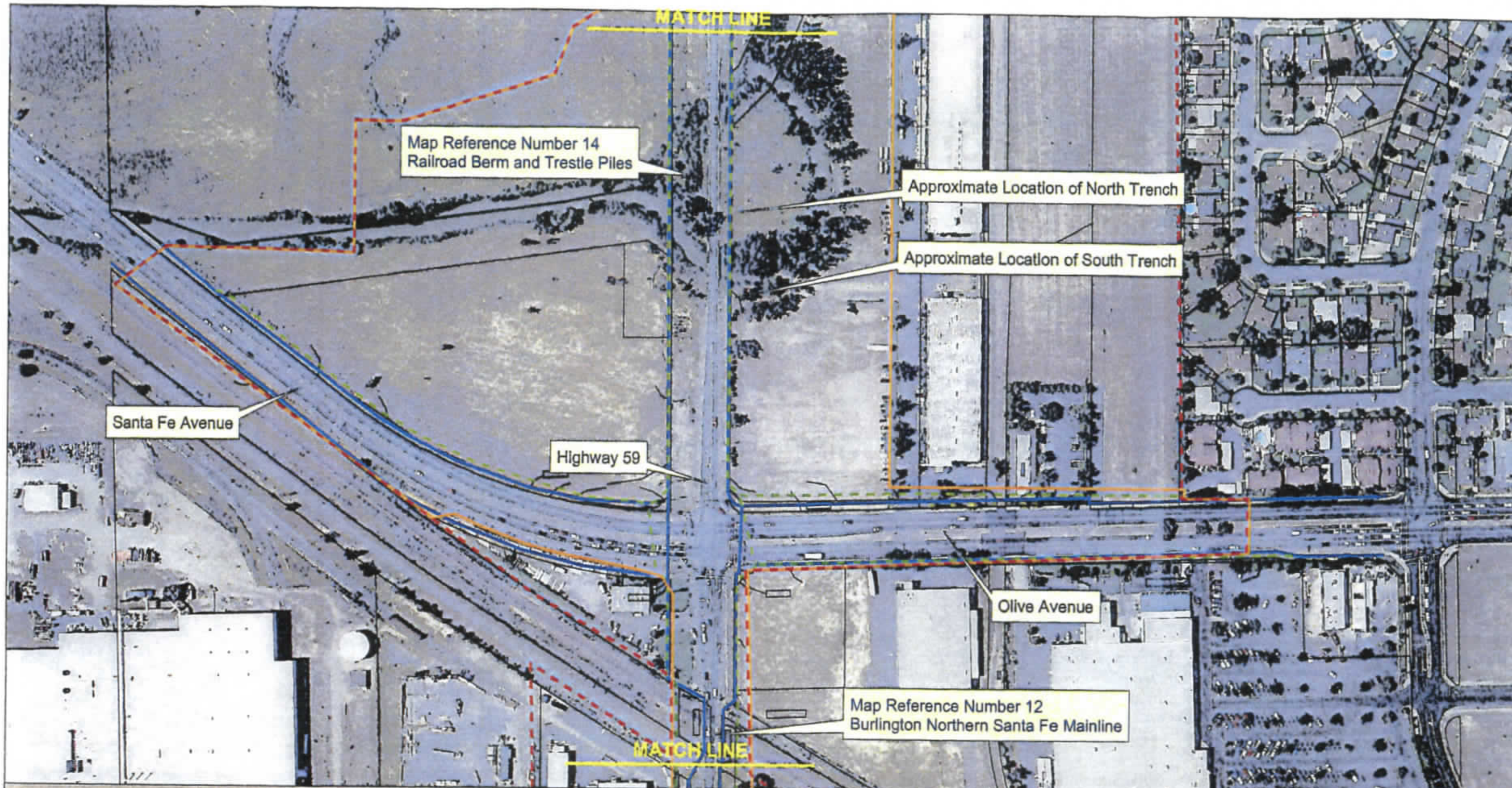


Figure 3d
Area of Potential Effects

Highway 59/16th Street Widening Project
10-MER-59, PM 15.3/16.6 (KP 24.6/26.7)
EA 10-0E5900

- APE Limit for Direct Effects
- APE Limit for Indirect Effects
- Current Right-of-Way
- Proposed Right-of-Way

N

0 125 250 500 750 1,000 Feet

0 50 100 200 Meters

Brian Gassner, PQS

Ram Narayan Gupta, Project Manager

P-24-001881
Map Ref. #12

P-24-001881

OFFICE OF HISTORIC PRESERVATION * * * Directory of Properties in the Historic Property Data File for MERCED County. Page 9 03-20-14

PROPERTY-NUMBER	PRIMARY-#	STREET.ADDRESS	NAMES	CITY.NAME	OWN	YR-C	OHP-PROG.	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	CRIT
							prev. page HIST.RES.	SHL-0548-0000	01/27/56	7L	
052421	24-000725 !!	SR 152	BRIDGE #39-40L	(VIC) LOS BANOS	S	1917	HIST.SURV.	3635-0001-0000		7R	
ok 089491	24-~~000643~~ 643!!	W SR 152 (31770)	PACHECO PASS	(VIC) LOS BANOS	F		HIST.RES.	SHL-0829-0000	05/29/69	1CL	
043081	24-0~~00621~~ 1870	WOLFSEN RD	SAN LUIS CAMP ADOBE	(VIC) LOS BANOS	PS	1866	NAT.REG.	24-0002	02/24/94	7W	
107923	24-000726		see report HE-4828 EDENDALE CREEK RAILROAD TRESTLE/YO	MERCED			PROJ.REVW.	COE970203A	05/07/97	6Y	
119204	24-000581		DEANE CANAL	MERCED	D	1888	HIST.RES.	DOE-24-98-0002-0000	12/28/98	6Y	
							PROJ.REVW.	FHWA981221Z	12/28/98	6Y	
119205	24-000580		EASTSIDE CANAL (vic. Stevinson)	MERCED	D	1887	HIST.RES.	DOE-24-98-0003-0000	12/28/98	6Y	
							PROJ.REVW.	FHWA981221Z	12/28/98	6Y	
125243	24-647		OWENS CREEK BRIDGE #39-06 @ SR99	MERCED	F		HIST.RES.	DOE-24-00-0005-0000	06/15/00	6Y	
							PROJ.REVW.	FHWA000107A	06/15/00	6Y	
130093			TANK HOUSE / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0002	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130094	Sunshine Dairy -		BUNKHOUSE / SUNSHINE DAIRY	MERCED	P	1927	HIST.RES.	DOE-24-02-0001-0003	02/26/02	2D2	AC
	no records						PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130095			MILK BARN / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0004	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130096	+ see also p. 10+11		HAY BARN / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0005	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130097			HAY STORAGE STRUCTURE / SUNSHINE D	MERCED	P		HIST.RES.	DOE-24-02-0001-0006	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130099			LOAF BARN / SUNSHINE DAIRY	MERCED	P	1955	HIST.RES.	DOE-24-02-0001-0007	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130100			SHOP BUILDING / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0008	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130101			QUONSET HUT / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0009	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130102			BULL SHEDS / SUNSHINE DAIRY	MERCED	P		HIST.RES.	DOE-24-02-0001-0010	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130521	24-608 + -1887		LE GRAND CANAL	MERCED	U	1922	PROJ.REVW.	COE081231A	04/20/09	6Y	
							HIST.RES.	DOE-24-02-0074-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130522	24-606 + -1888		FAIRFIELD CANAL	MERCED	U	1903	PROJ.REVW.	COE081231A	04/20/09	6Y	
							HIST.RES.	DOE-24-02-0075-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130523	24-1889		TOWER LATERAL	MERCED	U	1925	HIST.RES.	DOE-24-02-0076-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130524	24-1890		SELLS LATERAL	MERCED	U	1888	HIST.RES.	DOE-24-02-0077-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130525	-1891		YOSEMITE LATERAL	MERCED	U	1888	HIST.RES.	DOE-24-02-0078-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130526	-1885		BRADLEY LATERAL	MERCED	U	1903	HIST.RES.	DOE-24-02-0079-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130527	-1882		MERCED LATERAL	MERCED	U	1903	HIST.RES.	DOE-24-02-0080-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130528	-1883		ROBINSON LATERAL	MERCED	U	1903	HIST.RES.	DOE-24-02-0081-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130529	-86 + -1884		HARTLEY LATERAL	MERCED	U	1903	HIST.RES.	DOE-24-02-0082-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
							HIST.RES.	DOE-24-01-0025-0000	12/18/01	6Y	
							PROJ.REVW.	FHWA010924C	12/18/01	6Y	
130530	-607 + -1886		DOANE LATERAL	MERCED	U	1922	HIST.RES.	DOE-24-02-0083-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130531	24-001881		BURLINGTON NORTHERN SANTA FE RAILR	MERCED	P	1890	PROJ.REVW.	FHWA050324D	04/18/05	6Y	
							HIST.RES.	DOE-24-02-0084-0000	02/26/02	6Y	

cont'd next pg.

25th to 27th St's.

P-24-001881

OFFICE OF HISTORIC PRESERVATION * * * Directory of Properties in the Historic Property Data File for MERCED County. Page 10 03-20-14

PROPERTY-NUMBER	PRIMARY-#	STREET.ADDRESS	NAMES	CITY.NAME	OWN	YR-C	OHP-PROG.	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	CRIT
→	24-1881		BNSF RR				PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130824	24-86		HARTLEY LATERAL- BRANCH C	MERCED	~~U~~	~~1913~~	~~HIST.RES.~~	~~DOE-24-01-0026-0000~~	~~12/18/01~~	~~6Y~~	
							PROJ.REVW.	FHWA010924C	12/18/01	6Y	
163427				MERCED	P	1871	PROJ.REVW.	FHWA060310A	05/11/06	6Y	
163815	24-2105		@SR59? BEAR CREEK BRIDGE ~~Caltrans~~	MERCED			PROJ.REVW.	FHWA050324D	04/18/05	6Y	
163829	24-20417		BLACK RASCAL CANAL ~~does not on file~~	MERCED			PROJ.REVW.	FHWA050324D	04/18/05	6Y	
163830			CONCRETE SIPHONS/RAILROAD BERM(IRR	MERCED			PROJ.REVW.	FHWA050324D	04/18/05	6Y	
175261			SMITH TRUST BARN — where??	MERCED	P	1913	PROJ.REVW.	COE081231A	04/20/09	6Y	
057033	24-000734		DOWNTOWN MERCED	MERCED	P	1880	HIST.SURV.	5340-0025-9999 Dist		5D2	
057150	24-000735	25TH ST	G TO CANAL ST	MERCED	P	1885	HIST.SURV.	5340-0026-9999 Dist		5D2	
057515	24-000736	1300 B ST	MERCED CEMETERY, MERCED CEMETERY D	MERCED	M	1850	HIST.SURV.	5340-0154-0000		7N	
128628	24-001710	1411 B ST	JUVENILLE HALL	MERCED		1946	HIST.RES.	DOE-24-01-0001-0000	09/25/01	6Y	
							PROJ.REVW.	DOJ000825A	09/25/01	6Y	
057516	24-000737	1480 B ST	DE LONG MEMORIAL PARK, EVERGREEM M	MERCED	P	1873	HIST.SURV.	5340-0155-0000		5S2	
130825		2562 BAKER DR		MERCED	P	1945	HIST.RES.	DOE-24-01-0027-0000	12/18/01	6Y	
							PROJ.REVW.	FHWA010924C	12/18/01	6Y	
130826		2584 BAKER DR		MERCED	P	1948	HIST.RES.	DOE-24-01-0028-0000	12/18/01	6Y	
							PROJ.REVW.	FHWA010924C	12/18/01	6Y	
130168		3397 BAKER ST		MERCED	P	1900	HIST.RES.	DOE-24-02-0012-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130169		3421 BAKER ST		MERCED	P	1942	HIST.RES.	DOE-24-02-0013-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130170		3431 BAKER ST		MERCED	P	1942	HIST.RES.	DOE-24-02-0014-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130171		3445 BAKER ST		MERCED	P	1940	HIST.RES.	DOE-24-02-0015-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130172		3457 BAKER ST		MERCED	P	1942	HIST.RES.	DOE-24-02-0016-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130173		3461 BAKER ST		MERCED	P		HIST.RES.	DOE-24-02-0017-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130174		3463 BAKER ST		MERCED	P	1942	HIST.RES.	DOE-24-02-0018-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
057524	24-000738	1560 CANAL ST	SOUTHERN PACIFIC FREIGHT STATION	MERCED	P	1918	HIST.SURV.	5340-0163-0000		3S	
057025	24-000739	1717 CANAL ST	MERCED PRODUCE CO, HELEN AND LOUIS	MERCED	P	1905	HIST.SURV.	5340-0025-0052		5D2	
057026	24-000740	1733 CANAL ST	HARRIS GARIBALDI BUILDING, STEFANI	MERCED	P	1912	HIST.SURV.	5340-0025-0053		5D2	
057027	24-000741	1734 CANAL ST	MERCED MEAT MARKET, A GROWING CONC	MERCED	P	1924	HIST.SURV.	5340-0025-0054		5D2	
057028	24-000742	1737 CANAL ST	C E KOCHER HARDWARE/RUSSELLS PHARM	MERCED	P	1910	HIST.SURV.	5340-0025-0055		3S	
057029	24-000743	1740 CANAL ST	MERCED IOOF HALL / ODD FELLOWS BUI	MERCED	P	1909	HIST.SURV.	5340-0025-0056		3S	
057030	24-000744	1812 CANAL ST	HILL BUILDING, ROBINSON MONTGOMERY	MERCED	P	1928	HIST.SURV.	5340-0025-0057		7N	
057525	24-000745	1921 CANAL ST	DAUNT APARTMENTS	MERCED	P	1919	HIST.SURV.	5340-0164-0000		7N	
057526	24-000746	2421 CANAL ST	MERCED IRRIGATION DISTRICT	MERCED	C	1922	HIST.SURV.	5340-0165-0000		3S	
130091		CHILDS AVE		MERCED	P	1915	HIST.RES.	DOE-24-02-0007-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
130167		CHILDS AVE		MERCED			HIST.RES.	DOE-24-02-0011-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	
155728	24-86	CHILDS AVE	HARTLEY LATERAL	MERCED	D	1890	PROJ.REVW.	FHWA041102A	12/06/04	6Y	
057518	24-000747	CHILDS AVE	CALVARY CEMETERY, MED CEMETERY DIS	MERCED	M	1873	HIST.SURV.	5340-0157-0000		7N	
130103		3144 CHILDS AVE (E.Childs)	RESIDENCE / SUNSHINE DAIRY	MERCED	P	1927	HIST.RES.	DOE-24-02-0001-0011	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130104		21 COFFEE ST	RESIDENCE / SUNSHINE DAIRY no info	MERCED	P	1930	HIST.RES.	DOE-24-02-0001-0012	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130105		46 COFFEE ST	RESIDENCE / SUNSHINE DAIRY	MERCED	P	1930	HIST.RES.	DOE-24-02-0001-0013	02/26/02	2D2	AC
							PROJ.REVW.	FHWA020109A	02/26/02	2D2	AC
130204		2831 CROWN RD		MERCED	P	1930	HIST.RES.	DOE-24-02-0038-0000	02/26/02	6Y	
							PROJ.REVW.	FHWA020109A	02/26/02	6Y	

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 24-001881
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

3/09

P1. Other Identifier: Burlington Northern Santa Fe (BNSF, formerly Atchison, Topeka and Santa Fe) Railway

***P2. Location:** ___ Not for Publication √ Unrestricted ***a. County** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quads**
- Merced, Calif. Date 1961, photo-revised 1987
- Planada, Calif. Date 1961, photo-inspected 1973
- Plainsburg, Calif. Date 1960, photo-inspected 1976
- * Le Grand, Calif. Date 1961, photo-revised 1981

T7S; R14E; Sections 19, 20, 25, 26, 27, 28, and 29; M.D. B.M.
T7S; R15E, Sections 27, 28, 29, 30, 34, and 35; M.D. B.M.
T8S; R15E, Sections 1, 2, 12, and 29; M.D. B.M.
T8S; R16E, Sections 7, 17, 18, 20, and 21; M.D. B.M.
Elevation: Approx. 170-260 feet above mean sea level

c. Address N/A **City** N/A **Zip Code** N/A

d. UTM: Zone 10; **A:** 745,878 mE/ 4,122,346 mN;
B: 723,222 mE/ 4,132,128 mN
UTM Derivation: ___ USGS Quad √ GPS (NAD 1983)

e. Other Locational Data: (e.g., parcel #, directions to resource, etc., as appropriate) The recorded segment of the railroad (BNSF Mile Post 1039.9 to 1056.4) extends from near Ipsen Avenue in the community of Le Grand northwesterly to near M Street in the City of Merced.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The site consists of a 16-mile segment of the BNSF line situated between MP 1039.9 and MP 1056.4. This line was originally constructed by the San Francisco and San Joaquin Valley (SF&SJV) Railway
(Continued on p. 3)

***P3b. Resource Attributes:** (List attributes and codes) HP37: Railroad

***P4. Resources Present:** ___ Building √ Structure ___ Object ___ Site ___ District ___ Element of District ___ Other (isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

(See pp. 10-12)

P5b. Description of Photo: (view, date, accession #) Photos taken on February 2, 2009

***P6. Date Constructed/Age of Sources:** √ Historic ___ Prehistoric ___ Both

***P7. Owner and Address:** Burlington Northern Santa Fe Railway Company, 2650 Lou Menk Drive, Fort Worth, TX 76131

***P8. Recorded by:** (Name, affiliation, and address) Josh Smallwood, CRM TECH, 1016 E. Cooley Drive, Suite A/B, Colton, CA 92324

***P9. Date Recorded:** February 2, 2009

***P10. Survey Type:** Project-related survey for compliance with CEQA and Section 106 of the NHPA (intensive-level)

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Bai "Tom" Tang and Josh Smallwood (2009): Historical Resource Evaluation Report: Le Grand to Merced, CA Double Track Project, BNSF Railway Company Mainline Track (MP 1039.9 to 1056.4), Merced County, California. On file, Central California Information Center, California State University, Stanislaus.

***Attachments:** ___ None √ Location Map √ Continuation Sheet √ Building, Structure, and Object Record ___ Archaeological Record ___ District Record ___ Linear Resource Record ___ Milling Station Record ___ Rock Art Record ___ Artifact Record ___ Photograph Record ___ Other (List):

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # 24-001881
HRI #

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code 6Z
*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

B1. Historic Name: San Francisco & San Joaquin Valley Railway; Atchison, Topeka and Santa Fe Railway
B2. Common Name: Burlington Northern Santa Fe Railway
B3. Original Use: Railroad B4. Present Use: Railroad
*B5. Architectural Style: N/A
*B6. Construction History: (Construction date, alterations, and date of alterations) The SF&SJV Railway was constructed from Stockton to Bakersfield in 1895-1897, along with a private telegraph line that served the railroad's needs. The line was acquired by the ATSF in 1899 and became a part of the ATSF's first line to reach the port of San Francisco. The rails, ties, and ballast have been replaced numerous times as part of upgrades and maintenance since its original construction in the late 1890s.
*B7. Moved? √ No ___ Yes ___ Unknown Date: ________ Original Location: ________
*B8. Related Features: Bridges, culverts, and other common railroad features (see pp. 11-12)
B9a. Architect: N/A b. Builder: San Francisco & San Joaquin Valley Railway Company
*B10. Significance: Theme Railroad transportation Area California
Period of Significance 1890s Property Type Railroad Applicable Criteria N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.) This segment of railroad line appears to meet Criterion A for the National Register of Historic Places and Criterion 1 for the California Register of Historical Resources because it is closely associated with an important event in 19th-century California history, namely the arrival of a second transcontinental railroad system in the Central Valley. The ATSF "invasion" spelled the end of the Southern Pacific Railway Company's virtual monopoly on modern transportation in California, which left profound and far-reaching impacts on the political, economic, and social life of the state. Most directly, the coming of a competing rail system served as a major boost to the growth of the Central Valley and the entire state.
(Continued on p. 5)

B11. Additional Resource Attributes: (List attributes and codes) HP19: Bridges; HP20: Culverts
*B12. References: Lee Gustafson and Philip Serpico (1996): *Santa Fe Coast Lines Depots, Valley Division* (Omni Publications, Palmdale, California).

B13. Remarks:
*B14. Evaluator: Josh Smallwood
*Date of Evaluation: February 2009

(Sketch Map with north arrow required.)

(See pp. 4-9)

(This space reserved for official comments.)

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 24-001881
HRI #
Trinomial

Resource name or # (Assigned by recorder) CRM TECH 2312-1H

Recorded by Josh Smallwood *Date February 2, 2009 √ Continuation __ Update

*P3a. **Description** (continued): Company in 1895-1897, and acquired by the Atchison Topeka-Santa Fe Railroad Company in 1899. The recorded segment is located between the community of Le Grand and the City of Merced, in Merced County. The rail line consists of a single standard gauge track laid on a raised bed of earth and crushed rock ballast. Some portions of this segment include sidings for passing trains. A single, abandoned telegraph pole was encountered near MP 1046.1.

Two historic-period concrete culverts, one stamped with a date of 1920 and the other 1923, were observed crossing beneath the track, as were a total of five minor concrete or wood bridges over small drainages. These structures are considered associated features of the railway, and are all relatively minor components of standard design and construction, with no special architectural or engineering merits to set them apart from the many similar features found along other segments of the railroad.

Since its construction in the 1890s, the physical features associated with the railway have all been replaced and upgraded over the years, and many of them are evidently modern in origin. Consequently, the existing rail line, which is the principal feature of the site, exhibits no particular historic characteristics, as can be expected from an active line that remains in use today.

*B10. **Significance** (continued): However, as stated above, most of the physical components of the site have since been replaced or upgraded repeatedly in order to sustain continuous service through the past 110 years. As a result, other than the aspect of location, the existing railway and its associated features, as working components of the modern transportation infrastructure, do not retain sufficient historic integrity to relate to the site's period of significance. In addition, this segment of railway is not known to be an important or notable example of a type, period, region, or method of construction, it is not directly associated with the life of an important person, and it demonstrates little potential for any important archaeological data.

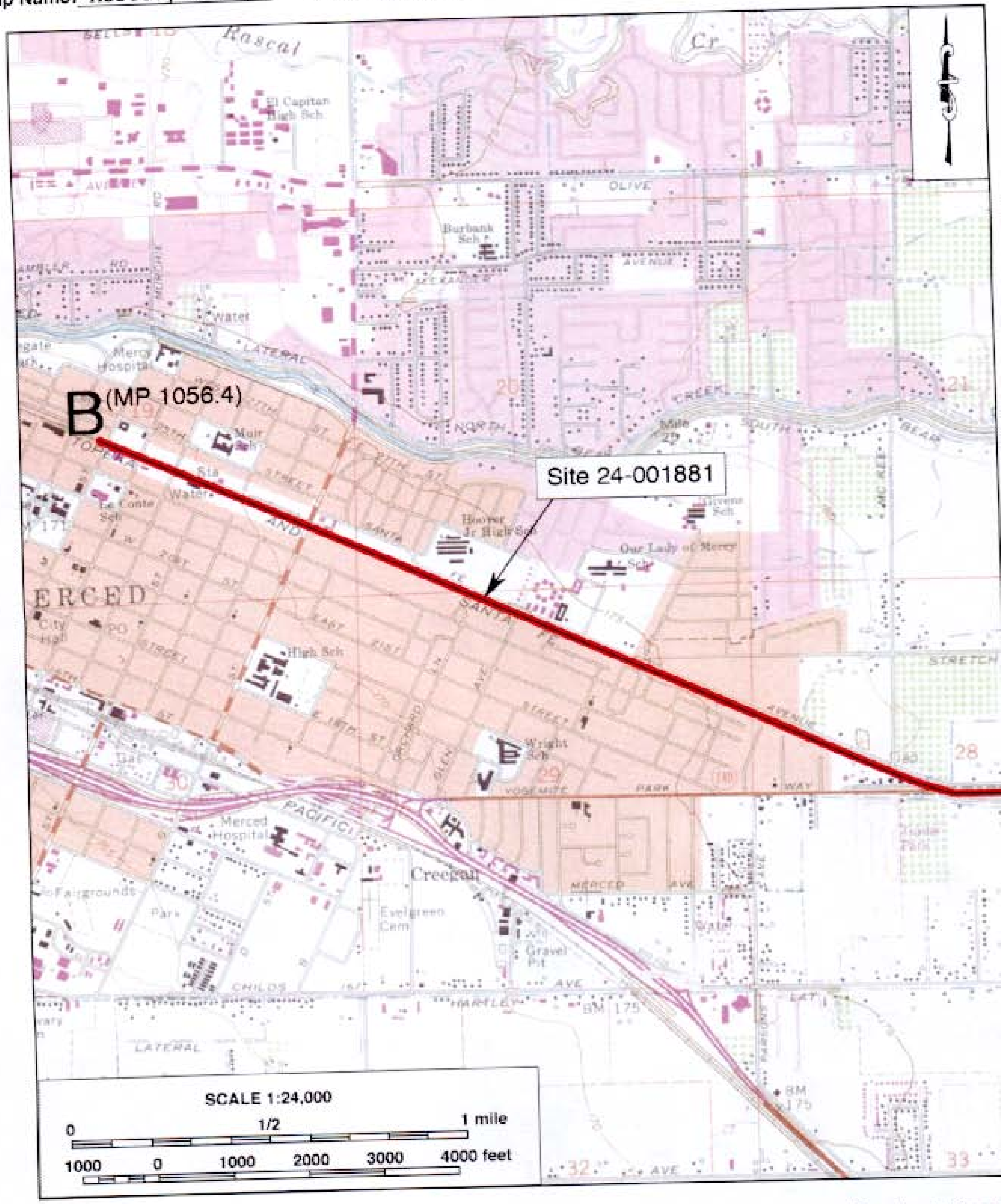
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 24-001881
HRI #
Trinomial

Page 4 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Name: Merced, Calif. *Scale: 1:24,000 *Date of Map: 1961, photo-revised 1987



DPR 523J (1/95)

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

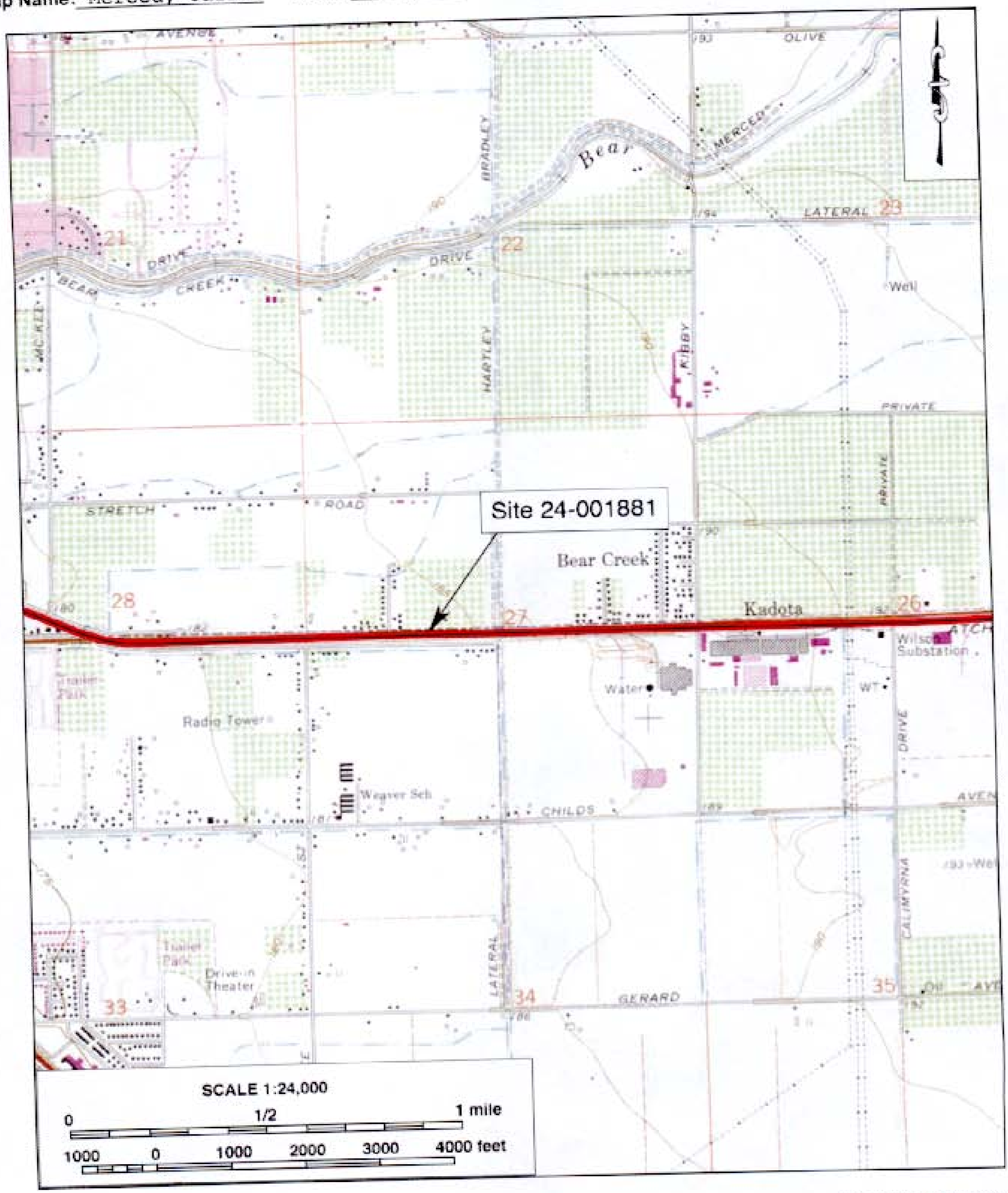
LOCATION MAP

Primary # 24-001881
HRI #
Trinomial

Page 5 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Name: Merced, Calif. *Scale: 1:24,000 *Date of Map: 1961, photo-revised 1987



DPR 523J (1/95)

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

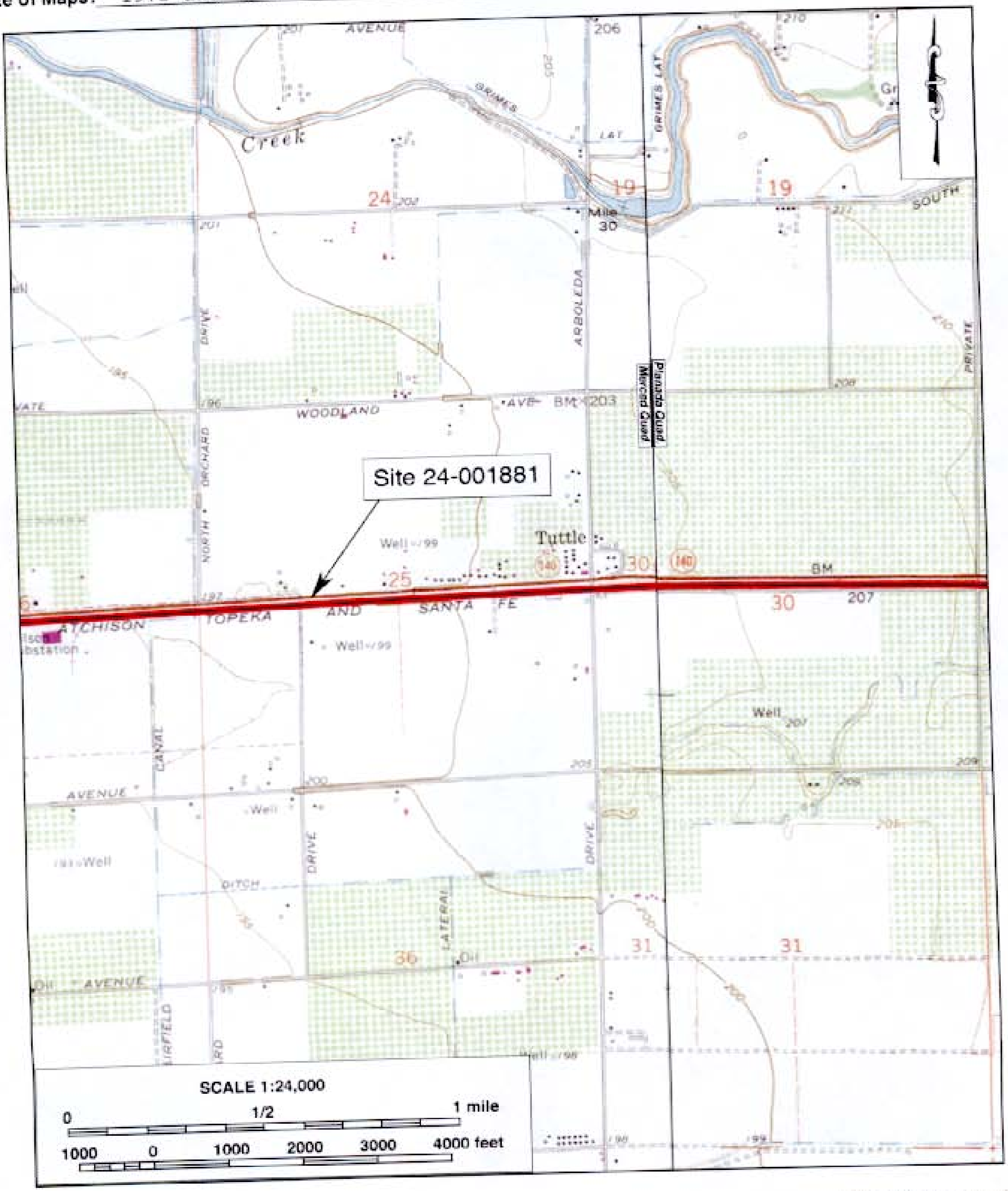
LOCATION MAP

Primary # 24-001881
HRI #
Trinomial

Page 6 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Names: Merced, Calif./Planada, Calif.
*Scale: 1:24,000
*Date of Maps: 1973 and 1987 editions



DPR 523J (1/95)

*Required information

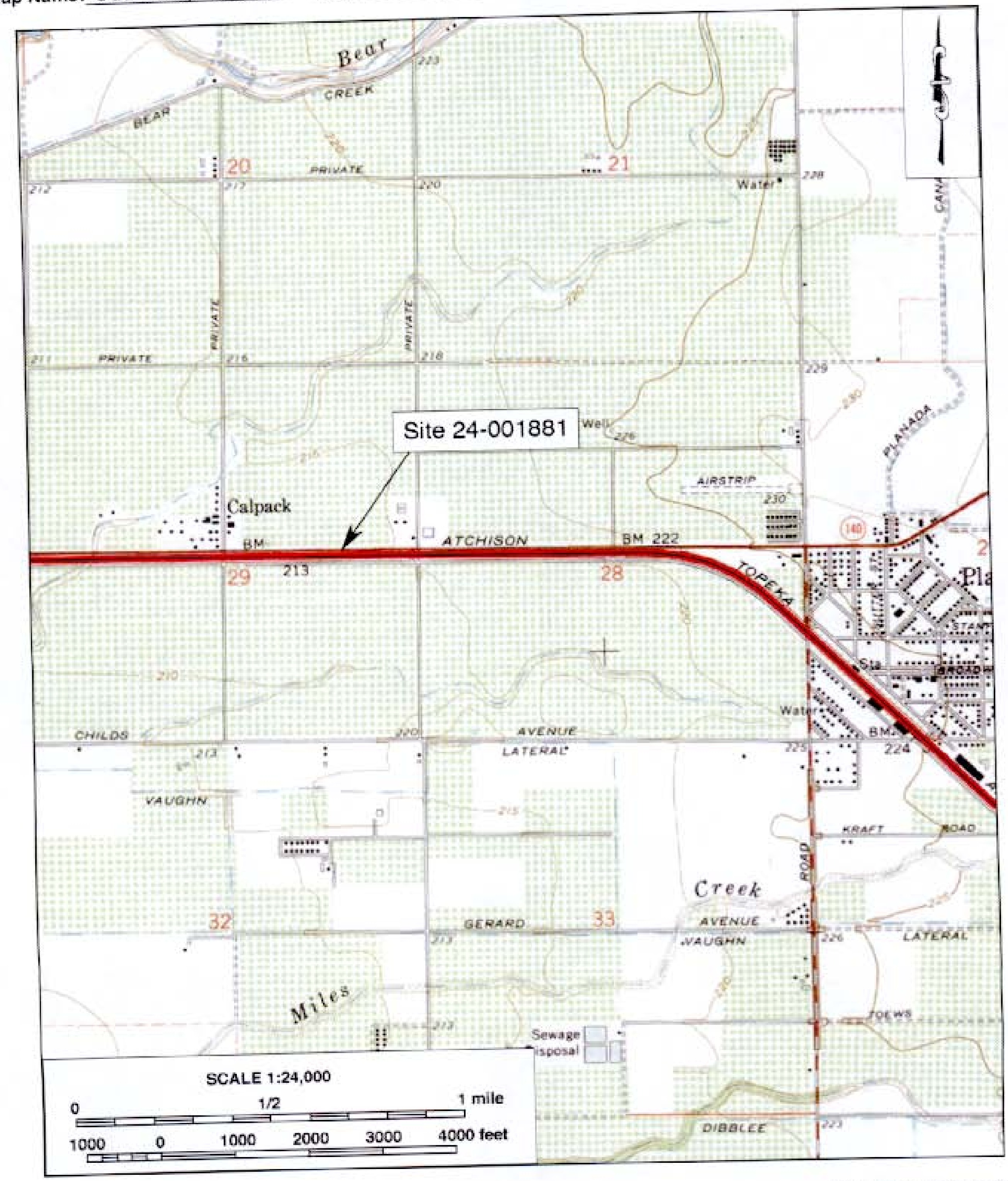
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # 24-001881
HRI #
Trinomial

Page 7 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Name: Planada, Calif. *Scale: 1:24,000 *Date of Map: 1961, photo-inspected 1973



*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

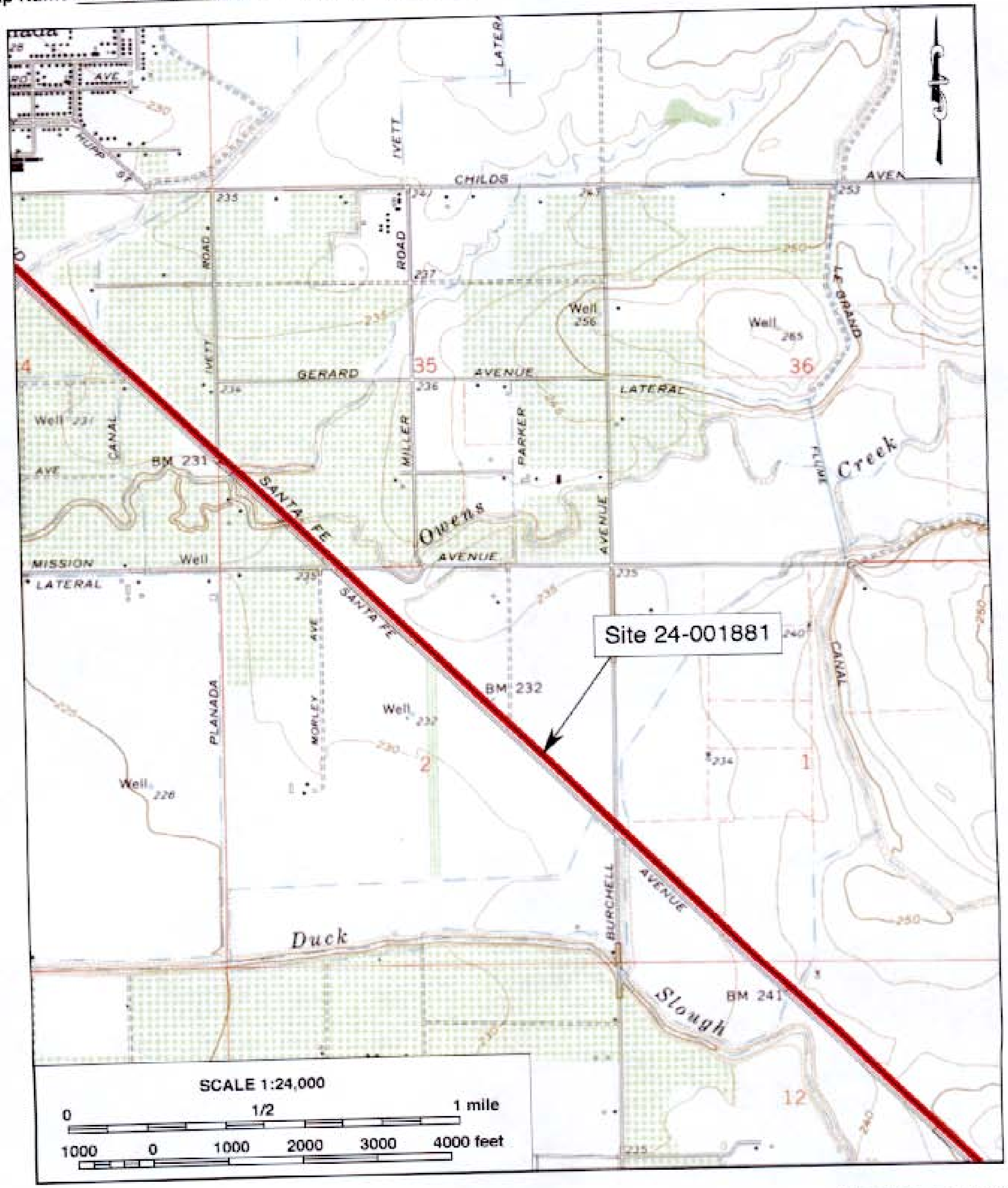
Primary # 24-001881
HRI #
Trinomial

LOCATION MAP

Page 8 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Name: Planada, Calif. *Scale: 1:24,000 *Date of Map: 1961, photo-inspected 1973



*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

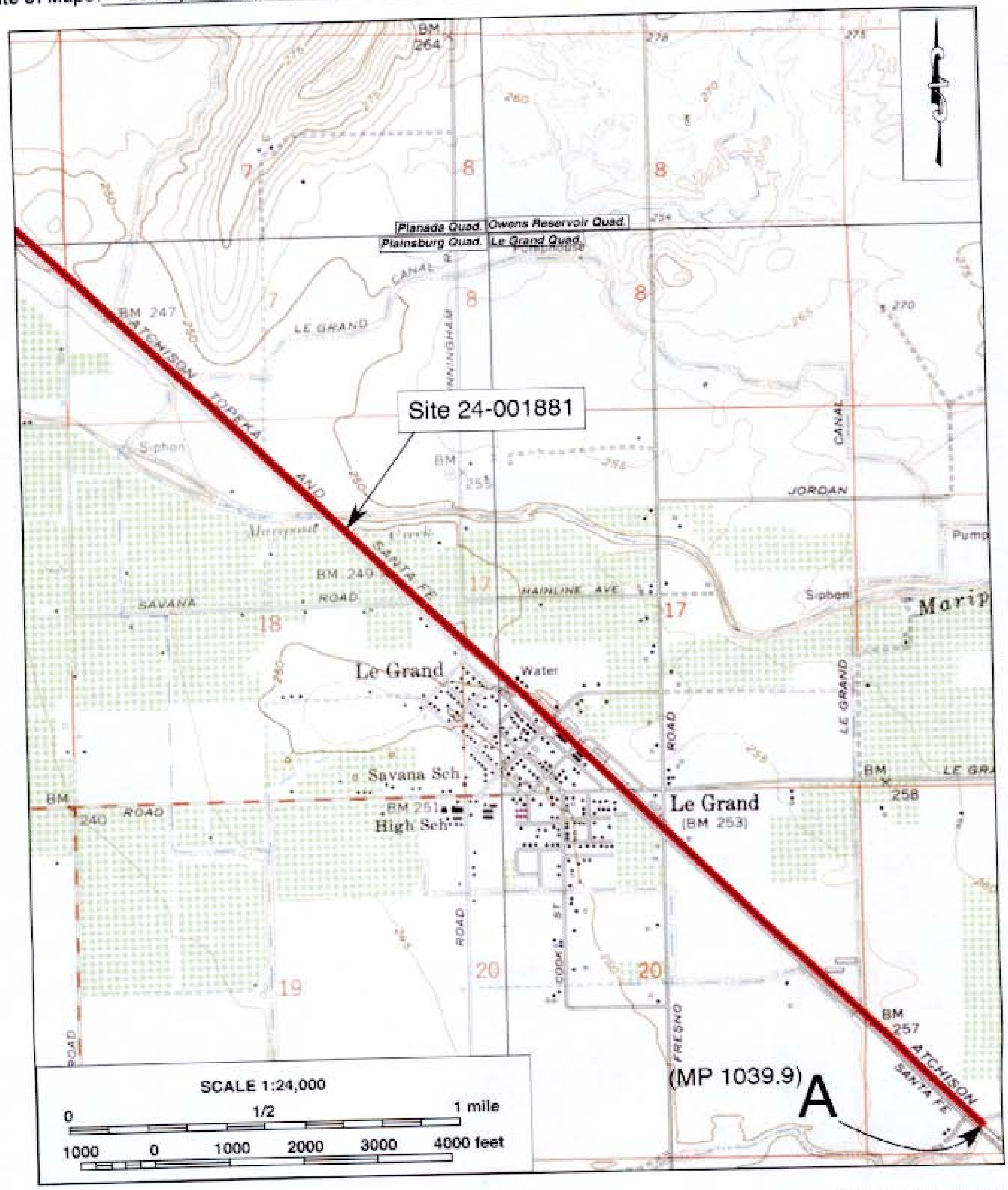
LOCATION MAP

Primary # 24-001881
HRI #
Trinomial

Page 9 of 12

*Resource Name or # (Assigned by recorder) CRM TECH 2312-1H

*Map Names: Le Grand, Calif./Plainsburg, Calif./Planada, Calif. *Scale: 1:24,000
*Date of Maps: 1973, 1976, and 1981 editions



DPR 523J (1/95)

*Required information

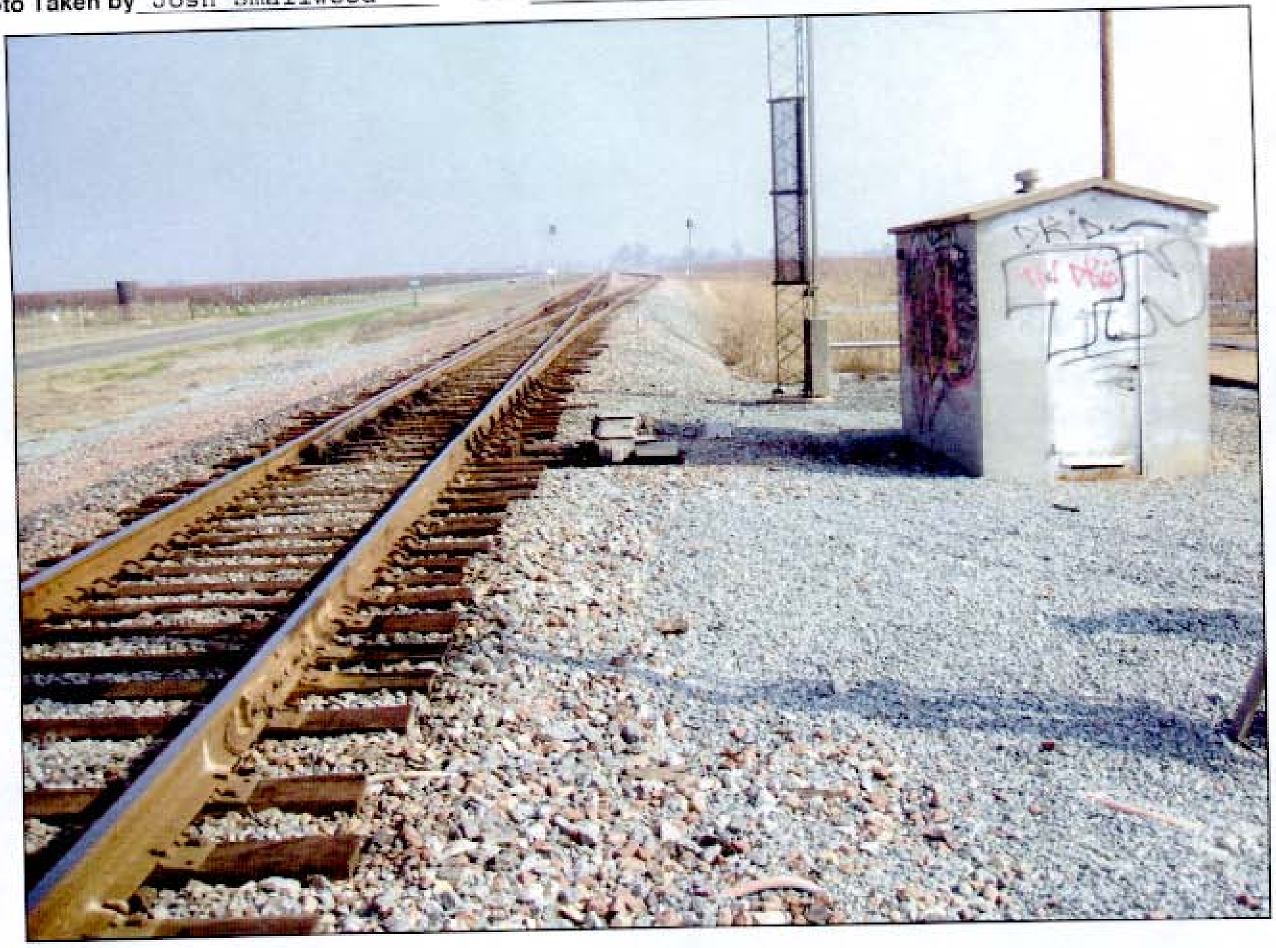
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 24-001881
HRI #
Trinomial

Resource name or # (Assigned by recorder) CRM TECH 2312-1H

Photo Taken by Josh Smallwood

*Date February 2, 2009 √ Continuation ___ Update



Typical view of the existing railroad line (MP 1048.47)

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 24-001881
HRI #
Trinomial

Page 11 of 12

Resource name or # (Assigned by recorder) CRM TECH 2312-1H

Photo Taken by Josh Smallwood

*Date February 2, 2009 √ Continuation ___ Update

Abandoned isolated telegraph pole along the south side of the track (MP 1046.1)

DPR 523L (1/95)

*Required information

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 24-001881
HRI #
Trinomial

Resource name or # (Assigned by recorder) CRM TECH 2312-1H

Photo Taken by Josh Smallwood *Date February 2, 2009 √ Continuation ___ Update

Concrete culvert with date stamp of 1923 (MP 1041.5) *see also P-24-000608

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-24-000608
HRI #
Trinomial CA-MER-000365H
NRHP Status Code 6

Other Listings
Review Code ______ Reviewer ______ Date ______

*Resource Name or # (Assigned by recorder) Le Grand Canal

4/09

P1. Other Identifier: Le Grand Canal

***P2. Location:** ☐ Not for Publication ☒ Unrestricted *a. County Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad Merced Date 1961 (1987) T ___; R ___; ___ ¼ of Sec ___; ___ B.M.

c. Address ______ City ______ Zip ______

d. UTM: (give more than one for large and/or linear resources) Zone ___; ______ mE/ ______ mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

--See Section L2a on Linear Feature Records--

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Le Grand Canal is one of the two major canals within the M.I.D. system of irrigation canals that draws it water from Lake Yosemite (the other is the Fairfield Canal). Flowing in a general southeasterly direction throug the eastern portion of Merced County, the Le Grand Canal serves the communities of Planada and Le Granc Only a small fraction of the canal – approximately 2.5 miles in length – passes through the survey area. Th recordation points are confined to this segment. In general, it can be said that the canal is well maintained an was found to have similar geometry at each recordation point. Although the canal was carrying water at the tim of the recordation, it can be assumed to have a roughly parabolic shape, probably with a broad bottom.

***P3b. Resource Attributes:** (List attributes and codes) HP20

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo of Drawing (Photo required for buildings, structures, and objects.)

-- Photographs are included with the attached Linear Feature Records and Continuation Sheets--

P5b. Description of Photo: (View, date, accession #)

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both

ca. 1922-1927

***P7. Owner and Address:**

Merced Irrigation District,
720 West 20th Street
Merced, CA 95344

***P8. Recorded by:** (Name, affiliation, address)

Bryan Larson and Chris Cannon
JRP Historical Consulting Service
1490 Drew Ave, Suite 110
Davis, CA 95616

***P9. Date Recorded:** July 2000

***P10. Survey Type:** (Describe)

Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Historic Architecture Survey Report/ Historic Resource Evaluation Report, Campus Parkway Project, Merced County, California.

*Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

*NRHP Status Code 6

*Resource Name or # (Assigned by recorder) Le Grand Canal

B1. Historic Name: Le Grand Canal

B2. Common Name: Le Grand Canal

B3. Original Use: Irrigation canal B4. Present Use: Irrigation canal

*B5. Architectural Style: n/a

*B6. Construction History: (Construction date, alteration, and date of alterations)

The Merced Irrigation District built the canal at some time between 1922 and 1927. It is shown as "Propose Canal" on a plan of the works of the Crocker-Huffman, at the time of the sale of the system in about 1922. It i not known exactly when the canal was constructed, although it was in place on a 1927 M.I.D. system map. It wa also realigned in the vicinity of the modern Merced Hills Golf Course in 1948.

*B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: ______ Original Location: ______

*B8. Related Features:

B9. Architect: Unknown b. Builder: Merced Irrigation District

*B10. Significance: Theme n/a Area n/a

Period of Significance n/a Property Type n/a Applicable Criteria n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Le Grand Canal does not appear to meet the criteria for listing in the National Register of Historic Place because it is not significant historically or for its engineering, and because it lacks integrity of design, material workmanship, feeling, and association. There are two areas in which the canal might be seen as significant: unde Criterion A, for its association with events important to our history; and Criterion C, as a distinguished example c a type, period, or method of construction. Each potential area of eligibility will be discussed separately below (See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes)

*B12. References: Historic Architecture Survey Report/ Historic Resource Evaluation Report, Campus Parkway Project, Merced County, California.

B13. Remarks:

*B14. Evaluator: Stephen D. Mikesell

*Date of Evaluation: July 2000

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See "Location Map"

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-24-001887
HRI #
Trinomial CA-MER-457H

*Resource Name or # (Assigned by recorder) Le Grand Canal

L1. Historic and/or Common Name: Le Grand Canal

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation **Designation:** LGC1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been fie inspected on a Location Map.)

UTM: 10 / 727992 / 4138843
Approximately 200 yards south of headwaters at Lake Yosemite.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The canal at this recordation point is earthen with a berm on the west side that carries a maintained access roac The canal was carrying water at the time of the recordation; its bottom configuration, therefore, is unknown.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. Top Width 90-100'
b. Bottom Width unknown (carrying water)
c. Height or Depth unknown (carrying water)
d. Length of Segment 100'

L4e. Sketch of Cross-Section (include scale) **Facing:** South

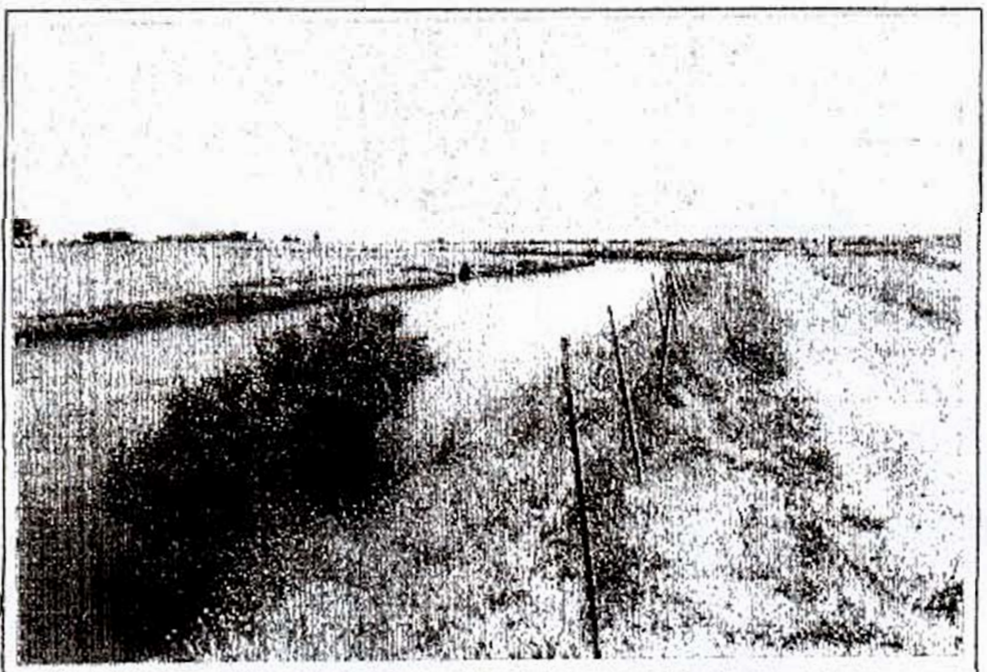
L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

Semi-rural landscape. Lake Yosemite recreational area and parking lot lie to the north and west, and ope grazing lands lie to the east.

L7. Integrity Considerations:

See "Significance Statement," Section B10.



L8b. Description of Photo, Map, or Drawinc
July 2000; camera facing south

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Bryan Larson / Chris Cannon
JRP Historical Consulting Services
1490 Drew Ave. Suite 110
Davis, CA 95616

L11. Date: July 2000

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-24-001587
HRI #
Trinomial CA-MER-457H

*Resource Name or # (Assigned by recorder) Le Grand Canal

L1. Historic and/or Common Name: Le Grand Canal

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation Designation: LGC2

*b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been fiel inspected on a Location Map.)

UTM: 10 / 728510 / 4138589

Approximately 500 yards south of headwaters at Lake Yosemite.

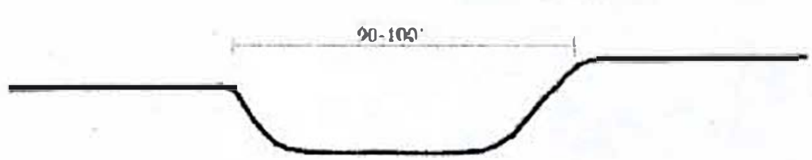
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The canal at this recordation point is earthen with a 10-foot wide berm on the west side that carries a maintaine access road. The canal was carrying water at the time of the recordation; its bottom configuration, therefore, i unknown.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width 90-100'
b. Bottom Width unknown (carrying water)
c. Height or Depth unknown (carrying water)
d. Length of Segment 100'

L4e. Sketch of Cross-Section (include scale) Facing: South



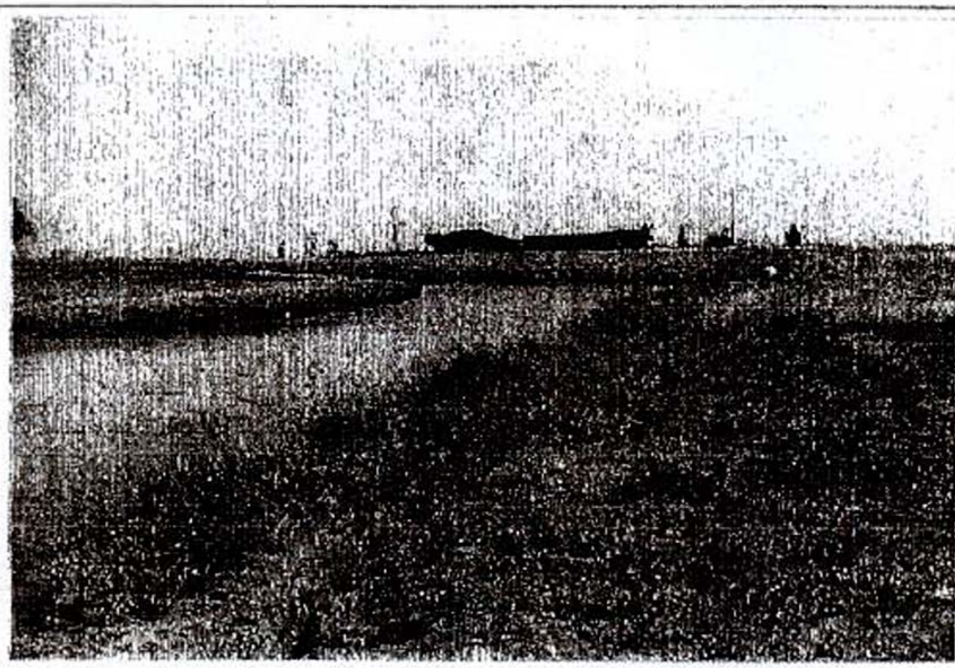
L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

Rural landscape. Grazing fields lie to the east and west, and the Lake Yosemite recreational area and parking lo lie to the northwest.

L7. Integrity Considerations:

See "Significance Statement," Section B10.



L8b. Description of Photo, Map, or Drawing
July 2000; camera facing south

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Bryan Larson / Chris Cannon
JRP Historical Consulting Services
1490 Drew Ave, Suite 110
Davis, CA 95616

L11. Date: July 2000

*Required Informatior

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-24-001887
HRI #
Trinomial CA-MER-457H

*Resource Name or # (Assigned by recorder) Le Grand Canal

L1. Historic and/or Common Name: Le Grand Canal

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation Designation: LGC3

*b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been fie inspected on a Location Map.)

UTM: 10 / 729046 / 4138244

Eastern boundary of the Merced Hills Golf Course, parallel to the 17th fairway.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The canal at this recordation point is earthen with well-groomed banks. There are substantial berms on both side of the canal, the northern berm being slightly higher than the southern. The southern berm also carries maintained dirt access road, measuring approximately 10 feet across. The canal was carrying water at the time c recordation.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

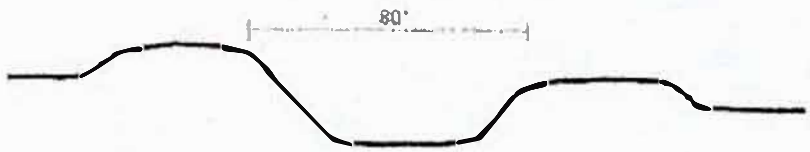
a. Top Width approx. 80'

b. Bottom Width unknown (carrying water)

c. Height or Depth unknown (carrying water)

d. Length of Segment 100'

L4e. Sketch of Cross-Section (include scale) Facing: Southeast



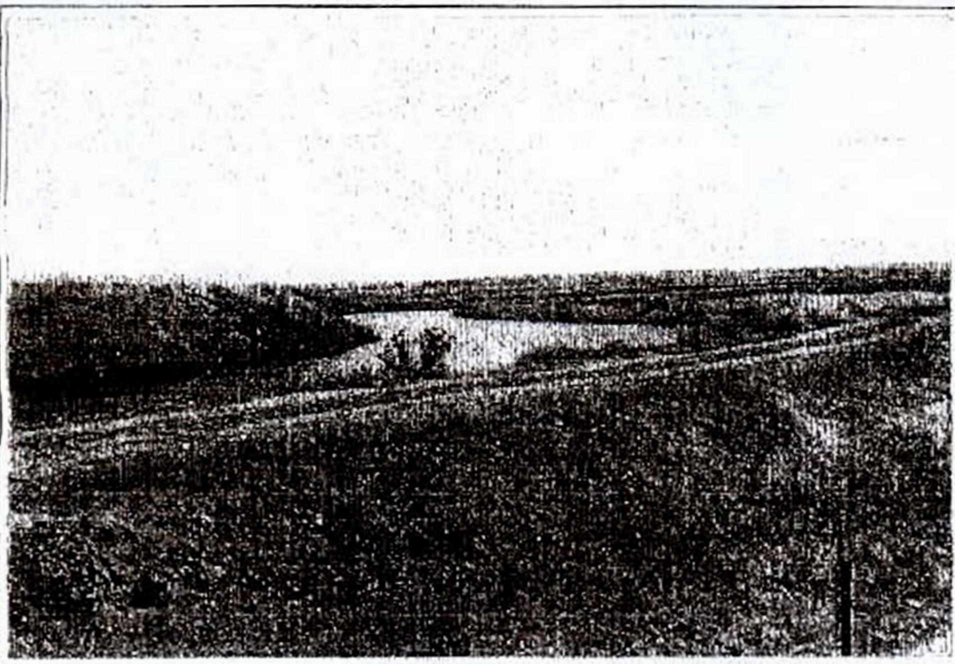
L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

Rural landscape. Grazing fields lie to the north, and a golf course lies to the south.

L7. Integrity Considerations:

See "Significance Statement," Section B10.



L8b. Description of Photo, Map, or Drawing

July 2000; camera facing southeast

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Bryan Larson / Chris Cannon
JRP Historical Consulting Services
1490 Drew Ave, Suite 110
Davis, CA 95616

L11. Date: July 2000

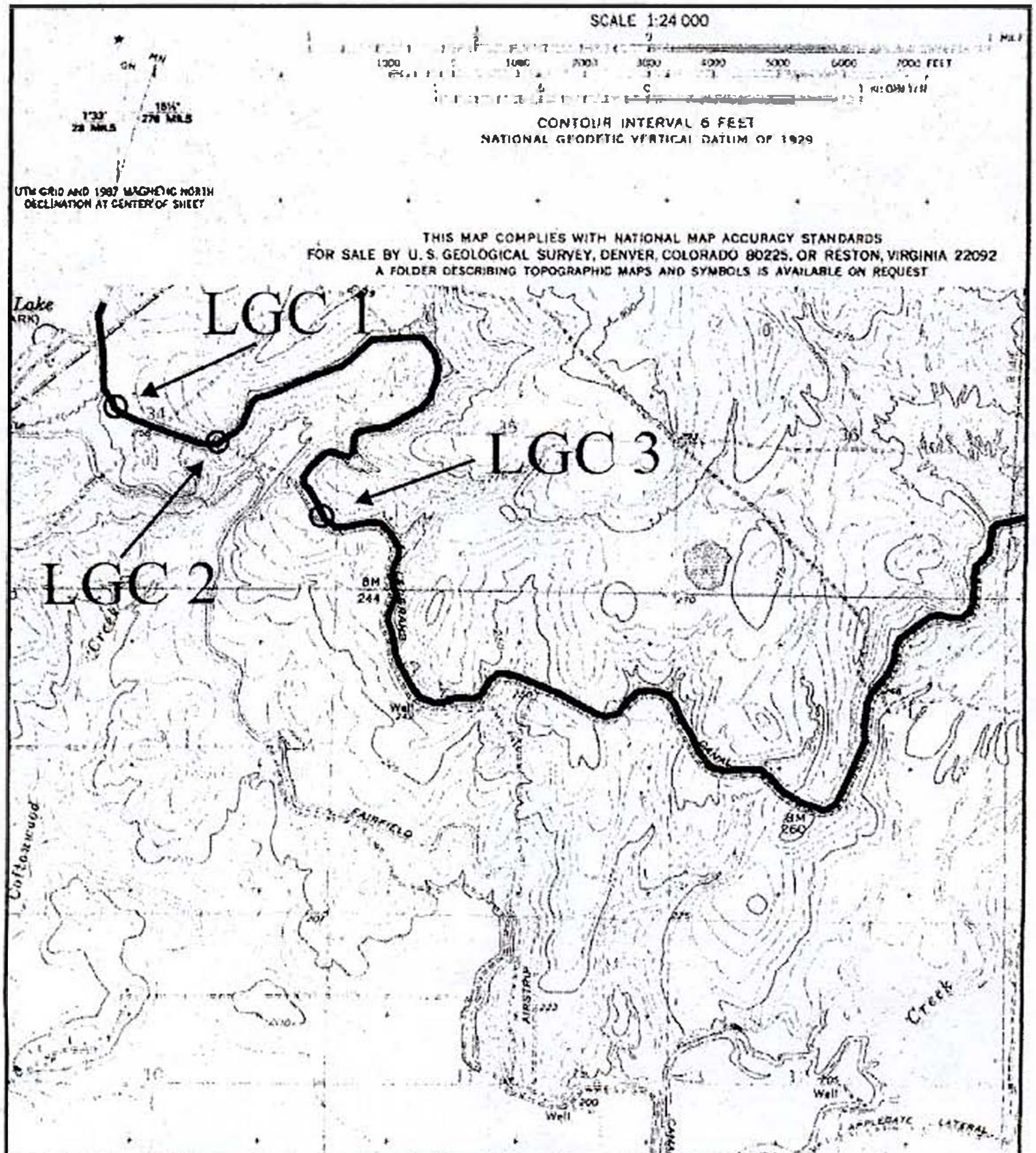
*Required Information

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-24-001887
HRI #
Trinomial CA-MER-457H

*Resource Name or # (Assigned by recorder) Le Grand Canal

Map Name: Merced Calif. 15' USGS Quadrangle * Scale: 1:24,000 *Date of Map: 1961 (1987)



*Required Information

B10. Significance (continued):

Under Criterion A, the canal does not appear to be associated with events or patterns of events that are importan to our history, particularly when evaluated within the broader context of irrigation canals in the San Joaqui Valley. The Central Valley of California is laced with irrigation canals. There are dozens of irrigation districts i the San Joaquin Valley, each of which maintains dozens of canals. In Merced County alone, there are thre irrigation districts, although M.I.D. is the most active of these in terms of supplying water to farms in the county M.I.D. maintains about 793 miles of canals.[1] Similar figures may be found in other districts; M.I.D. is an averag sized irrigation district in the San Joaquin Valley. Although no total figures have been identified, it is likely tha there are hundreds of individually named canals in the San Joaquin Valley. The question of whether these canal qualify for listing in the National Register, then, is a question of whether these canals are significant when treate in the context of the hundreds of canals that are similar in design and function. As noted earlier, there is no doub that the entire system of canals maintained by M.I.D. contributes to the economic and social well-being of Merce County. The importance of the canals to the local economy may be stipulated and acknowledged. The question i whether the canals in question can be said to be associated with events important to our history, when seen in th context of the operations of irrigation districts throughout California.

It is difficult to establish a single standard for what might constitute significance for an irrigation canal becaus there are several areas in which that significance might come into play. In general, however, the test would b some type of importance that is not common to other canals in the Central Valley or other region of the state Priority might be one test: was a canal the first to bring irrigation water to a region? The Persian Ditch in Visalia for example, was found to qualify for listing in the National Register because it was one of the first canals to b built in the San Joaquin Valley; it dates to the 1860s. Level of service might be another test. Several of the canal of the Bureau of Reclamation's Central Valley Project (CVP) have been found to qualify in this regard, on thei basis of the sheer volume of water that they deliver, enough water in a single canal to change fundamentally th cropping pattern of a region. A canal could also be unusual for its design, either because it represents breakthrough in the science of canal engineering, or because it represents a rare example of an antiquated histori method of canal design. Some of the CVP canals were found to qualify because they represented breakthrough in the design of very large canals; the CVP canals rival major rivers in their capacities. Several old stone line canals in the San Bernardino-Riverside area have been found to qualify for the National Register because they ar rare examples of this largely antiquated method of canal construction.

The Le Grand Canal is an important canal, measured in terms of its capacity and the role it plays in providin water to a large area of southeast Merced County. However, in the context of canal construction in this part of th county, it lacks historic significance. By the time that the Le Grand Canal was built in the 1920s, th transformation of Merced County from livestock-based agriculture to irrigated crops was well under way. Mor important to this transformation were canals from the early systems dating to the 1870s and early 1880s – th pioneering years of irrigation development in the county. These might include the Main Canal from Merced Rive to Lake Yosemite, built over period of several years in the 1880s, or other canals constructed by the early cana companies such as the Farmers' Canal Company. These conduits were fundamentally important components t the agricultural development and transformation of this part of Merced County. The Le Grand Canal, in contrast

[1] Statistics taken from M.I.D. web site, www.mercedid.org.

is a comparatively recent addition to M.I.D. system. It was not one of the first, or even most important, irrigatio canals in the east part of the county.

Furthermore, the integrity of the Le Grand Canal appears to be quite low, owing to the fact that it wa fundamentally realigned in 1948 following the removal of a quarter mile flume.[2] This work changed all aspects o the material and design of the canal and also removed the elements that were most characteristic of the earl construction there. Beyond this dramatic realignment and reconfiguration, all of the canals in M.I.D. – includin the Le Grand – have been reshaped, straightened and compacted, as a matter of regular maintenance. Th maintenance practices have affected different canals to varying degrees. An inspection of the photographs in th attached "Linear Features Records" gives a sense of the differences. The Le Grand and Fairfield canals, the tw main canals that draw water from Lake Yosemite and feed numerous laterals downstream, show the highes degree of impact from maintenance activities, and bear little resemblance to historic views of the canals of M.I.D.

The Le Grand Canal does not appear to meet Criterion C, for essentially the same reason that it does not qualif under Criterion A. Under Criterion C, it must be evaluated in the context of the engineering of irrigation canals i the region and the state. Although canals may seem to be simple structures, they are in fact carefully engineere facilities, reflecting centuries of study and analysis, including exhaustive analyses by scientists and engineers i universities as well as those in the major state and federal water development agencies, including the Corps o Engineers, Bureau of Reclamation, and the California Department of Water Resources.[3] In California i particular, irrigation canals have been formally engineered throughout the 20th century; the era of "vernacular" o non-engineered irrigation systems ended in the 19th century.

The Le Grand Canal reflects many generations of work, but none more so than work that has been accomplishe since the end of World War II. Most of the elements that may be recorded, from the geometry of the canal bank and bed to the control structures and, in some cases, the basic alignment of these canals, is far more the product o post-war work than any work that was accomplished in the pioneering era of canal construction. There is n indication that this canal is significant within the context of modern (post-war) canal engineering. It is a usefu irrigation conduit that displays modern methods of canal maintenance and is generally workmanlike in it construction. There is no indication, however, that this canal is an important example of the science of irrigatio canal constuction and maintenance.

To conclude, the Le Grand Canal does not appear to meet the criteria for listing in the National Register o Historic Places. Although it performs a needed function in sustaining irrigated agriculture in the area, the canal when assessed in the context of irrigation in the Central Valley or in Merced County, does not appear to represen a significant entity historically or in terms of its engineering. In addition, the canal retains a very low degree o integrity to its appearance upon construction in the 1920s. Lacking significance and integrity, the canal does no appear to meet the criteria for listing in the National Register of Historic Places.

Additionally, the canal does not appear to meet the criteria for listing in the California Register of Historica Resources. The criteria include the twin requirements of significance and integrity, in the same manner as th National Register. Because it is not significant, and because it lacks integrity to its historical appearance, the L

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[2] To assess integrity, it is necessary to establish a potential period of significance for the canals. This issue is discussed in detail i Section 5.3 of this report.

[3] The scientific basis for canal design is discussed in detail in JRP Historical Consulting Services, "Canals," 1995.

Grand Canal does not appear to meet the standards of historical significance as outlined in Section 15064.5(1)(2 (3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resourc Code.

*Merced County

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD *see P-24-001910 & 001911
NRHP Status Code: 3
Review Code Reviewer

* Primary #: P-24-001909
HRI #:
Trinomial P-22-003197
Other Listings:
Date

Page 1 of 8 filed in Gustine 12/10
*Resource Name or #: Merced Irrigation District

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County: Merced + Mariposa Co. + Hornitos

*b. USGS 7.5' Quads: Coulterville. Penon Blanco Peak. Merced Falls. Snelling. Turlock Lake. Yosemite Lake. Winton. Cressey. Turlock. Planada. Merced. Atwater. Arena. Stevinson. Gustine. Turner Ranch. Sandy Mush. El Nido. Plainsburg. Le Grand. Portions of R9 through R16 East and T8 through T3 South MDBM

c. Address: 744 West 20th (Headquarters) City: Merced Zip: 95340

d. UTM: e. Other Locational Data: none. Elevation: 1000-95 feet asl

*P3a. Description: (*Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)* The MID is located throughout much of the northeast portion of the County of Merced and the boundary is defined in a map created by the MID in 1973 (attached). According to MID's website, the District owns, operates and maintains ditches, canals, laterals, wells, pumping plants, the New Exchequer and McSwain Dams, reservoirs, and hydroelectric facilities. These serve farmers and domestic water users. The dams are the primary water storage facilities on the Merced River and are located in the foothills on the western slope of the Sierra Nevada mountain range. The two dams and reservoirs are integral parts of the 1964 Merced River Development Project, and are licensed by the Federal Energy Regulatory Commission (FERC). McSwain Dam was completed in 1967 and is a regulating reservoir. The New Exchequer Dam Project was completed in 1967 as a multi-purpose facility providing facilities and water for all beneficial uses, including domestic and irrigation water, flood control, hydroelectric power generation, recreation, and the environment. The original Exchequer dam was removed (built 1924-1926). The MID water system diverts water from the Merced River at two locations. The Northside Canal diversion is small and located slightly downstream from Merced Falls and serves about 10,000 acres of farm ground north of the Merced River. The Main Canal diversion is larger and has a capacity of 2,000 cubic feet per second, and is located three miles downstream of the McSwain Dam. The diversion is from a small reservoir created by the Crocker-Huffman Diversion Dam, owned and operated by the District. The Diversion Dam also provides water to salmon and trout hatcheries and rearing facilities.

Staff did not review all of the physical parts of the MID, just a segment of the McCoy Lateral and the Garibaldi Lateral that are the subject of the referenced analysis by Dice and Lord (2010).

*P3b. Resource Attributes: HP11, HP20, HP21, HP22. Eng. structure, Canal, Dam, Lake (reservoir)

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☒ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing see Photo pages

P5b. Description of Photo: (View, date, accession #) None on this page. See photo list.

*P6. Date Constructed/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both

*P7. Owner and Address:
Merced Irrigation District 744 West 20th
Merced, CA. 95340 (209.722.5761)

*P8. Recorded by: (Name, affiliation, and address)
Michael H. Dice. M.A. Michael Brandman Associates
621 Carnegie Drive, Suite #100 San Bernardino, CA. 92408

*P9. Date Recorded: October 10, 2010.

*P10. Survey Type: (Describe)
NEPA Linear Survey of District lateral segments

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") Dice, M.H., and K.J. Lord 2010. Section 106 Cultural Resource Impact Analysis for the McCoy Lateral and Garibaldi Lateral Project, Merced Irrigation District, County of Merced, California. Draft Dated November 2 2010.

Report MB-7704 rec'd @ CCIC – 2013

*Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record ☒ Other (List): Official Map of 1973 District showing boundary against Township and Ranges

Section 106 Cultural Resources Assessment for the Garibaldi Lateral and McCoy Lateral Project, Merced Irrigation District, County of Merced, California (Revised).

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code: 3

*Resource Name or #: Merced Irrigation District

B1. Historic Name: Merced Irrigation District B2. Common Name: MID

B3. Original Use: Water conveyance system B4. Present Use: Water conveyance system

*B5. Architectural Style: No style: vernacular based on topography.

*B6. Construction History: (Construction date, alterations, and date of alterations)

Prior to development of the MID, most of the creeks and rivers flowing into and through Merced County were known to be useful for irrigation and mining purposes but much of the water was from spring runoff that ended up in the tributaries of the San Joaquin River. During California's state-wide development boom of the 1880's, hundreds of agricultural colonies were developed with the intent on selling land to immigrants from the east. The value of an irrigatable property hinged on several factors: soil type, reliable water sources, legally protected water rights, and rail transportation. The Crocker-Huffman Land and Water Company was one of many colonies formed in the Merced region of the Central Valley. Crocker-Huffman's water had been entitled for several decades prior to the coming of the MID and was originally part of the Robla Canal Company, which had built water delivery canals beginning in 1870.

The MID was created through the coalescing of a series of irrigation canals and ditches that had been built privately between 1870 to 1922. As a public entity, the MID formed in 1919, sold bonds, and began buying up the private irrigation systems. Once the Crocker-Huffman canal system and water rights were purchased, the MID became the leading irrigation district in the County. Roughly 180,000 acres were included in the District in the 1920's. McSwain (1978) records that the primary types of crops grown using MID water (1934-1976) were "field crops" (mostly sweet potatoes), grain (wheat, barley, hay, alfalfa), pasture, rice, nut trees (walnuts and later almonds and pistachios), peaches, and grapes. These crops can be seen in the area today.

Successful farming ventures on lands adjacent to the Merced and San Joaquin Rivers in 1920 were dependent upon control of the Merced upstream from the rivers' confluence to Merced Falls at the Mariposa County line. Upstream control of the San Joaquin as it meandered through its wide, slough-filled floodplain was also important. Small sloughs lined the Merced River throughout its 38 mile meander west across the County, but because of its drop (350-60 feet) the Merced was tightly reined in its floodplain. The San Joaquin River watershed exhibited a maze of sloughs and meandering channels running between 110 and 60 feet above sea level through the County. Given the existing topography, thousands of acres of low-lying farmland could be protected from flooding and still be irrigated reliably if and only if a large number of landholders could work cooperatively. The San Joaquin River was used for irrigation in the westernmost portion of the County, but the San Joaquin was already being used for irrigation in Fresno, Kings and Kern counties so the water rights were more complicated. Dams for storing water would have to built in several areas not only to control flooding but to smooth delivery. These included Yosemite Lake (built 1888), which was a reservoir built for regulation of the Main Canal at a point east of the City of Merced, and Exchequer Lake (aka Lake McClure, built 1927) upstream on the Merced in Mariposa County, which formed the primary water storage facility for the MID.

The MID was designed to be a publically-owned utility that relied on taxes and hydropower sales. Land sales were undertaken if and only if a farmer lost his title to the MID for non-payment of taxes. Records show that the District taxed landowners within the District at yearly varying rates per 100 acre units with an expected 15 percent delinquency rate. It was those tax payments that allowed the farmer to take whatever water he needed as he paid taxes on the amount of acreage he had rather than how much water he used or what he grew. Certain crops, particularly rice, required a constant flow of irrigation water and required permits from the District with added fees. The rest could be irrigated during daylight hours only, which was the preferred method for most. If a farmer closed his sluices but didn't unblock the weir, backups and spills could occur, and might damage other farmers' properties. This would create ill will and legal action so the District hired "ditchtenders" who would maintain the Laterals locally and make certain local mishaps were reduced. Ditchtenders usually got a small house to live in and used their own vehicles for mileage.

Rice was grown in the MID because of the existence of the Yamato Colony, a Japanese agricultural community begun in 1904 by Kyutaro Abiko (CDPR 1988), who was somehow able to purchase 3,000 acres without legal recriminations. Unusual for the time, the Yamato Colony was one of three colonies begun by Issei (first generation Japanese immigrants) in the Central Valley in the early 1900's. Originally located slightly east of the town of Livingston, many farmed parcels in this area are today owned by ethnic Japanese.

High water tables and seepage across the canal walls appear to have been the first complaints registered with the MID in the early days because all of the facilities were either hard-packed dirt canals, former creeks and washes, or unlined tunnels. Prior to MID development, most farmers except the riparian farmers along the Merced and the San Joaquin drew their water from wells and used the land for pasture. When the water table rose after regional irrigation began, drainage wells had to be built which would take the excess ground water out and pump it back into the canals, Laterals and drains. Pumping requires electricity, so the District included hydroelectric power generation as part of the financing effort to build the Exchequer Dam. With power generation beginning in 1927, the MID used whatever power it needed, and sold the remainder to San Joaquin Power and Light (absorbed by PG&E in the 1950's).

*NRHP Status Code: 3

B6 (continued)

Nearly all of the MID was unlined until after the Crocker-Huffman was purchased: complaints and litigation forced the District to begin lining its canals and Laterals with concrete. Lining the system took years and was expensive, and a few farmers apparently did their own lining of the Lateral segments as it crossed their land. Research shows that the lining process was probably undertaken first in those sections of the MID which carried the largest capacity and/or had the biggest seepage and break problems. Examination of the entirety of the McSwain (1978) shows that while several localities were difficult to keep running smoothly and were subject to constant litigation over seepage damage, neither the Garibaldi and McCoy Laterals nor the ranches they served were ever mentioned as places that needed repairs or where litigation was occurring. Subsequently, we estimate that the McCoy and Garibaldi APE was probably lined during the 1935-1937 period when the New Deal made Reconstruction Finance Corporation (RFC) monies available to the MID. That section of the Garibaldi between the corner of Vineyard and River Road and the Merced is unlined to this day and demonstrates what the entirety of the system must have looked like before the MID was created.

In the 1950's and 1960's McSwain notes that although lining (and relining) was still taking place, the amount of needed lining work slacked off. The types of crops grown changed to meet new post-War demands. As an example, nut orchard acreage had increased dramatically by 1976. With the MID mature and the farm economy more stable now than during the periods before the War, farmers could grow products that would require a long-term investment, such as nuts and grapes. Almonds and walnuts appear to be flood-irrigated in the MID, while grapes are drip irrigated. Grapes are deep rooted plants and poor drainage can kill an old and valuable orchard quickly. It would have been necessary to place grape orchards away from areas subject to seepage. In sum, the essential elements of a publicly-owned irrigation district developed in the 1920's remain to this day: storage behind dams used to regulate gravity flow, hydropower electricity generation, delivery downstream using a series of main canals, miles of gravity-fed Laterals with concrete weirs and Calco sluice gates, delivery of water to farmed parcels at the high point on the property, taxation on the basis of acreage owned, and reduction of the irrigated water table through well pumping. These factors are what make the MID system a potential *Historic District.*

*B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: Original Location:

*B8. Related Features: Contributing features of the MID include Dams, Reservoirs, Main Canals, Laterals and Wells.

B9a. Architect: MID b. Builder: MID

*B10. Significance: Theme: Water Conveyance Development in the Central Valley Area: County of Merced
Period of Significance: 1919-1939 Property Type: Engineering Structure
Applicable Criteria: Criterion A, B, C and D
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The integrity of the historic property's location, design, setting, materials, workmanship, feeling, or association must be considered as part of this analysis. We consider these important aspects of the original integrity to be reflected in the Laterals and Lateral segments that will be affected by the undertaking. The basic framework for the MID includes reservoirs, dams, primary canals, Laterals, wells and drains that allow the District to operate and serve its constituents ably. It can be considered a Historic District with contributing and non-contributing elements. The Irrigation District's water delivery framework was created during the Period of Significance and although the system is self-sustaining and improvements to the basic structure have occurred on a regular basis, the basic framework still remains and is essentially unchanged. The MID system is therefore considered wholly intact and the integrity of the MID system within its period of significance is considered *good.*

*NRHP Status Code: 3

B10 (continued)

Criteria A, Event: the property must make a contribution to the broad patterns of American history.
The Merced Irrigation District reflects a California-wide pattern of water delivery development during the early part of the 20th Century in response to the States' quickly developing agricultural landscape. Its historical contribution to the development of Central Valley agribusiness is in fact well known to persons beyond the County of Merced. In our view the MID system does currently qualify for the NR under Criterion A as a Historic District because there is good evidence to support the idea that the MID makes a significant contribution to historical patterns at the local, State or national level of analysis.

Criteria B, Person: the property must be associated with persons or people significant in the American past.
The original developers of the MID system were persons who built the earliest canals and waterworks, and it was the local bankers and landowners who were able to create the MID through a vote of the people and put the whole of the MID together. These local figures have not gained national or State prominence and while their names may be known to local historians and County historical societies, we do not consider that they have a storied place in State history. In our view the MID Historic District does not currently qualify for the NR under Criterion B.

Criteria C, Design/Construction: the property must exhibit distinctively American characteristics through its construction and architecture, including having high artistic value or being the work of an American master.
It is clear that the MID system reflects a State-level trend in waterworks construction that was occurring during its period of significance. Many Irrigation Districts built before World War II in the Central Valley exist to this day and serve their constituents well. The initial framework of design reflects effective use of a gravity-fed technology at a time when these technologies could serve newly developing agricultural "colonies" and landscapes. Once built, lands that were pasture and irrigated with wells, or lands that would flood yearly upon which long-term agribusiness concerns (vineyards, nut tree orchards) could not be constructed, could be confidently developed so that the agricultural climate of the region would be vastly improved. The system of reservoirs, canals and irrigated land is distinctive to the Central Valley and important to American history at the State level of analysis. For these reasons and in our view the MID Historic District does currently qualify for the NR under Criterion C.

Criteria D, Information Potential: the property has yielded or may be likely to yield information important to American prehistory or American history.
Review of historic records at the MID archives plus knowledgeable research on the part of other authors has shown that the MID's historic background will invariably yield additional information associated with the development of these types of public water control systems in the Central Valley. Not all of the original contributing elements have yet to be recorded or examined by a qualified historian. Therefore, the MID Historic District does currently qualify for the NR under Criterion D.

B11. Additional Resource Attributes: (List attributes and codes) none

***B12. References:** McSwain, K. 1978. *History of the Merced Irrigation District, Merced and Mariposa Counties California 1919-1977.* Merced Irrigation District, Merced.

Outcalt, J. 1925. *History of Merced County, California.* Historic Record Company, Los Angeles.

(This space reserved for official comments.)

Record (Record Steam Book and Job Printing House). 1873. Irrigation In California: the San Joaquin and Tulare Plains. Pamphlet by Record Steam Book and Job Printing House, Sacramento

Dice, M. and K. Lord. (2010). Section 106 Cultural Resource Impact Analysis for the Garibaldi Lateral and McCoy Lateral Project, Merced Irrigation District, County of Merced, California. On-file CCIC and MID. Michael Brandman Associates, Inc. San Bernardino, CA.

B13. Remarks:

***B14. Evaluator:** Michael Dice, M.A.
***Date of Evaluation:** November 10, 2010

D1: Historic Name: Merced Irrigation District

D2: Common Name: MID

*D3: Detailed Description (Discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district.):

The MID was created through the coalescing of a series of irrigation canals and ditches that had been built privately between 1870 to 1922. MID boundaries encompasses 164,000 gross acres. Total irrigable lands in the MID amount to 138,000 acres. Of the 825 total miles of water distribution facilities, earthen-lined channels account for 596 miles, or 75 percent; concrete-lined channels, 109 miles, or 14 percent; and 89 miles of pipelines or 11 percent. The MID also maintains some 4,100 delivery gates, as well as 1,500 check structures. In addition to providing irrigation water, the MID also uses its existing irrigation distribution system for local flood control by routing local foothill runoff and stream flood waters away from populated areas. At the end of 2007, there were approximately 14,062 residential, commercial, industrial, and government parcels located primarily within the urban area of Merced Irrigation District that received flood protection.

In February 1888 the Crocker and Huffman Land and Water Company opened the gates of the Yosemite Reservoir to allow water to flow into the downstream portion of the Main Canal, which had been placed into "Canal Creek". Irrigation water was made available to the City of Merced and nearby smaller towns. During the early period in Central Valley irrigation history, the biggest primary canals were built in modified creek beds, and Laterals were brought off the main canals (possibly using old washes) via excavation. Water was delivered through a series of siphons or gravity draws. Canals such as the Arena or the Livingston leading to the northwest portion of the MID, where the APE is located, were probably excavated before 1900. Old washes may not have been used for these canals because the natural slope is to the west-southwest. Despite a thorough search of available records, it is not known exactly when the Livingston and the Arena canals were first built but they may have been part of the Crocker-Huffman system.

In 1922, the District purchased the Crocker Huffman Land and Water Company canal system for $2.25 million. The Exchequer Mining Company property on the Merced River (in Mariposa County) was chosen as the ideal location to construct the District's primary storage dam. Planning for the dam started in 1921, with construction taking place between 1922 and 1926. After selling bonds totaling $16 million through 1926, in 1927 the District had a completed a fully operational dam, an extended canal system, and hydropower facilities generating a supply of electricity exceeding local demand. The Exchequer Dam, one of the largest concrete gravity arch dams at the time, was 326 feet high, backed up water for a run of 14 miles and allowed storage of 281,000 acre-feet. The District built two generators in the powerhouse, each with a rated capacity of 15,625 kilowatts. When the reservoir was depleted, irrigation water would be shut off (typically early October) and not be restarted until March. Between those months, the MID wouldn't sell hydropower and the canal system would be cleaned and repaired. In excellent water years, hydropower would be produced earlier or later by allowing the water to flow into the Merced. Droughts would force agricultural rationing (a minor problem because of a high water table sustained by irrigation) and loss of electrical revenues (a major source of the MID income). This is exactly what happened between 1928 and 1932.

During the 1931-1936 period in its history, the national economic collapse took a toll on the ability of the MID to survive. Saddled with debt and several years of a state-wide drought that saw stored water reserves dwindle, the MID was unable to generate electric power for sale at levels that would make the entirety of the venture feasible. In 1932, newspaper reports showed that MID was essentially bankrupt. The late 1932 through 1934 period saw the MID delay interest payments to bondholders, local banks' refinancing schemes essentially failed, and half its employees were laid off. Massive drops in land value occurred, reducing tax receipts significantly. Virtually all farmers lost money during this period and although the water kept flowing, much of the land in the MID in 1934 lay fallow. Hundreds of properties were seized and sold at auction for non-payment of District taxes. In 1935-1936 with the advances made toward the Roosevelt Administration through its lobbyists and backed by federal loans, MID operations and financing was restructured and by the end of the 1930's had gotten back on its feet from an economic standpoint. During the 1940's, no development of capacity occurred due to shortages brought on by the War. By 1947, construction-related commodities were available once again.

*D4. Boundary Description (Describe limits of district and attach map showing boundary and district elements.): The District is located in the north-central portion of the County of Merced. The District boundaries are shown on a MID map created in 1973, and is attached. The farmland inside the MID boundary is taxed for water service and flood control.

*D5. Boundary Justification: Offical taxed limits, locations of laterals and dams.

*D6. Significance

Theme: The theme associated with the analysis of the MID system Historic District is the idea of water conveyance development in the Central Valley.

Area: County of Merced.

Period of Significance: 1919-1939: The Merced Irrigation District was formed from simple, earlier water transportation systems through public activism. During this Period, the MID formed, expanded, nearly failed, was reinvigorated by New Deal legislation, and finally matured enough to provide water to more than 180,000 potential acres just in time for World War II when the expansion process was curtailed. Because of the MID, a significant portion of the Central Valley was able to grow crops in support of the War effort efficiently with cooperative water use. The earliest period of significance allows the MID to be considered eligible for the NR because it was initiated more than 50 years ago.

Applicable Criteria: (Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole.) The basic framework for the MID includes reservoirs, dams, primary canals, Laterals, wells and drains that allow the District to operate and serve its constituents ably. It can be considered a Historic District with contributing and non-contributing elements. The Irrigation District's water delivery framework was created during the Period of Significance and although the system is self-sustaining and improvements to the basic structure have occurred on a regular basis, the basic framework still remains and is essentially unchanged. The MID system is therefore considered wholly intact and the integrity of the MID system within its period of significance is *good*. Applicable criteria should be evaluated at the State lkevel of analysis.

Criteria A, Event: the property must make a contribution to the broad patterns of American history.
The Merced Irrigation District reflects a California-wide pattern of water delivery development during the early part of the 20th Century in response to the States' quickly developing agricultural landscape. Its historical contribution to the development of Central Valley agribusiness is in fact well known to persons beyond the County of Merced. In our view the MID system does currently qualify for the NR under Criterion A as a Historic District because there is good evidence to support the idea that the MID makes a significant contribution to historical patterns at the local, State or national level of analysis.

Criteria B, Person: the property must be associated with persons or people significant in the American past.
The original developers of the MID system were persons who built the earliest canals and waterworks, and it was the local bankers and landowners who were able to create the MID through a vote of the people and put the whole of the MID together. These local figures have not gained national or State prominence and while their names may be known to local historians and County historical societies, we do not consider that they have a storied place in State history. In our view the MID Historic District does not currently qualify for the NR under Criterion B.

Criteria C, Design/Construction: the property must exhibit distinctively American characteristics through its construction and architecture, including having high artistic value or being the work of an American master.
It is clear that the MID system reflects a State-level trend in waterworks construction that was occurring during its period of significance. Many Irrigation Districts built before World War II in the Central Valley exist to this day and serve their constituents well. The initial framework of design reflects effective use of a gravity-fed technology at a time when these technologies could serve newly developing agricultural "colonies" and landscapes. Once built, lands that were pasture and irrigated with wells, or lands that would flood yearly upon which long-term agribusiness concerns (vineyards, nut tree orchards) could not be constructed, could be confidently developed so that the agricultural climate of the region would be vastly improved. The system of reservoirs, canals and irrigated land is distinctive to the Central Valley and important to American history at the State level of analysis. For these reasons and in our view the MID Historic District does currently qualify for the NR under Criterion C.

Criteria D, Information Potential: the property has yielded or may be likely to yield information important to American prehistory or American history.
Review of historic records at the MID archives plus knowledgeable research on the part of other authors has shown that the MID's historic background will invariably yield additional information associated with the development of these types of public water control systems in the Central Valley. Not all of the original contributing elements have yet to be recorded or examined by a qualified historian. Therefore, the MID Historic District does currently qualify for the NR under Criterion D.

*D7. References (Give full citations including the names and addresses of any informants, where possible.):

McSwain, K. 1978. *History of the Merced Irrigation District, Merced and Mariposa Counties California 1919-1977.* Merced Irrigation District, Merced.

Outcalt, J. 1925. *History of Merced County, California.* Historic Record Company, Los Angeles.

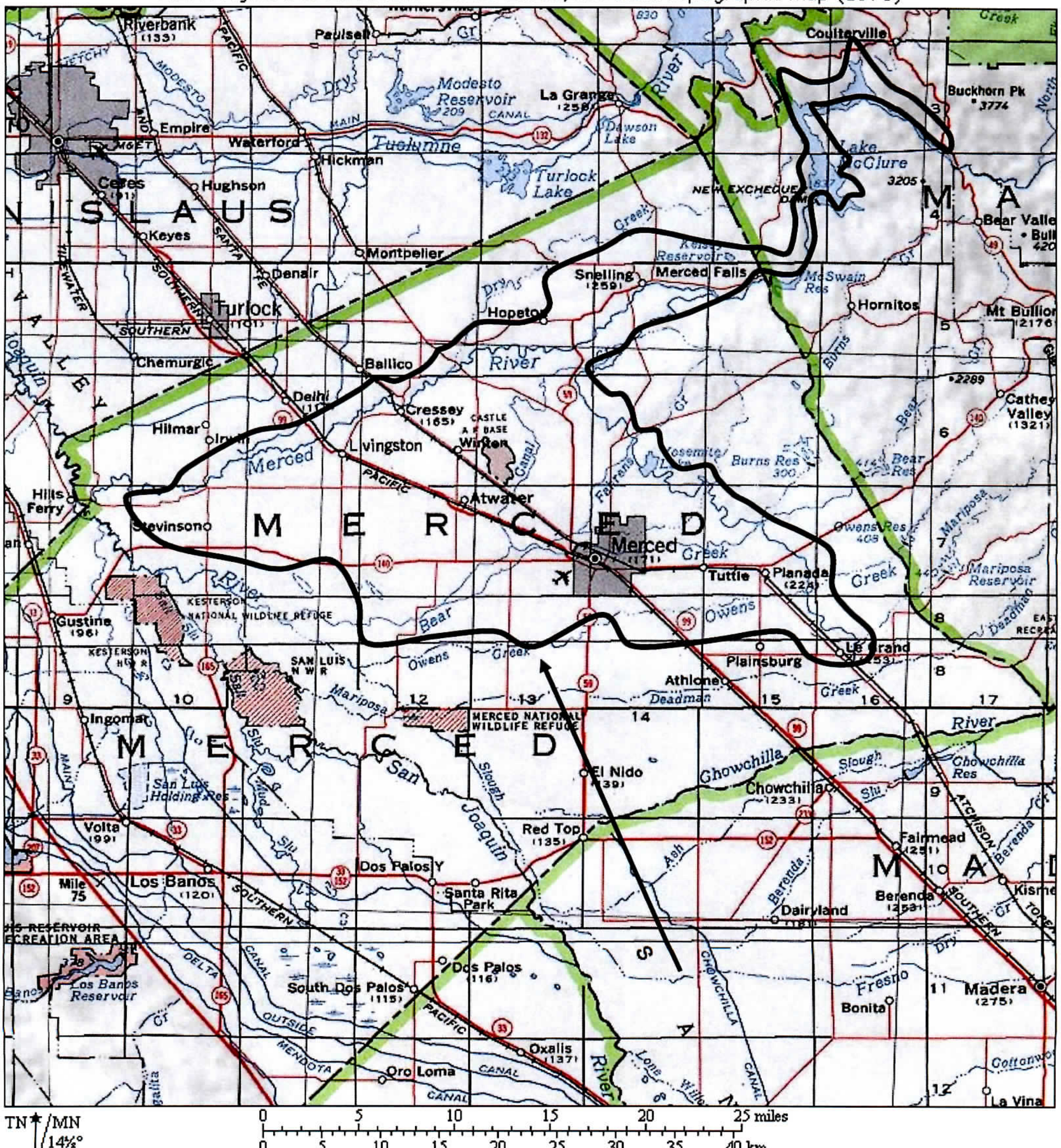
*D8. Evaluator: Michael Dice, M.A.

Date: November 10, 2010

Affiliation and Address: Michael Brandman Associates 621 Carnegie Drive, Suite #100_San Bernardino, CA. 92408

***Resource Name or #: Merced Irrigation District**

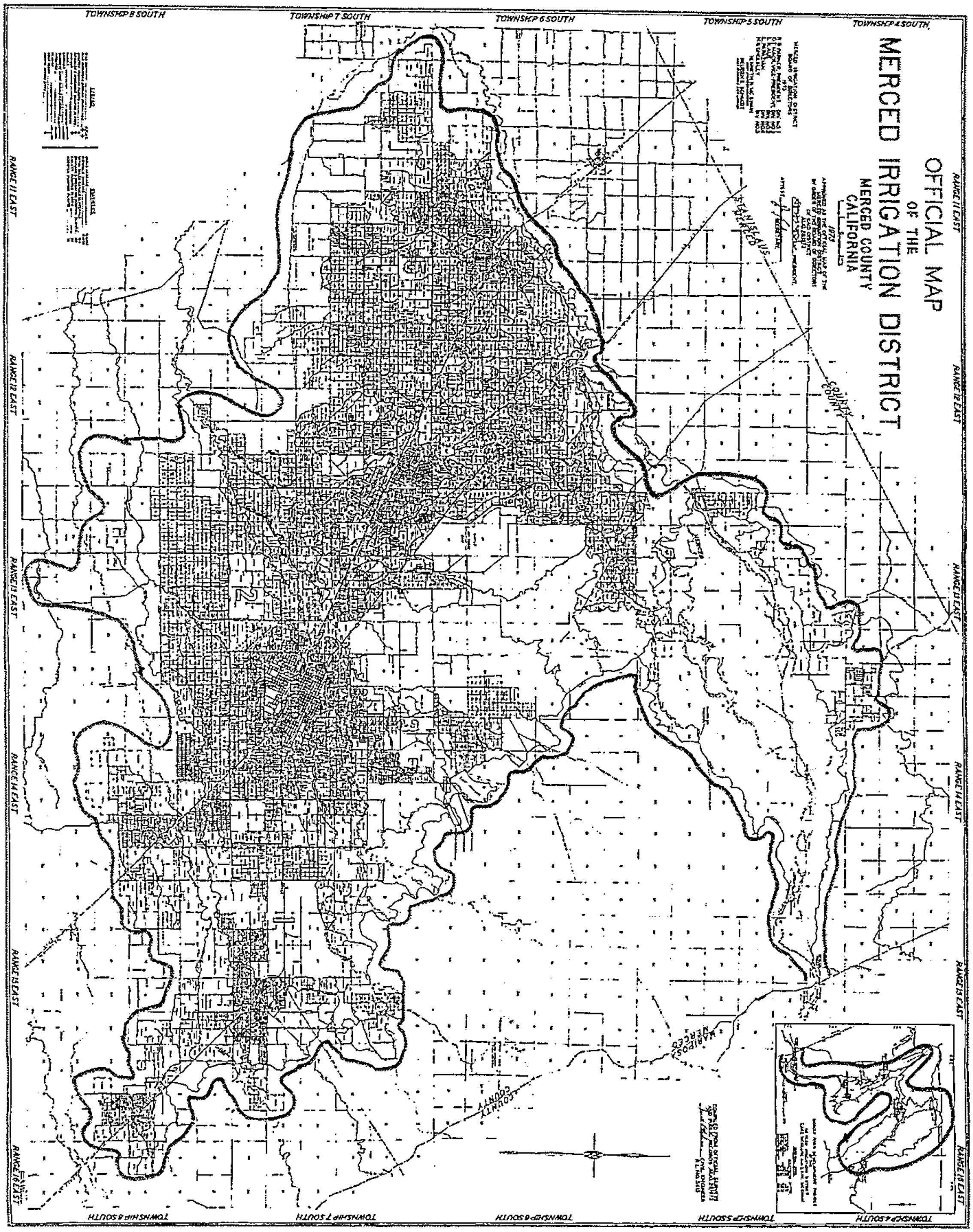
MBA Project #3866.0001.0 USGS 1:500,000 scale topographic map (1973)



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

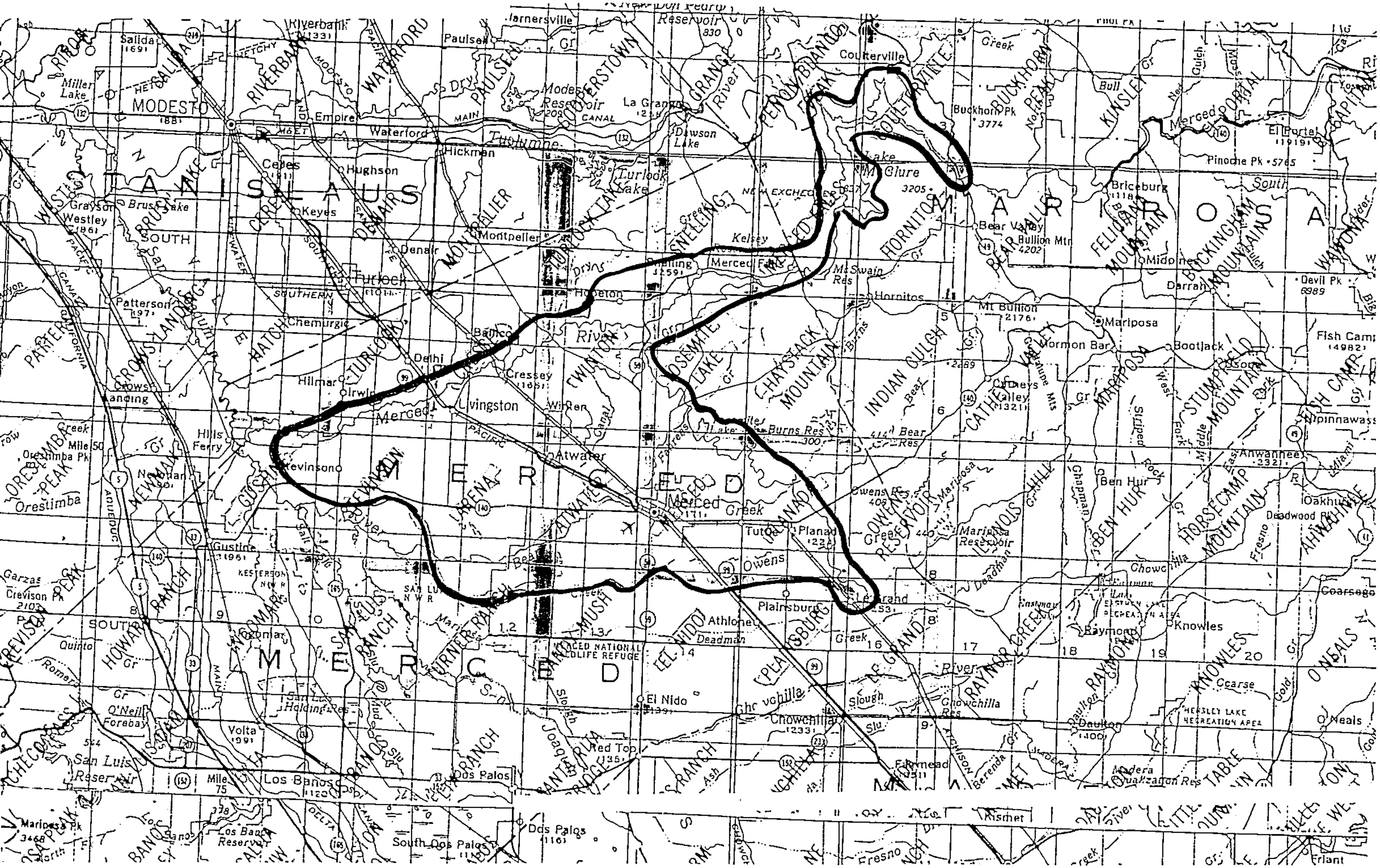
NOTE: The approximate limits of the MID are shown. **NOTE: map is USGS 1:500,000 scale State Series (1973)**

*Resource Name or #: Merced Irrigation District



NOTE: This image shows the full extent of the MID using a copy of the official 1973 Merced Irrigation District map. The boundary of the District is shown as a heavy line.

P24-001909


STANISLAUS
MERCED
MARIPOSA
Modesto
Salida
Riverbank
Empire
Waterford
Hughson
Ceres
Keyes
Denair
Turlock
Hilmar
Delhi
Livingston
Cressey
Atwater
Merced
Planada
Le Grand
El Nido
Dos Palos
South Dos Palos
Los Banos
Gustine
Newman
Patterson
Westley
Crows Landing
Snelling
La Grange
Hornitos
Coulterville
Mariposa
Bootjack
Oakhurst
Fish Camp
El Portal
Chowchilla
Plainsburg
Stevinson
Volta
Cathey Valley
Mt Bullion
Bear Valley
Briceburg
Knowles
Raymond
Fairmead
Lake McClure
Merced Falls

(Keep this copy in Gustine 7.5')

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # P24-001909/P22-003197
HRI#
Trinomial

*Resource Name or #: Merced Irrigation District

Cressey 7.5'

*Recorded by: Shannon L. Loftus MA HP RPA/RPH   *Date: 1/29/2011   ☐ Continuation   ✓ Update

The site record (Dice and Lord 2010) for P24-01909/P22-003197 was reviewed for the purposes of a Section 106 brecords search study undertaken in support of the Livingston High School cell site candidate study.

11/11

Recommended Status Code Changes:

From 3 to;
7N1: "*Needs to be reevaluated – may become eligible for NR w/restoration or when meets other specific conditions*" to replace the present Status Code of 3, with respect to the MID as a whole.

Additionally, a Status Code of 5D3: "*Appears to be a contributor to a district that appears eligible for local listing or designation through survey evaluation*" with respect to the McCoy Lateral and Garibaldi Lateral, the two laterals investigated by Dice and McCoy in October 2010.

The District was documented and mapped as an area-based district covering in excess of 900 square miles. This mass-area was determined by a circa 1937 map created by the Merced Irrigation District. As opposed to a modern-era linear feature-based district, limited to the actual historical framework of the district, thus in conflict with the description of the district; "The basic framework of the MID [Merced Irrigation District] includes reservoirs, dams, primary canals, laterals, wells and drains that allow the District to operate and serve its constituents ably" (Dice and Lord 2010: Building Structure, Object Record for P24-001909/P22-003197).

Additionally, Dice and Lord indicate that the entirety of the MID was not inventoried. Rather, "Staff did not review all of the physical parts of the MID, just a segment of the McCoy Lateral and the Garibaldi Lateral that are the subject of the referenced analysis by Dice and Lord (2010)" (Dice and Lord 2010: Primary Record). This statement is in conflict with a recommendation of 3S, as no formal survey of the entire MID was undertaken. This brings into question the following statement:

> "The integrity of the historic property's location, design, setting, materials, workmanship, feeling, or association must be considered as part of this analysis. We consider these important aspects of the original integrity to be reflected in the laterals and lateral segments that will be affected by the undertaking. The basic framework for the MID includes reservoirs, dams, primary canals, laterals, wells and drains that allow the District to operate and serve its constituents ably. It can be considered a Historic District with contributing and non-contributing elements. The Irrigation District's water delivery framework was created during the Period of Significance [1919-1939] and although the system is self-sustaining and improvement to the basic structure have occurred on a regular basis, the basic framework still remains and is essentially unchanged. The MID system is therefore considered wholly intact and the integrity of the MID system within its period significance is considered *good*" (Dice and Lord 2010: Building, Structure and Object Record).

As such, the mapped area of the MID is seemingly erroneous at this time. Utilization of a historic map, a circa 1937 archival resource (indicated above) to document a potential district in excess of 900-square miles, without performing in-field survey of the potential district in entirety, does not provide adequate documentation of the potential district. Nor does survey and evaluation of two isolated laterals of the water conveyance system seemingly provide an adequate basis for the findings above in regard to the entirety of the MID. The basic framework of the MID was not inventoried and thus the finding above cannot be substantiated. It is premature to state that the MID is "wholly intact" and the integrity of the MID is "good" when no reconnaissance has been undertaken in this regard. At best, the McCoy Lateral and Garibaldi Lateral can be said to retain historical integrity and satisfy the criteria for contributing elements of a larger potential historic district, when identified.

Therefore, as part of the present undertaking a DPR Update form has been prepared and a Status Code of 7N1: "*Needs to be reevaluated – may become eligible for NR w/restoration or when meets other specific conditions*" to replace the present Status Code of 3, with respect to the MID as a whole. Additionally, a Status Code of 5D3: "*Appears to be a contributor to a district that appears eligible for local listing or designation through survey evaluation*" is also recommended with respect to the McCoy Lateral and Garibaldi Lateral, the two laterals investigated by Dice and McCoy in October 2010.

Assoc'd report is ME-7488 (LACE Environmental, LLC, 2011):

Cultural Resource Records Search and Site Survey, Vista Tower Site, Livingston High School, 1617 Main Street, Livingston, Merced County, California

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-24-001909
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

 See also P-24-000088,000090, -000091,-000552 -000574, 001783, -001899 and East Ashe Lat., Bear Creek, Black Rascal Cr. Hess Lat., a Drainage Ditch

*Resource Name or # MR1

P1. Other Identifier: portions of Merced Irrigation District

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Atwater **Date:** 1960 (1987) **T**___; **R** ___; __ ¼ **of Sec** ___; ___ **B.M.**

c. Address ___ City ___Zip

d. UTM: (give more than one for large and/or linear resources) See Linear Records

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Located between Atwater and Merced roughly bounded by SR 59, Bellevue Road, Buhach Road, and SR 140.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Merced Irrigation District (MID) incorporated in 1919 and consists of over 750 miles of canals that irrigate more than 110,000 acres. This form evaluates a portion of that system in the area between the cities of Atwater and Merced described in P2e above. An overall description of each canal follows on the attached continuation sheets. Also attached are Linear Feature Records for each point surveyed. The sections of this form are arranged by major canals and their associated minor laterals are grouped together. Engineering structures, such as headgates, are grouped with their associated canal. (See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) Canal (HP20); Engineering Structure (HP11)

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1. Canal Creek, camera facing east. 12/12/07.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1876-1957; alterations and improvements to present; John Outcalt, *A History of Merced County, California*; USGS *Atwater Quad;* Galloway, *Report on the Merced Irrigation;* McSwain, *History of the Merced Irrigation District.*

***P7. Owner and Address:**
Merced Irrigation District
744 W. 20th Street
Merced, CA 95340

***P8. Recorded by:** (Name, affiliation, address)
Meta Bunse/ Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95618

***P9. Date Recorded:** 12/12/06; 1/22/07

***P10. Survey Type:** Intensive

CCaIC Report #ME-7959:

***P11. Report Citation:** JRP Historical Consulting, LLC, "Historical Resources Inventory and Evaluation Report, Atwater-Merced Expressway Project, Merced County, California," 2007.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ___

B1. Historic Name: Canal Creek, Main Ashe Lateral, East Ashe Lateral, Canal Creek Lateral Headgate, Bear Creek, Meadowbrook Lateral, Black Rascal Creek, Hess Lateral, Buhach Lateral, Drainage Ditch, Henderson Lateral, Mason/Curtis Lateral, Livingston Canal, Livingston Canal Headgate

B2. Common Name: see B1

B3. Original Use: irrigation water conveyance and distribution B4. Present Use: irrigation water conveyance and distribution

***B5. Architectural Style:** utilitarian

***B6. Construction History:** (Construction date, alteration, and date of alterations) 1876-1957, alterations up to the present; See Continuation Sheet Section B10 "Significance" for construction histories of each canal.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date:** ______ **Original Location:** ______

***B8. Related Features:** ______

B9. Architect: unknown b. Builder: Farmer's Canal Company, Crocker-Huffman Land and Water Company, Merced Irrigation District

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

This form evaluates a portion of the Merced Irrigation District (MID) system located between the cities of Atwater and Merced approximately bounded by SR 59, Bellevue Road, Buhach Road, and SR 140. The following section contains historic context for the development of the MID, including its predecessors. Also included are brief histories of each canal evaluated within this form and following the historic context are evaluations of the relevant canals. The canal histories and evaluations are arranged with major canals grouped together with their associated minor laterals. The properties contained on this form have been evaluated in accordance with Section 15064.5 (1)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code. None of the properties appear to be historic resources for the purposes of the California Environmental Quality Act (CEQA) and they do not appear to meet the criteria for listing in California Register of Historical Resources (CRHR). (See Continuation Sheet for evaluations of individual canal segments.)

B11. Additional Resource Attributes: (List attributes and codes) ______

***B12. References:** Crocker-Huffman Land & Water Company, "Map Showing Lands of the Crocker-Huffman Land & Water Co., Situated in Merced County, California," 1895, 1903; W.P. Stoneroad, "Official Map of Merced County, California, Compiled from Official Surveys & Public Records" (San Francisco: Punnett Brothers, 1900); A.E. Cowell, "Official Map of the County of Merced, California, Compiled from Official Surveys & Public Records," 1909; The Kenyon Company, "Map of Merced County, California," 1919; Merced Irrigation District. "Official Map of the Merced Irrigation District, Merced County, California," 1927; U.S.G.S., *Atwater, Calif.*, 15' series, 1918 (surveyed 1915), 7.5' series 1918 (revised 1946), 1960, 1960 (photorevised 1976), 1960 (photorevised 1987). John Outcalt, *A History of Merced County, California* .(See Footnotes)

B13. Remarks:

***B14. Evaluator:** Meta Bunse/Steven J. Melvin

*Date of Evaluation: March 2007

See Location Map 8

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-1

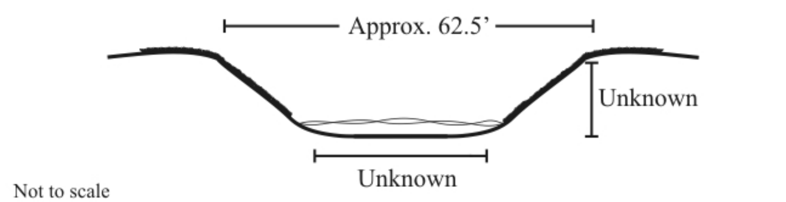
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 717,126mE; 4,137,517mN. Located at the Canal Creek bridge on Fox Road in the S1/2 of Section 33, T6S/R13E MDBM near the intersection of Fox Road and Bellevue Road (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
Canal Creek originates in Section 29 T5S/R14E MDBM where it branches off from the MID's Main Canal. This segment of the canal is U-shaped and approximately 62.5 feet wide at the top. It is unlined and vegetation grows along its gently sloping banks which show signs of erosion. On the both sides of the canal are access roads. The canal is crossed by the Fox Road bridge (Photographs 2, 29).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 62.5 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** east



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The terrain is flat agricultural land of pastures, orchards, and row crops. Immediately to the northwest of this point is the former Castle Air Force Base.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 2. Canal Creek from Fox Road Bridge, camera facing east. 12/12/06

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-2

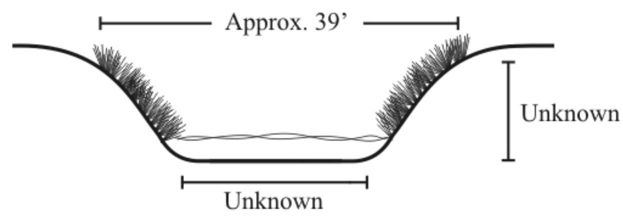
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10, 716,115mE; 4,136,176mN. Located at the Avenue Two bridge over Canal Creek in the SE1/4 of Section 5 T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 39 feet wide. Water in the canal prevented an accurate determination of depth. The unlined channel is U-shaped with bramble growing on its steep banks. The Avenue Two bridge crosses the canal (Photograph 3, 32).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 39 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** northeast



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The terrain is flat agricultural land used as pastures and for raising alfalfa.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 3. Canal Creek from Avenue Two, camera facing northeast, 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/2/06

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-3

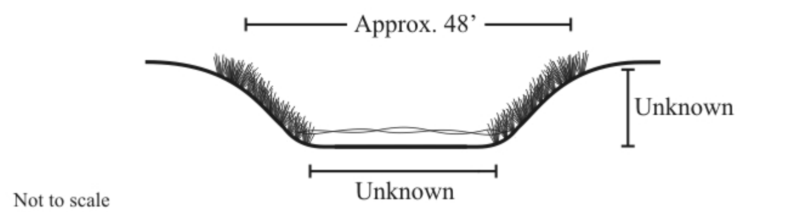
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map. UTM: 715,287mE; 4,135,411mN; located at the Avenue One bridge over Canal Creek in the NW ¼ of Section 8, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 48 feet wide (Photographs 4). The unlined channel is U-shaped with bramble and grasses growing on its banks. The Avenue One bridge crosses the canal at this point (Photograph 4).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- **a. Top Width:** approximately 48 feet
- **b. Bottom Width:** undetermined (carrying water)
- **c. Height or Depth:** undetermined (carrying water)
- **d. Length of Segment:** approximately 200 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** northeast



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
To the east of this canal segment the landscape is rural agricultural. To the west is residential development of recent construction.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 4. Canal Creek from Avenue One bridge, camera facing northeast. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Canal Creek

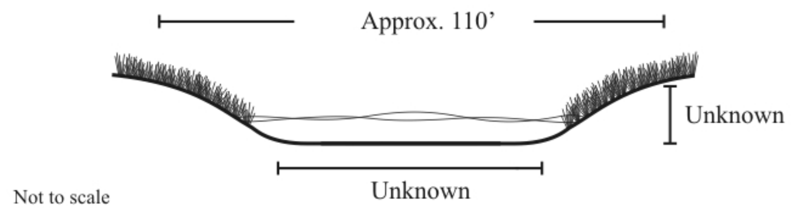
L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-4

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 715,490mE; 4,134,195mN; located at Ashby Avenue bridge over Canal Creek in S1/2 of Section 8, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 110 feet wide. The unlined channel is U-shaped with bramble and grasses growing on its banks. There is an overgrown access road on the west side of the canal. The Ashby Avenue bridge and US 99 cross the canal at this point (Photographs 5).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- a. **Top Width** approximately 110 feet wide
- b. **Bottom Width** undertermined (carrying water)
- c. **Height or Depth** undertermined (carrying water)
- d. **Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** northwest



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural to the north of this point. To the south is the four-lane US 99.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 5. Canal Creek from Ashby Avenue bridge, camera facing northwest. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Canal Creek

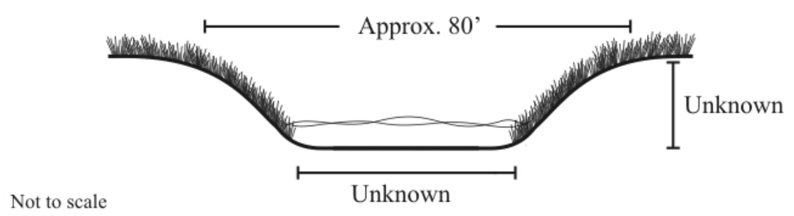
L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-5

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 715,516mE; 4,134,107mN; located Southern Pacific Avenue bridge over Canal Creek in N1/2 of Section 17, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 80 feet wide. The unlined channel is U-shaped with bramble and grasses growing on its banks. There is an overgrown access road on the west side of the canal. A Union Pacific Railroad bridge and the SP Avenue bridge cross the canal at this point (Photograph 6).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- **a. Top Width** approximately 80 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural to the south of this point. To the north is the four-lane US 99.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 6. Canal Creek passing under US 99 and Union Pacific railroad tracks. Photo taken from Southern Pacific Avenue bridge, camera facing north. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-6

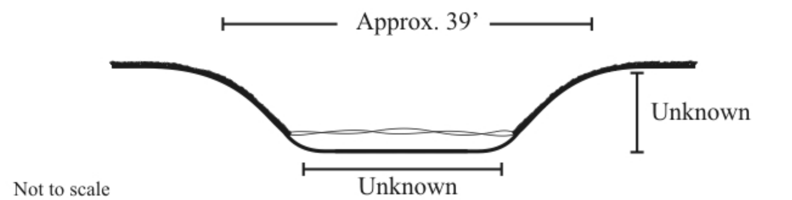
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 716,169mE; 4,133,021mN; located at the Canal Creek on Elliot Avenue bridge in SW1/4 of Section 17, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 39 feet wide The unlined channel is U-shaped with bramble, grasses, and scattered trees growing on its shallow, gently sloping banks. Canal Creek has a natural appearance at this point. The Elliot Avenue bridge crosses the canal (Photograph 7). .

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 39 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** south



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with much of the nearby land devoted to pastures.

L7. Integrity Considerations: See Section B10—“Significance”

L8b. Description of Photo, Map, or Drawing: Photograph 7. Canal Creek from Elliot Avenue bridge, camera facing south. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

*Resource Name or # MR1

P-24-000090

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-7

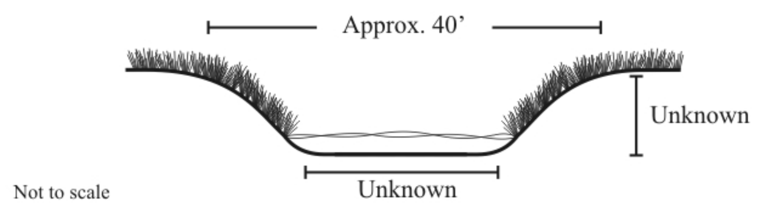
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 716,373mE; 4,132,341mN; located at the Landram Avenue bridge over Canal Creek in NE1/4 of Section 20, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 40 feet wide. The unlined channel is U-shaped with bramble, grasses, and scattered trees growing on its steep banks. An access road is on the west side of the canal. The Landram Avenue bridge crosses the canal (Photograph 8).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 40 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—“Significance”

L8b. Description of Photo, Map, or Drawing: Photograph 8. Canal Creek from Landram Avenue bridge, camera facing north. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Canal Creek

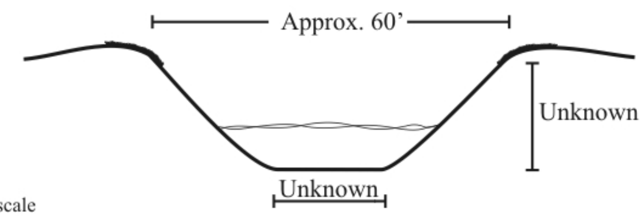
L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-8

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 100717665mE;4139125mN; located at Ladino Road bridge over Canal Creek on the section line between Sections 28 and 33, T6S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 60 feet wide. Overall, the channel at this point has a natural, riparian appearance. North of the bridge there is some riprap on the west bank, but this section is mostly covered with bramble, grasses, and scattered trees. A small residential area is also on this side of the bridge. South of the bridge the land appears to be used for grazing and the eroding banks are mostly bare with scattered patches of grass. Also south of the bridge is a metering station and a vertical pipe (Photograph 9).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- a. **Top Width** approximately 60 feet
- b. **Bottom Width** undetermined (carrying water)
- c. **Height or Depth** undetermined (carrying water)
- d. **Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** south



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with a small concentration of approximately five houses on the north side of the Ladino Bridge east of the creek.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 9. Canal Creek at Ladino Road, view south. 1/22/07

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/22/07

L1. Historic and/or Common Name: Canal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-CC-9

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10; 716,394mE; 4,136,363mN; At confluence with Livingston Canal; SW1/4 of Section 4, T7S/R13E MDBM (See Location Map 1).

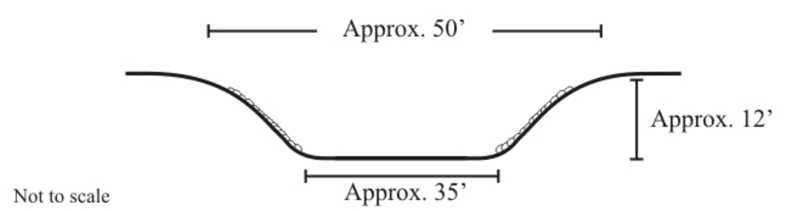
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The section of Canal Creek contains the headgate for the Livingston Canal and also a headgate to control the flow of Canal Creek downstream from this point. The headgate has four metal gates set in a concrete structure. The entire structure is approximately thirty feet long and ten feet wide. On both the upstream and downstream faces are concrete wings. The top of the headgate functions as a bridge and there is a metal railing on both sides and a guardrail on the downstream side. Also present on top of the headgate is the gate operating equipment. The canal at this point is approximately 50 feet wide and 12 feet deep and is roughly U-shaped. It is unlined except for a small area the area between the two headgates lined with riprap. The steep banks are wide with little vegetation and show signs of erosion. Immediately upstream from the headgate the canal passes under the BNSF railroad and Santa Fe Drive. Two large drain pipes protrude from the south bank of Canal Creek at this point (Photograph 10, 49, 51).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 50 feet
- **b. Bottom Width** approximately 35 feet
- **c. Height or Depth** approximately 12 feet
- **d. Length of Segment** approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** southwest



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

This segment of canal is set in a relatively isolated area near the BNSF railroad. The land immediately adjacent is uncultivated and with some trees.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 10. Canal Creek with flow control headgate, camera facing southwest. 1/22/07.

L9. Remarks:

L10. Form prepared by:

Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/22/07

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-24-000088
HRI #
Trinomial

 *Resource Name or # MR1

L1. Historic and/or Common Name: Main Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MA-1

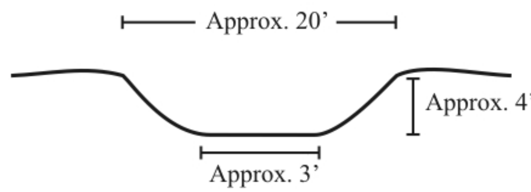
***b. Location of point or segment:** UTM Coordinates: Zone 10; 716,464mE; 4,136,219mN (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the Main Ashe Lateral canal is approximately 20 feet wide and approximately four feet deep. It originates from Canal Creek in the SW1/4 of Section 4, T7S/R13E MDBM. It is trapezoidal and lined with concrete with metal control gates. Access roads are on both sides of the channel. The Avenue Two bridge crosses the canal at this point (Photograph 11).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- a. **Top Width** approximately 20 feet
- b. **Bottom Width** approximately 3 feet
- c. **Height or Depth** approximately 4 feet
- d. **Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** southeast



Not to scale

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 11. Main Ashe Lateral at Avenue Two, camera facing southeast. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

L1. Historic and/or Common Name: Main Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MA-2

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Zone 10; 716,214mE; 4,136,174mN

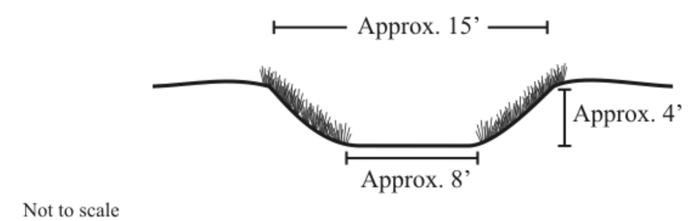
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and four feet deep. It is trapezoidal and unlined with bramble growing along the banks. There are several concrete and metal control gate structures along this segment. No water was flowing through the canal. A concrete culvert carries the canal under Avenue Two. This lateral crosses Canal Creek via a flume constructed of wood framing set in concrete piers supporting a corrugated metal channel (Photographs 12, 31, 32).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- a. **Top Width** approximately 15 feet
- b. **Bottom Width** approximately 8 feet
- c. **Height or Depth** approximately 4 feet
- d. **Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** southwest



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 12. Main Ashe Lateral at Avenue Two, camera facing southwest. 12/12/06

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

L1. Historic and/or Common Name: Main Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MA-3

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Zone 10; 715,779mE; 4,135,413mN (See Location Map 1).

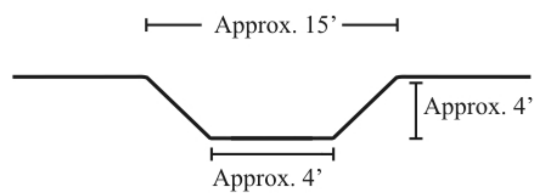
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and four feet deep. It is trapezoidal and lined with concrete. There are several concrete and metal slide control gates along this segment. It passes through farmland and a portion is adjacent to Avenue One (Photographs 13, 33).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 15 feet wide
- **b. Bottom Width** approximately 4 feet wide
- **c. Height or Depth** approximately 4 feet
- **d. Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** east



Not to scale

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 13. Main Ashe Lateral near Avenue One, camera facing east. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

*Resource Name or # MR1

P-24-000088

L1. Historic and/or Common Name: Main Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MA-4

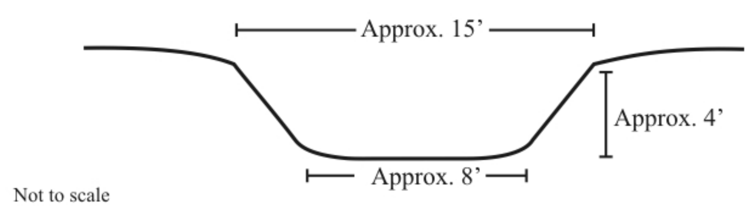
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Zone 10; 716,383mE; 4,133,743mN (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and eight feet deep. It is U-shaped and unlined. There are concrete and metal control gates placed intermittently along this segment. The channel is heavily silted and the gently sloping banks show signs of erosion. The canal passes under SP Avenue via a concrete culvert. The Union Pacific railroad is carried over the canal via a bridge. Access roads are alone both sides of the canal to the south along Gurr Road. The canal did not carry water at the time of the survey (Photographs 14, 34, 35).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** approximately 15 feet
b. **Bottom Width** approximately 8 feet
c. **Height or Depth** approximately 4 feet
d. **Length of Segment** approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** south



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 14. Main Ashe Lateral at SP Avenue and Gurr Road, camera facing south. 12/12/06

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # ____________________
HRI # ____________________
Trinomial ____________________

*Resource Name or # MR1

P-24-000088

L1. Historic and/or Common Name: Main Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation

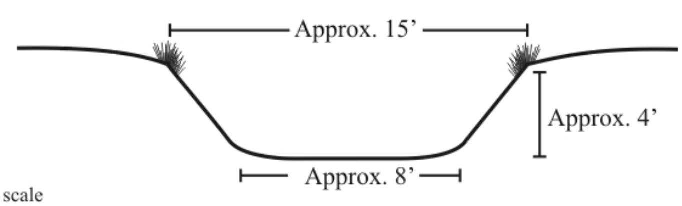
Designation: MR1-MA-5

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Zone 10; 716,372mE; 4,133,022mN (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and four feet deep (Photograph 15). It is U-shaped and unlined with some vegetation growing along the rim. There are concrete and metal control gates placed intermittently along this segment. The channel is heavily silted and the gently sloping banks show signs of erosion. The canal passes under Elliot Avenue and parallels Gurr Road. The canal did not carry water at the time of the survey.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- **a. Top Width** approximately 15 feet
- **b. Bottom Width** approximately 8 feet
- **c. Height or Depth** approximately 4 feet
- **d. Length of Segment** approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—“Significance”

L8b. Description of Photo, Map, or Drawing: Photograph 15. Main Ashe Lateral, camera facing north. 12/12/06

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/06

L1. Historic and/or Common Name: East Ashe Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-EA-6

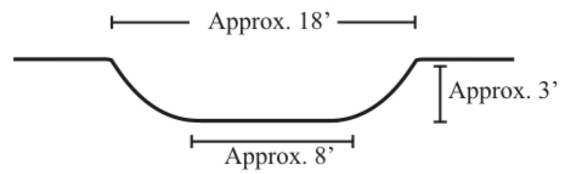
***b. Location of point or segment:** Zone 10; 717,149mE; 4,135,379mN (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
The East Ashe Lateral branches off the Main Ashe Lateral in the NE1/4 of Section 9, T7S/R13E MDBM. At this point the canal is approximately 18 feet wide and 3 feet deep. It is U-shaped, unlined and has gently sloping banks. Metal and concrete control gates are placed intermittently along the canal. The canal did not carry water at the time of the survey (Photographs 16, 36).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- a. **Top Width** approximately 18 feet
- b. **Bottom Width** approximately 8 feet
- c. **Height or Depth** approximately 3 feet
- d. **Length of Segment** approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** southeast



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 16. East Ashe Lateral, camera facing southeast. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

L1. Historic and/or Common Name: Bear Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-BC-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 717,127mE; 4,131,062mN. Located at the Bear Creek bridge on highway 140 on the section line between sections 21 and 28 T7S/R13E MDBM (See Location Map 2).

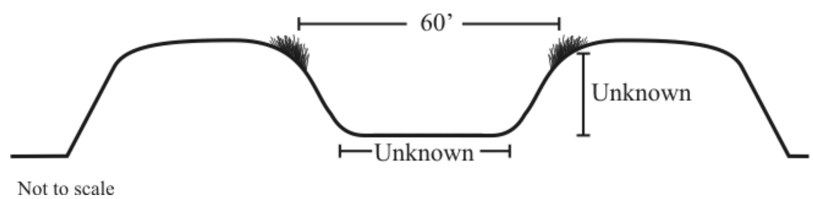
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the Bear Creek canal is approximately 60 feet wide. Water in the canal prevented an accurate depth measurement. The unlined channel is U-shaped and has vegetation growing on its steep banks. Both sides of the channel are built up forming levees on the banks. It is crossed by the SR 140 bridge. An access road runs on the east side of the canal. (Photographs 17).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 60 feet
- **b. Bottom Width** undetermined (carrying water)
- **c. Height or Depth** undetermined (carrying water)
- **d. Length of Segment** approximately 200 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10. "Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 17. Bear Creek passing under SR 140, camera facing north. 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Meadowbrook Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MB-1

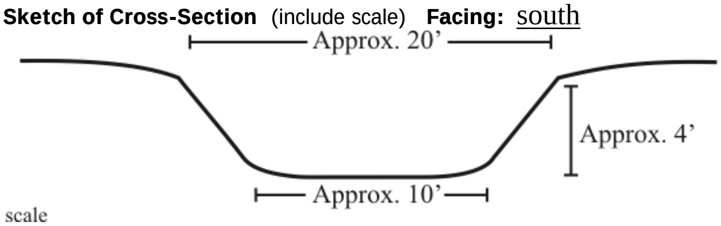
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 717,127mE; 4,131,062mN. Located at the Bear Creek bridge on highway 140 on the section line between sections 21 and 28 T7S/R13E MDBM (See Location Map 2).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
On the east side parallel to Bear Creek is the Meadowbrook Lateral canal constructed between 1946 and 1958. The lateral receives its water from the reservoir created by the Crocker Dam in Section 22 T7S/R13E MDBM. It is approximately 20 feet wide and four feet deep. It is unlined and U-shaped and its banks show signs of erosion. Both sides of the channel are built up above the surrounding land. It has concrete and metal gate structures and a concrete culvert passing under the highway. The lateral did not contain water at the time of the survey (Photographs 18, 37).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. Top Width approximately 20 feet
b. Bottom Width approximately 10 feet
c. Height or Depth approximately 4 feet
d. Length of Segment approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** south



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: The Meadowbrook Lateral maintains its integrity to its period of significance defined as the era of its original construction.

L8b. Description of Photo, Map, or Drawing: Photograph 18. Meadowbrook Lateral, camera facing south. 12/12/06

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/3/07

L1. Historic and/or Common Name: Black Rascal Creek

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-BR-1; MR1-BR-2

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) BR1: UTM: Zone 10; 716,381mE; 4,132,192mN. Located at the Black Rascal Creek bridge on Gurr Road in the NW1/4 of Section 21, T7S/R13E MDBM near the intersection of Gurr Road and Landram Avenue. BR2: UTM: Zone 10; 716,175mE; 4,132,213mN. Located at Landram Road approximately .25 miles west of the Black Rascal Creek bridge on Gurr Road NE1/4 of Section 20, T7S/R13E MDBM (See Location Map 3).

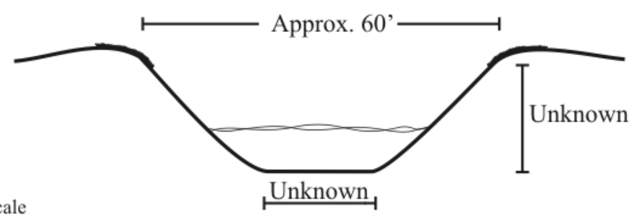
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 60 feet wide. Water in the canal prevented and accurate determination of depth. The unlined channel is U-shaped and has grassy vegetation growing on its banks. The banks of the canal are higher than the surrounding land. Access roads run on both the north and south sides of the canal east of Gurr Road. Also on the south side near Gurr Road is the Hess Lateral canal (Photographs 19, 38).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** approximately 60 feet
b. **Bottom Width** undertermined (carrying water)
c. **Height or Depth** undertermined (carrying water)
d. **Length of Segment** approximately 200 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section **Facing:** south



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10. "Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 19. Black Rascal Creek from Landrum Road, camera facing south. 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting Services,
1490 Drew Ave, Suite 110, LLC
Davis, CA 95618

L11. Date: 12/28/06

L1. Historic and/or Common Name: Hess Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-HS-1

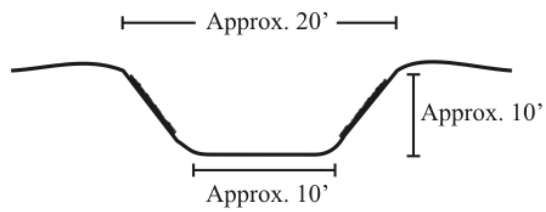
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 716,381mE; 4,132,192mN. Located at the Black Rascal Creek bridge on Gurr Road in the NW1/4 of Section 21, T7S/R13E MDBM (See Location Map 1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 20 feet wide and ten feet deep. The lateral receives its water from the reservoir created by the Crocker Dam Bear Creek in Section 22 T7S/R13E MDBM. The unlined channel is trapezoidal and has grassy vegetation growing on its steep banks. The banks of the canal are higher than the surrounding land. Access roads run on both the north and south sides of the canal east of Gurr Road. (Photograph 20).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- **a. Top Width** approximately 20 feet
- **b. Bottom Width** approximately 10 feet
- **c. Height or Depth** approximately 10 feet
- **d. Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** east



Not to scale

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10. "Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 20. Hess Lateral, camera facing east. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/3/07

Page 22 **of** 75 *Resource Name or # MR1

L1. Historic and/or Common Name: Henderson Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-HN-1

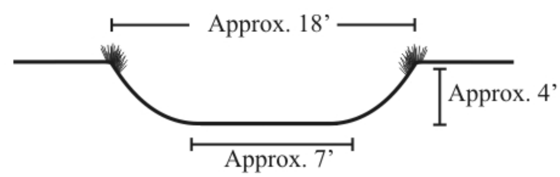
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 719,048mE; 4,137,552mN; Point is at the intersection of the Henderson Lateral and Bellevue Road (See Location Map 4).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and four feet deep. It originates from the Main Canal in Section 18 T6S/R14E MDBM. The unlined channel is U-shaped and has vegetation growing on its banks. Some erosion and silting is evident. Access roads run on both sides of the canal. Where the canal intersects Bellevue Road, a culvert carries the water under the roadway. To the east of the canal is a circular holding basin fenced with black plastic. (Photographs 21, 39-42).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 18 feet
- **b. Bottom Width** approximately 7 feet
- **c. Height or Depth** approximately 4 feet
- **d. Length of Segment** approximately 200 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** south



Not to scale

L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations:
See Section B10. “Significance”

L8b. Description of Photo, Map, or Drawing:
Photograph 21. Henderson Lateral, camera facing south. 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting Services,
1490 Drew Ave, Suite 110, LLC
Davis, CA 95618

L11. Date: 1/3/07

P-24-001783

L1. Historic and/or Common Name: Henderson Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-HN-2

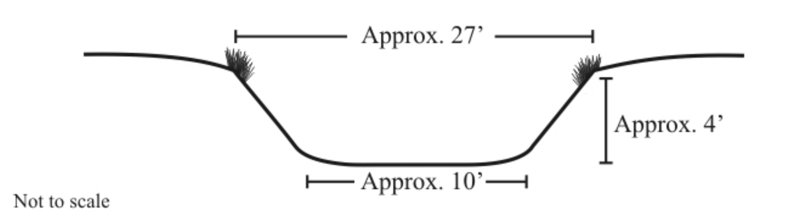
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 717,935mE; 4,137,508mN; Point is at the intersection of the Bellevue Road and Franklin Road (See Location Map 4).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
This canal is a branch of the Henderson Lateral that extends west from near where the lateral passes under Bellevue Road. This segment is approximately 20 feet wide and four feet deep. The unlined channel is U-shaped and vegetation is growing on its banks. Some erosion and silting is evident. Access roads run on both sides of the canal. Where the canal intersects Franklin Road, the water is piped under the roadway (Photographs 22, 43, 44).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- a. **Top Width** approximately 27 feet
- b. **Bottom Width** approximately 10 feet
- c. **Height or Depth** approximately 4 feet
- d. **Length of Segment** approximately 200 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** east



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations:
See Section B10. "Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 22. Henderson Lateral, camera facing east. 12/12/06.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/2/07

L1. Historic and/or Common Name: Mason-Curtis Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-MC-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 717,126mE; 4,137,517mN. Located near Fox Road where it crosses Canal Creek in the S1/2 of Section 33, T6S/R13E MDBM near the intersection of Fox Road and Bellevue Road (See Location Map 4).

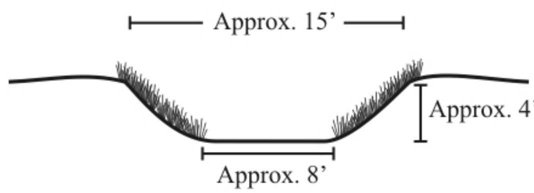
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
This is a small lateral canal that originates from the Henderson Lateral in Section 34 T6S/R13E MDBM. It is approximately 15 feet wide and four feet deep, U-shaped and unlined. Its banks are raised slightly above the surrounding landscape and are covered in vegetation. This section of the canal runs parallel to Fox Road, and then turns to parallel Canal Creek. The canal ultimately drains into Canal Creek (Photograph 23).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 15 feet
- **b. Bottom Width** approximately 8 feet
- **c. Height or Depth** approximately 4 feet
- **d. Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** west



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: See Section B10. "Significance"

L8b. Description of Photo, Map, or Drawing:
Photograph 23. Mason-Curtis Lateral, camera facing south, 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting Services, 1490 Drew Ave, Suite 110, LLC
Davis, CA 95618

L11. Date: 1/2/07

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-24-000091
HRI #
Trinomial

*Resource Name or # MR1

L1. Historic and/or Common Name: Buhach Lateral

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-BH-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) UTM: Zone 10; 715,556mE; 4,132,990mN. Point located on Elliot Avenue on the section line between sections 17 and 20 T7S/R13E MDBM (See Location Map 5).

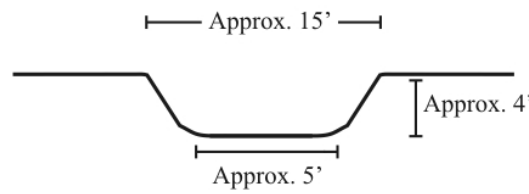
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
At this point the canal is approximately 15 feet wide and four feet deep. It runs roughly north to south from its origination point in Section 6 T7S/R13E MDBM where it branches off from the MID's Livingston Canal. The channel is trapezoidal and lined with concrete. An access road runs on the east side of the canal. The canal passes under Elliot Road via a concrete culvert (Photographs 24, 45, 46).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 15. feet
- **b. Bottom Width** approximately 5. feet
- **c. Height or Depth** approximately 4 feet
- **d. Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** south



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural agricultural with scattered farmsteads.

L7. Integrity Considerations: The Buhach Lateral was lined with concrete after World War II, and, therefore, lacks integrity to its period of construction.

L8b. Description of Photo, Map, or Drawing:
Photograph 24. Buhach Lateral, camera facing south, 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting Services,
1490 Drew Ave, Suite 110, LLC
Davis, CA 95618

L11. Date: 1/2/07

L1. Historic and/or Common Name: none (drainage ditch)

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-DR-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10; 720,665mE; 4,137,617mN. Located at Bellevue Road in the SE ¼ of Section 35, T6S/R13E MDBM (See Location Map 6).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

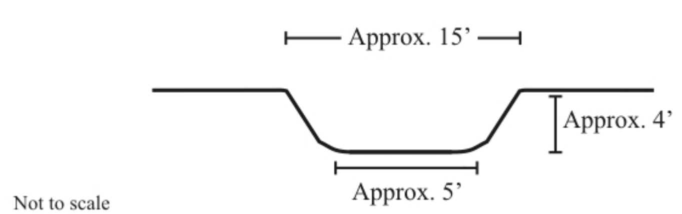
At this point the drainage ditch is approximately 15 feet wide and four feet deep. The unlined channel is U-shaped with some vegetation growing in the channel and on the banks. At the time of this survey the ditch was nearly dry. A field access road crosses the canal near Bellevue Road and water passes through a concrete culvert at this point. Another access road runs along the west side. (Photographs 25, 47, 48).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** approximately 15 feet
b. **Bottom Width** approximately 4 feet
c. **Height or Depth** approximately 4 feet
d. **Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The setting is rural agricultural with scattered farmsteads. The ditch at this point passes through orchards.

L7. Integrity Considerations: See Section B10—"Significance"

L8b. Description of Photo, Map, or Drawing: Photograph 25. Drainage Ditch, camera facing north. 12/12/06.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)

Steven J. Melvin
JRP Historical Consulting Services,
1490 Drew Ave, Suite 110, LLC
Davis, CA 95618

L11. Date: 1/2/06

L1. Historic and/or Common Name: Livingston Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-LC-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10; 716,394mE; 4,136,363mN; At headgate/confluence with Canal Creek; SW1/4 of Section 4, T7S/R13E MDBM (See Location Map 7).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

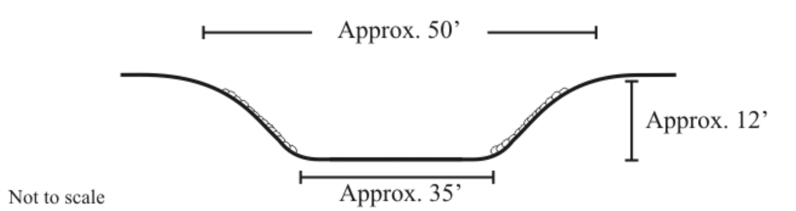
This is where the Livingston Canal begins and draws water from Canal Creek. The section of the canal contains the headgate which consists of a concrete structure with three metal gates raised and lowered mechanically. The structure is approximately thirty feet long and ten feet wide. On both the upstream and downstream faces are concrete wings. The top of the headgate functions as a bridge and there is a metal railing on both sides and a guardrail on the downstream side. Also present on top of the headgate is the gate operating equipment, and, to one side a vertical pipe. Immediately downstream the canal is lined with riprap for approximately 200 feet, after which it is lined with concrete. There is also a set of slide gates in this segment. The canal is approximately 50 feet wide and 12 feet deep and is trapezoidal in shape (Figure 1 and Photographs 26, 49, 50).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- a. **Top Width** approximately 50 feet
- b. **Bottom Width** approximately 35 feet
- c. **Height or Depth** approximately 12 feet
- d. **Length of Segment** approximately 200 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** west



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

This segment of canal is set in a relatively isolated area near the BNSF railroad. The land immediately adjacent is uncultivated and treelined.

L7. Integrity Considerations: See Section B10 "Significance" on previous page.

L8b. Description of Photo, Map, or Drawing: Photograph 26. Livingston Canal, camera facing west. 1/22/07

L9. Remarks:

L10. Form prepared by:
JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/22/07

L1. Historic and/or Common Name: Livingston Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-LC-2

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10; 714,727mE; 4,136,660mN; At intersection with Buhach Road; NW1/4 of Section 5, T7S/R13E MDBM (See Location Map 7).

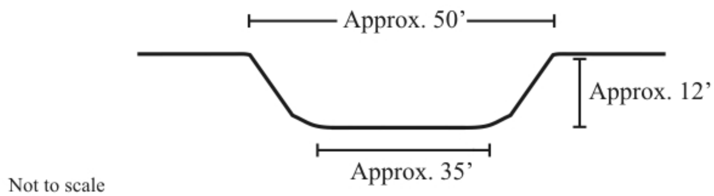
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

This section of the Livingston Canal is approximately 50 feet wide and 12 feet deep. It is trapezoidal in shape and unlined. There are service roads along both sides. The banks are smooth and shaped to a uniform angle. There is a gate on the south bank of the canal west of Buhach Road (Photograph 27).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** approximately 50 feet
- **b. Bottom Width** approximately 35 feet
- **c. Height or Depth** approximately 12 feet
- **d. Length of Segment** approximately 100 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** east



L5. Associated Resources:

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

[The setting is a combination of agricultural and housing.

L7. Integrity Considerations: See Section B10 "Significance" on page 27.

L8b. Description of Photo, Map, or Drawing:

Photograph 27. Livingston Canal, camera facing east. 1/22/07.

L9. Remarks:

L10. Form prepared by:

Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/22/07

L1. Historic and/or Common Name: Livingston Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment Point Observation **Designation:** MR1-LC-3

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10; 713,598mE; 4,137,379mN; At intersection with Bellevue Road; NW1/4 of Section 6, T7S/R13E MDBM (See Location Map 7).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

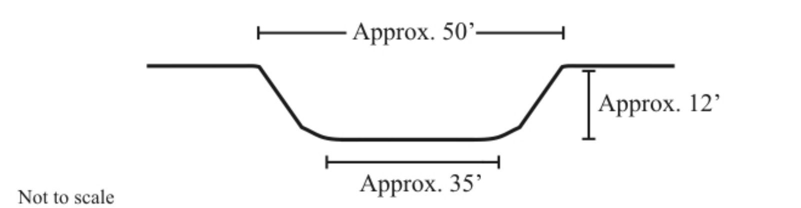
This section of the Livingston Canal is approximately 50 feet wide and 12 feet deep. It is trapezoidal in shape and unlined. There are service roads along both sides. The banks are smooth and shaped to a uniform angle. There is a drain and a vertical pipe on the east bank of the canal north of Bellevue Road (Photograph 28).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** approximately 50 feet
b. **Bottom Width** approximately 35 feet
c. **Height or Depth** approximately 12 feet
d. **Length of Segment** approximately 100 feet

L5. Associated Resources:

L4e. Sketch of Cross-Section (include scale) **Facing:** north



L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

This segment of canal passes through suburban housing tracts.

L7. Integrity Considerations: See Section B10 "Significance" on page 27.

L8b. Description of Photo, Map, or Drawing: Photograph 28. Livingston Canal, camera facing north. 1/22/07.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

L11. Date: 1/22/07

*Recorded by M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

P3a. Descriptions (continued):

What follows are general descriptions of the canals recorded for this survey. Descriptions of individual canal recordation points and comparison points appear on the Linear Forms.

Canal Creek P-24-000090

Canal Creek (MR1-CC) is an irrigation canal that runs approximately 16 miles north to south from its origination point in Section 29 T5S/R14E MDBM where it branches off from the MID Main Canal. It terminates in the NE ¼ of Section 20 T7S/R13E where it flows into Black Rascal Creek. Canal Creek is a natural watercourse that has had irrigation water conveyed into it from the Main Canal since 1876. Today the route follows the natural route of the creek for much of its length. Small sections of Canal Creek have been realigned into straight segments with right angles and a "man-made" appearance. At many of the points recorded on this form the channel follows a generally natural alignment, but the banks and channel bottom have been dredged, graded, shaped, and maintained (See Linear Feature Records MR1-CC and Photographs 29, 30, 32).

This form does not evaluate Canal Creek in its entirety, but does address an approximately five mile section between the cities of Atwater and Merced within or near the study area (See Location Map 1). JRP recorded nine points along this segment, which is also the downstream portion of the canal. Canal Creek's junction with the Livingston Canal is located within or near the study area. The Livingston Canal receives much of Canal Creek's water at this junction and Canal Creek becomes a smaller facility from this point downstream. Upstream Canal Creek carries more water and is wide and shallow with banks that undergo routine maintenance and grading. Downstream from the Livingston Canal diversion, Canal Creek is narrow and deep in places with trees and shrubs growing on its banks. Some sections of the canal have a natural, riparian appearance, while in others extensive channel and bank alterations are apparent (See Linear Feature Record MR1-CC-1). There appears to be few diversions from Canal Creek below the Livingston Canal headgate. Many bridges pass over Canal Creek where it intersects with roads and railroads, and in at least one place a flume of a lateral canal passes over the Canal Creek (See Linear Feature Record MR1-CC-5 and Photograph 32).

There is a lateral headgate across Canal Creek at its junction with the Livingston Canal controlling the flow of Canal Creek downstream from this point. The exact construction date of the gate is unknown, although it is likely a modern structure. It consists of four vertical, rectangular, steel lift gates set in a poured concrete foundation with flaring wings. A roadway runs over the top of the structure (See MR1-CC-9).

Main Ashe Lateral/East Ashe Lateral Main Ashe = P-24-000088

The Main Ashe Lateral draws water from Canal Creek at the same point as the Livingston Canal diversion. The East Ashe Lateral branches off of the Main Ashe Lateral in Section 9, T7S/R13E MDBM (See Location Map 1). These two relatively small canals are only a few miles in length and function to transport water from Canal Creek to farm fields. Prevalent along their banks are metal gates that control the flow of water into the fields. Some sections of these laterals are unlined, while others are trapezoidal in cross section and concrete lined. Along their course, they pass under roadways by means of concrete culverts (See Linear Feature Records MR1-MA and MR1-EA and Photographs 31-36).

Bear Creek P-24-002046

Bear Creek is an irrigation canal that runs roughly northeast to southwest through the southern end of the study area. It is a natural watercourse that has had water conveyed into it via irrigation canals. The natural channel begins receiving canal water into its flow northeast of Merced from the Fairfield Canal (See Location Map 2). The creek then passes through agricultural land, the city of Merced, more agricultural land and ultimately drains into the San Joaquin River. Along its course is the Crocker Dam in Section 22 T7S/R13E MDBM southwest of Merced where Black Rascal Creek branches off from Bear Creek. This form addresses that portion of the creek intersecting SR 140.

The part of the canal surveyed for this project is roughly U shaped in cross section, unlined and has vegetation growing along its steep banks. Its channel has been dredged and its banks enhanced to form a berm or levee. The channel has a groomed appearance and has been deepened, widened, and realigned to make for more efficient water conveyance and flood control. In this area the canal passes through agricultural land irrigating orchards, pastures, and row crops (See Linear Feature Record MR1-BC-1).

Meadowbrook Lateral P-24-000574

The Meadowbrook Lateral is an irrigation canal running adjacent to Bear Creek, paralleling its east side (Location Map 2). It is approximately 20 feet wide and four feet deep. It is unlined and roughly U shaped in cross section and its banks show signs of erosion. Both sides of the channel are built up above the surrounding land. It has concrete and metal gate structures and a concrete culvert passing under SR 140. This form addresses that portion of the creek intersecting SR 140 (See Linear Feature Record MR1-MB-1 and Photograph 37).

Black Rascal Creek

Black Rascal Creek is an irrigation canal that runs roughly northeast-southwest from its origination point in the Sierra Nevada foothills northeast of the city of Merced (Location Map 3). The Creek passes through the northern part of the city of Merced and empties into the Bear Creek channel one half mile east of Crocker Dam. At Crocker Dam, Black Rascal Creek splits off from Bear Creek and continues in a generally southwesterly direction. Black Rascal Creek is a natural watercourse that has had water conveyed into it via irrigation canals. This form addresses that portion of the creek intersecting Gurr Road.

The role of this creek as a canal began around 1905 when the Crocker-Huffman Irrigation Company constructed the Livingston Canal, from which Black Rascal Creek drew water. This part of Black Rascal Creek is roughly U shaped in cross section and has vegetation growing along its unlined banks. Black Rascal Creek has a very regular, groomed appearance. Its banks have been raised above the surrounding farmland to form berms or levees and the banks have a uniform slope. The channel also appears straight and angular in alignment, within the segment addressed in this study. In this area the canal passes through agricultural land irrigating orchards, pastures, and row crops (See Linear Feature Record MR1-BR-1 and Photographs 38).

Hess Lateral

The Hess Lateral is a conveyance structure beginning at the Crocker Dam and continues parallel to the north side of Black Rascal Creek for approximately one and a half miles where it passes under the creek via siphon and parallels the south side (Location Map 3). At the point recorded for this survey, the canal is approximately 20 feet wide and ten feet deep. The unlined channel is roughly U shaped in cross section and has grassy vegetation growing on its banks, which are higher than the surrounding land. Access roads run on the berms both the north and south of the canal east of Gurr Road. The Hess Lateral terminates approximately one half mile west of Gurr Road, for a total length of about 2 miles (See Linear Feature Record MR1-HS-1).

***Recorded by** M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Henderson Lateral P-24-001783

The Henderson Lateral is an irrigation canal that runs roughly north-south from its origination point in Section 18 T6S/R14E MDBM where it branches off from the MID's Main Canal. Its course is approximately eight miles, terminating in the SE1/4 of Section 10 T7S/R13E MDBM (Location Map 4). Portions of the Henderson Lateral's route follow natural watercourses, while others are of artificial construction. This form addresses that portion the lateral intersecting and parallel to Bellevue Road. This part of the canal is roughly U shaped in cross section and unlined, with a small amount of vegetation growing along its banks. It is heavily silted and shows signs of erosion. In this area the canal passes through agricultural land irrigating orchards, pastures, and row crops. There are access roads on both sides of the canal north of Bellevue Road (See Linear Feature Records MR1-HN and Photographs 39-44).

Mason-Curtis Lateral P-24-001899

The Mason-Curtis Lateral is an irrigation canal that runs roughly northeast-southwest from its origination point in Section 34 T6S/R13E MDBM where it branches off from the Henderson Lateral (Location Map 4). Its course is approximately one and a half miles long, terminating in the SE1/4 of Section 33 of the same township. The last half mile of the canal runs along Fox Road, and then turns to parallel Canal Creek, ultimately draining into the latter. This form addresses that portion the lateral parallel to Fox Road and Canal Creek. This part of the canal is U shaped in cross section, unlined, and overgrown with vegetation. In this area the canal passes through agricultural land irrigating orchards, pastures, and row crops (See Linear Feature Record MR1-MC-1).

Buhach Lateral P-24-000091

The Buhach Lateral is an irrigation canal that runs roughly north-south from its origination point in Section 6 T7S/R13E MDBM where it branches off from the MID's Livingston Canal (Location Map 5). The Buhach Lateral was built in the 1890s to serve the Buhach agricultural colony. This form addresses that portion the lateral intersecting Elliot Road. This part of the canal is roughly trapezoidal in shape and lined with concrete. In this area the canal passes through agricultural land irrigating orchards, pastures, and row crops (See Linear Feature Record MR1-BH-1 and Photographs 45, 46).

Drainage Ditch

This drainage ditch, built between 1957 and 1960 borders farm land in Sections 25, 26, 34 and 35, T6S/13E MDBM and is about four miles in total length (Location Map 6). Ditches such as these are common in Merced County and drain irrigation water from fields. The ditch is approximately 14 feet wide at the top and four feet deep. It is unlined and has some vegetation on its banks and shows signs of erosion and of recent excavation. This form addresses that portion the ditch perpendicular and parallel to Bellevue Road. The ditch at this point runs north/south between two fields in Section 35 and east/west parallel to Bellevue Road. Maps and field observation indicate that a portion of the original ditch has been piped and covered recently. The terminus was undetermined, but generally such ditches drain into a natural waterway or canal (Linear Feature Record MR1-DR-1 and Photographs 47, 48).

Livingston Canal P-24-000552

The Livingston Canal, constructed in 1879, begins in the SW1/4 of Section 4, T7S/R13E MDBM where it draws water from Canal Creek (Location Map 7). Livingston Canal irrigates land between the cities of Atwater and Livingston. This form addresses that portion of the canal at its junction with Canal Creek. At the points recorded for this survey, the canal has a uniform, trapezoidal shape with no vegetation growing on the banks and access roads along the sides. Some sections are lined with concrete or riprap, while others are unlined. The canal follows a circuitous route through residential areas in the city of Atwater as ti runs northwest away from the study area. There are periodic metal gates along the canal's course (See Linear Feature Records MR1-LC and Photographs 49, 50).

B10. Significance (continued):

Historic Context

San Joaquin Valley Irrigation

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853; others spread out through the Kaweah River and Kings River deltas in the 1860s. Further north in the valley, where rain was more abundant and grain could be dry-farmed, irrigation development was slower. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California.[1]

Challenges faced by early irrigators included California's porous soil, the limited technological knowledge of farmers, high cost of construction, scarce machinery, and conflicting concepts of water rights. Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s.[2]

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development.[3] The first irrigation district organized under the Wright Act was the Turlock Irrigation District (TID), and unlike many other irrigation districts formed during the late nineteenth century, it has remained active throughout the

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[1] JRP Historical Consulting Services, "Historic Mining, Hydroelectric, Irrigation, and Multi-purpose Canals of California, Volume 1: Historic Overview, Typology, and Discussion of Previously Inventoried Canals," 1995, 66 (hereafter, JRP, "Canals of California"); JRP Historical Consulting Services, "Water Conveyance Systems in California," for Caltrans, 2001, 11-12 (hereafter, JRP, "Water Conveyance Systems in California.")
[2] Paul H. Willison, "Past, Present, and Future of the Fresno Irrigation District," California State University, Fresno, Special Collections (August 1, 1980), 68, 76, 99, 102, 107.
[3] Thomas E. Malone, "The California Irrigation Crisis of 1886: Origins of the Wright Act" (Ph.D. diss., Stanford University, 1965), 13; Alan M. Patterson, *Land, Water and Power: The History of the Turlock Irrigation District, 1887-1987* (Glendale, Calif.: The Arthur H. Clark Company, 1987) 52-57; Frank Adams, *Irrigation Districts in California*. California Department of Public Works, Division of Engineering and Irrigation, Bulletin No. 21 (Sacramento, California State Printing Office, 1929), 180.

twentieth century. TID has evolved from a water conveyance organization dedicated to supplying water to local farmers to a multipurpose supplier of water and hydraulic power to a broad constituency.[4] The Modesto and Tulare irrigation districts were other early districts organized under the Wright Act.[5]

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California.[6] Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Between 1897 and 1909, no new districts were formed. By the late 1920s only seven of the original districts were still in existence, including the Modesto, Turlock, and Tulare irrigation districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915; each year from 1917 to 1925, five or more districts were formed, including 18 in 1920. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930.[7]

Merced Area Irrigation

Irrigation began in the Merced area with ditches in the bottomlands of the Merced River beginning in the 1850s. These were minor diversions from the Merced River constructed by farmers, which collectively irrigated between 1,500 and 2,000 acres by 1880.[8] Organized, large-scale irrigation in the Merced area began in 1870 when William G. Collier, William P. Sproul, and Stephen Bratzley organized the Robla Canal Company (RCC) in March 1870 and made the first major diversion of water from the Merced River to lands within the current Merced Irrigation District (MID). Collier, who conceived of the enterprise, came to California in 1853 and to Merced County in 1859. Trained as a surveyor and civil engineer, he served as surveyor for Merced County in the 1860s and had experience constructing irrigation canals on Bear Creek. Collier planned to divert water at the current location of the MID Main Canal diversion, and carry it across the uplands commanding the east side plains of the San Joaquin Valley to Bear Creek and beyond. Collier filed for an appropriative water right for his canal system in May 1873.[9]

The RCC, however, had a short history. In November of 1873, RCC sold its entire stock to the Farmers' Canal Company (FCC), which consisted of a group of landowners and farmers who had incorporated the previous May. FCC began to work on the Main Canal and extended it as rapidly as funding would permit. Constructed through hard gravelly soil, excavation costs doubled the original estimates and prevented the company from carrying out its plans as originally proposed. By

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[4] TID and the Wright Act have been the subject of extensive analysis in the annals of the state's water development history. This overview relies on T.E. Malone, "The California Irrigation Crisis of 1886: The Origins of the Wright Act" (Ph.D. Dissertation, Stanford University, 1965); JRP, "Water Conveyance Systems in California"; Donald Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West* (Berkeley: University of California Press, 1984); and other sources as noted.

[5] JRP Historical Consulting, "Historic Resources Inventory and Evaluation Report: Turlock Irrigation District Upper Main Canal, Stanislaus County, California," May 2006.

[6] JRP, "Water Conveyance Systems in California," 14-15.

[7] Harmon S. Bonte, *Financial and General Data Pertaining to Irrigation, Reclamation and other Public Districts in California*. California Department of Public Works, Bulletin No. 37 (Sacramento: California State Printing Office, 1931), 27; *Cost of Irrigation Water in California*, California Department of Public Works, Division of Water Resources, Bulletin No. 36 (Sacramento: California State Printing Office, 1930), 12; California Statistics, 1911, 322 and 1913, 778; JRP, "Water Conveyance Systems in California," 14-15.

[8] C.E. Grunsky, *Irrigation Near Merced*, USGS, Water Supply Paper No. 19 (Washington: Government Printing Office, 1899), 33, 37-39; S.T. Harding, *Water in California* (Palo Alto: N-P Publications, 1960), 101.

[9] John Outcalt, *A History of Merced County, California* (Los Angeles: Historic Record Company, 1925), 333-334.

March 1876, however, the Main Canal had reached Canal Creek, a distance of about eight miles, and made water available for irrigation. The most impressive engineering achievement was an 11.5-foot wide by 9-foot high, 1600-foot long unlined tunnel in the foothills excavated through sandstone and cemented gravel at a cost of $20,000. The Main Canal itself, as constructed, was unlined and had a bed width of 20 feet. Its depth was four feet with a grade of one foot per mile. In 1879, FCC built a second conduit, the Livingston Canal, which diverted water from Canal Creek just east of present-day Atwater and extended to a point about two miles north of the town of Livingston (See Linear Feature Record MR1-LC). The company built a third canal, the Colony Branch Canal, also to serve the Atwater vicinity.[10]

FCC had planned on expanding its system south into the Mercd area, but did not succeed in extending the Main Canal beyond Canal Creek. In 1882, FCC sold out to Charles Crocker and C.H. Huffman who organized the Merced Canal & Irrigation Company (MC&IC).[11] Huffman was a large grain-raiser in Merced County who owned vast tracts of land in the vicinity of Cressey north of Merced, while Charles Crocker was one of the founders of the Southern Pacific Railroad. In 1883, the new company, under the direction of its chief engineer Charles Barrent, enlarged the Main Canal to a bed width of 60 feet and the tunnel to 22 feet wide, adhering to the alignment of the old canal in all locations except near the head of the canal. The company extended the Main Canal beyond Canal Creek a distance of five miles in 1884 with the assistance of some 200 teams of mules and scrapers. The following year work began on a second tunnel in the foothills eight miles north of Merced. The tunnel was 30 feet wide, 13 feet high, and 2100 feet long; it was constructed with redwood timbers at a cost of about $70,000. In 1886-1887 another six miles of the Main Canal were completed terminating at a reservoir (present-day Yosemite Lake) that functioned primarily as a domestic water supply for the City of Merced. Water was turned into the reservoir through the completed Main Canal in February 1888. The Main Canal eventually continued southeastward from the reservoir.[12]

In April 1888, the Crocker-Huffman Land & Water Company (Crocker-Huffman) purchased MC&IC to furnish irrigation water for several colonies the company planned to develop in the Merced vicinity. By the 1890s, Crocker-Huffman irrigation water served its own Rotterdam, British, El Capitan, and Buhach colonies as well as V.C.M. Hooper's Yosemite Colony and the Southern Pacific's Bear Creek Colony. Crocker-Huffman furnished the purchasers of land a water right at the rate of $10-$20 per acre and $1-$2 per annum for water service under contract with a life of 50 years. Total irrigated acreage of the Crocker-Huffman system in 1899 was approximately 12,000 acres.[13]

Crocker-Huffman continued to expand its canal system in subsequent decades including construction of the Fairfield Canal and the Bradley, Merced, Hartley, and Robinson Laterals. The company also constructed the Henderson Lateral during the first decade of the twentieth century to draw water from the Crocker-Huffman Main Canal at a point northwest of Lake Yosemite and diverted it to the land lying between Atwater and Merced. By 1914, however, the Crocker-Huffman wanted to sell its holdings. At the time, its system watered about 50,000 acres of land reaching from northeast of Merced to Livingston and was appraised at approximately $1.5 million.[14] In general, Crocker-Huffman had allowed the system to

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[10] Grunsky, *Irrigation Near Merced*, 34; Outcalt, *A History of Merced County*, 333-334; Kenneth R. McSwain, *History of the Merced Irrigation District* (Merced, Merced Irrigation District, 1978), 1-9.
[11] Adams, *Irrigation Districts in California*, 190.
[12] Grunsky, *Irrigation Near Merced*, 35.
[13] Grunsky, *Irrigation Near Merced*, 34-37; Outcalt, *History of Merced*, 333-338; Harding, *Water in California*, 101.
[14] Grunsky, *Irrigation Near Merced*, 34-37; Outcalt, *History of Merced*, 333-338; Harding, *Water in California*, 101; McSwain, *History of the Merced Irrigation District*, 9; Crocker-Huffman Land and Water Company, *Map Showing Lands and Canals of Crocker-Huffman Land & Water Company Near Merced, California*, 1912.

languish and did not keep up maintenance on the canals and other works. By 1919, the system as whole was in poor condition and long reaches of the system were overgrown with grass, willows, and other obstacles.[15]

It was during this period that local interests began agitating to form an irrigation district in the Merced area. Irrigation districts formed by local residents were being established in many areas of California in the 1910s and these districts often acquired earlier private enterprise irrigation systems. The most common transition occurred when the local citizens formed an irrigation district covering the area served and then purchased the commercial canals serving it. The Fresno, Consolidated, Merced, and Madera irrigation districts were among those formed through acquisition of nineteenth century systems.[16]

After years of effort, an irrigation district in Merced County came into being. Spearheaded by the Merced County Farm Bureau, elections in November 1919 created the Merced Irrigation District (MID), a district chartered for the purpose of providing irrigation water to lands in eastern Merced County and to generate electricity. One of the district's first actions was to hire John Debo Galloway, a prominent California water engineer, to find a reservoir site in the Sierra Nevada foothills to store flood waters for irrigation. Galloway chose a site in the Merced River Canyon as the location for the future Exchequer Dam and Lake McClure. District voters approved a $12 million bond issue to acquire the Crocker-Huffman system and construct the dam and reservoir in November 1921.[17]

The fledgling MID quickly embarked on an aggressive expansion and improvement program of the neglected former Crocker-Huffman system. MID constructed many miles of new canals during the 1920s, spending almost $5 million in construction on the lower portion of its system. The overwhelming majority of control structures in the canal system such as headgates were constructed of timber and MID set out to gradually replace these original structures with concrete in ensuing years. New construction included the Le Grand canal system, North Side Canal, rebuilt the Fairfield Canal, and many new small canals. By the end of the decade, MID owned 1,020 miles of canals and was the fifth largest district in California. Its Main Canal extended 17 miles, passed through two tunnels and had a capacity of about 1,500 cubic feet per second (cfs).[18] Only about ten miles of the district's more than 1,000 miles of canals were concrete lined by 1927.[19]

MID's most ambitious building program during the 1920s was the construction of the Exchequer Dam completed in 1926. The dam, built at a cost in excess of $5 million, created the Lake McClure reservoir capable of storing 289,000-acre feet of water. Like other districts that were beginning to build dams during this period, MID built a hydroelectric power plant at the base of Exchequer Dam and contracted to sell power to the San Joaquin Light and Power Corporation. Exchequer Dam was built across a narrow gap about seven miles above Merced Falls. Rising 326 feet above the Merced River, the water passed through the powerhouse or spillways and flowed down river to a point a few miles below Merced Falls. There, the old Crocker-Huffman diversion dam distributed water to the various district canals.[20]

During the 1930s, MID experienced financial difficulty as many district farmers became delinquent on their debts. In turn, MID could not pay its debts and declared bankruptcy. The district survived this trauma, however, by selling power from the Exchequer Dam and refunding its debts through the Reconstruction Finance Corporation under the specially enacted federal

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[15] John D. Galloway, "Report on the Merced Irrigation District, Merced, California, 1920-1921," p. 511, Water Resources Center Archives, University of California, Berkeley; McSwain, *History of the Merced Irrigation District*, 15; Crocker-Huffman Land and Water Company, "Map Showing Lands and Canals of Crocker-Huffman Land & Water Company Near Merced, California," 1895, 1903, 1912.
[16] JRP, "Canals of California", 68; McSwain, *History of the Merced Irrigation District*, 15-16.
[17] Adams, *Irrigation Districts*, 190-195; McSwain, *History of the Merced Irrigation District*, 15.
[18] Adams, *Irrigation Districts*, 194-195.
[19] Adams, *Irrigation Districts*, 190, 195; Galloway, "Report on the Merced Irrigation District," 509.
[20] Adams, *Irrigation Districts*, 192-195; Harding, *Water in California*, 101; Pisani, *From Family Farm to Agribusiness*, 388.

law. Despite these difficulties, MID did manage to make improvements to its system in the 1930s, and undertook a program of creek cleaning and excavation. MID directors were also interested in implementing a flood control program, which included levee construction along area creeks.[21]

World War II halted work on the MID system, but this was a temporary interruption. The booming economy of the postwar years allowed the district to expand its system and continue to improve its infrastructure. A major component of this work was an accelerated program of canal concrete lining that began in 1946, with lining 10.1 miles of canal at various sites with concrete. Many of the canals built earlier in the century such as the Buhach Lateral (See Linear Feature Record MR1-BH-1), Atwater Lateral, Lingard Lateral, Hartley Lateral, and Arena Lateral were all lined with concrete in the ensuing years.

In addition to concrete lining, MID installed pipeline and realigned many canals in the 1940s and 1950s. The district's purchase of several new draglines at this time facilitated its ability to maintain and realign its many miles of earthen canals, and the use of this canal shaping equipment was the beginning of the end of the horse and Fresno scraper for the district. A dragline, consisting of a crane and bucket device used extensively in strip mining, gave the district the capacity to create smoother and more compacted canal alignments that had been possible previously.[22] The MID system was also fundamentally upgraded in the 1960s with construction of New Exchequer Dam and McSwain Dam, both of which greatly increased storage capacity while also supplying flood control and increasing power generation revenue. Improvements have continued up to the present on the MID.[23]

Canal Lateral Construction

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the 20th century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was an expensive proposition.[24]

The trapezoidal cross-section became the typical shape of the concrete lined canal since the advent of the practice. A common means of obtaining this shape was to excavate a channel either by hand or horse-drawn scraper, grade the bottom, and then backfill earth around a wooden form. Concrete was then poured in sections using boards much the same way as a sidewalk, then hand screeded and finished. By the 1930s mechanized canal excavation was the norm, and by 1946, the sub-

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[21] Harding, *Water in California*, 101; McSwain, *History of the Merced Irrigation District*, 102, 105.
[22] McSwain, *History of the Merced Irrigation District*, 52, 85, 86.
[23] McSwain, *History of the Merced Irrigation District*, 163, 170; JRP Historical Consulting, "Historic Resource Evaluation Report, Livingston Canal, Merced Irrigation District, Merced County, California," 1998, 5; USGS, *Atwater*, 15' quadrangle (Washington, D.C.: Government Printing Office, 1918); USGS, *Atwater*, 7.5' quadrangle (Washington, D.C.: Government Printing Office,1960).
[24] B.A. Etcheverry, *Lining of Ditches and Reservoirs to Prevent Seepage Losses*, California Agricultural Experiment Station, Bulletin No. 188 (Berkeley: Agricultural Experiment Station, 1907),148-159; Samuel Fortier, *Concrete Lining As Applied to Irrigation Canals*, US Department of Agriculture, Bulletin No. 126 (Washington: US Department of Agriculture, 1914).

grade slip-form concrete lining machine became the common method for larger lining jobs. It is likely that MID used both methods to line canals depending on cost of labor, availability of equipment, and length of canal.[25]

Individual Canal Histories and Evaluations

Canals are common elements of the landscape in California, particularly in the Central Valley, Salinas Valley, and other major agricultural regions of the state. Irrigation canals are difficult to assess for historic significance because they are at once very common property types but are also economically important to the communities they serve. It is necessary then, to approach evaluating canals in a different way than other resources.

The first consideration is that there are many irrigation canals in California's Central Valley. Although no comprehensive figures are available, there are hundreds of individually named canals and thousands of miles of irrigation facilities throughout the Central Valley. MID, for example, has nearly 800 miles of canals, organized in dozens of individually named units. Similar figures prevail for the dozens of irrigation districts throughout the Sacramento and San Joaquin valleys. This point provides a useful perspective on irrigation systems generally. Collectively, all of these irrigation canals helped to revolutionize agriculture in the region and the state. Individually, however, any one canal or system of canals is part of a vast system of such properties.

Second, it is important to appreciate irrigation canals as part of a class of infrastructure that delivers benefits to broad constituencies. Most public works projects fall into this category, including state and local road systems, railroads, municipal water systems, sewer systems, airports, and the like. Major utility features such as electric power generating plants, natural gas pipelines, and telephone service also fall into this category. In irrigated farming communities, irrigation canals have become vital elements of the infrastructure, and many have also developed as electric utilities in addition to their water deliveries. These elements of the infrastructure are obviously important to the communities they serve and society has come to depend on these vital elements to function.

These considerations are useful in appreciating how significance might be assessed for such properties. In a sense, every road, bridge, telephone line, canal, and sewer system is important. Unless judgment is exercised, however, each one might be seen as eligible for the National Register for its importance to the local community. To avoid that trivial conclusion, we must assess historical significance of such infrastructure elements relative to similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating irrigation canals.[26]

It is difficult to establish a single standard for what might constitute significance for an irrigation canal because there are several areas in which that significance might come into play. In general, however, a canal or system should convey some importance that is not common to other canals in the Central Valley or other region of the state. Pioneering construction could be significant if a canal was the first to bring irrigation water to a region. The Persian Ditch in Visalia, for example, was found to qualify for listing in the National Register because it was one of the first canals to be built in the San Joaquin Valley; it dates to the 1860s. Level of service might be another test. Several of the canals of the Bureau of Reclamation's

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[25] Department of Irrigation Photograph Collection, Photograph # 710-B-a-114, 29 May 1929, Special Collections, University of California, Davis; Etcheverry, *Lining of Ditches and Reservoirs*, vol. 2, 118, 121, 156-160; US Bureau of Reclamation, *Lining For Irrigation Canals* (Denver: Bureau of Reclamation, 1952), 14-17; Michael Holleran, *Historic Context for Irrigation and Water Supply Ditches and Canals in Colorado* (Denver: University of Colorado at Denver, 2005), 59.

[26] JRP, "Water Conveyance Systems in California," 92-96.

Central Valley Project (CVP) have been found to qualify in this regard, on their basis of the sheer volume of water that they deliver, enough water in a single canal to change fundamentally the cropping pattern of a region. A canal could also be unusual for its design, either because it represents a breakthrough in canal engineering, or because it represents a rare example of an antiquated historic method of canal design. Some of the CVP canals were found to qualify because they represented breakthroughs in the design of very large canals, and, in fact, the CVP canals rival major rivers in their capacities. Several old stone lined canals in the San Bernardino-Riverside area have been found to qualify for the California Register because they are rare examples of this largely antiquated method of canal construction.

Another consideration in evaluating significance for canals is to establish a defensible period of significance. The period of significance should be defined to take into account the area of significance. If a canal is significant for its design, the period of significance should be restricted to the era in which the canal was built. If it is important for effect on cropping patterns, the period of significance should be restricted to the period when this change took place.

Finally, integrity should be assessed on the basis of the period of significance for a property as specified in the California Register of Historic Resources (CRHR) and, by reference, in the National Register guidelines and regulations. The resource must retain integrity to its potential period of significance if it is to meet the criteria for listing in either the CRHR or NRHP.

The long, linear shape of canals and the nature of the projects that compel their evaluation also make canal evaluations unique. Typically, a project's APE will only intersect a small portion of a canal. At these points the canal is recorded and evaluated. It is usually beyond the scope of a survey to consider an entire canal, or canal system. The standard procedure for evaluating linear features calls for recording the segment in the study area and at comparison points to show typical points of the canal that are representative of the segment. These additional recordation points allow the evaluation of the linear resource to be based upon a better understanding of the nature and general integrity of the feature. There have been several evaluations of MID canals and canal segments in the past, including some of the same canals evaluated on this form. Below is a table of the previous evaluations and attached at the end of this form are copies of the earlier forms.

P-24-	Previously Evaluated Canals in Merced Irrigation District			
	Date	Canal	Finding	Citation
001899	2005	Mason Curtis Lateral*	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Inventory And Evaluation Report, Bellevue Substation And Transmission Line Project."
001783	2005	Branch of Henderson Lateral*	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Inventory And Evaluation Report, Bellevue Substation."
001771	2004	Bellevue Ranch Canals	not eligible for CRHR	CalTrans, "Cultural Resources Survey and Assessment Report Woodside Group-Bellevue Ranch Project."
606, 1888	2001	Fairfield Canal	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals of the Merced Irrigation District, Campus Parkway Project."
001889	2001	Tower Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.

P-24-	Previously Evaluated Canals in Merced Irrigation District			
	Date	Canal	Finding	Citation
001890	2001	Sells Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
001891	2001	Yosemite Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
001885	2001	Bradley Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
001882	2001	Merced Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
001883	2001	Robinson Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
86&1884	2001; 2000	Hartley Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals;" California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
001886	2001	Doane Lateral	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
608&1887	2001	Le Grand Canal	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resource Evaluation Report, Ten Canals." California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
000092	2001	Atwater Canal	not eligible for NRHP	California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
000096	2000	Farmdale Lateral	not eligible for NRHP	California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
000085	2000	Koff Lateral	not eligible for NRHP	California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
1679& 574	7/1998; 9/1998	O'Donnell Lateral	not eligible for NRHP	JRP Historical Consulting, "Historic Resources Evaluation Report, O'Donnell Lateral, Merced Irrigation District;" CalTrans, "Historic Resources Evaluation Report, Rehabilitation of Bear Creek Bridge and the El Capitan Canal Bridge;" California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
574	1998	Meadowbrook Lateral*	not eligible for NRHP	CalTrans, "Historic Resources Evaluation Report, Rehabilitation of Bear Creek Bridge and the El Capitan Canal Bridge."
574	1998	McSwain Lateral	not eligible for NRHP	CalTrans, "Historic Resources Evaluation Report, Rehabilitation of Bear Creek Bridge and the El Capitan Canal Bridge."
577	1998	El Capitan Canal	not eligible for NRHP	CalTrans, "Historic Resources Evaluation Report, Rehabilitation of Bear Creek Bridge and the El Capitan Canal Bridge."
581	1998	Deane Canal	not eligible for NRHP	California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
	1998	Edendale Creek Turnout and Weir on Canal Creek	no NRHP evaluation/ HAER recordation	NPS, "Merced Irrigation District, Edendale Turnout and Weir," HAER No. CA-192-A.

*Recorded by M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

P-24-	Previously Evaluated Canals in Merced Irrigation District			
	Date	Canal	Finding	Citation
000552	1998	Livingston Canal*	not eligible for NRHP or CRHR	JRP Historical Consulting, "Historic Resources Evaluation Report, Livingston Canal;" California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.
000088	1993	Main Ashe Lateral*	not eligible for NRHP	JRP Historical Consulting, "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension."
000091	1993	Buhach Lateral*	not eligible for NRHP	JRP Historical Consulting, "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension."
000090	1993	Canal Creek*	not eligible for NRHP	JRP Historical Consulting, "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension."
000488	1992	Main Canal	eligible for NRHP	PAR Environmental Services, "National Register of Historic Places Significance Evaluation, Main Canal, Merced County;" California Office of Historic Preservation, "California Inventory of Historic Resources," Merced County.

* Canals also evaluated on this survey form.

Taking into account this general statement about canal evaluations, the historic context, and the description of the resources, the following section evaluates the potential significance and integrity of the various canal segments in the Merced Irrigation District.

Canals are rarely found eligible under two of the CRHR eligibility criteria (Criteria 2 and 4), discussed here for all of the canals evaluated. The other criteria are addressed by canal segment in the sections below. Under Criterion 2, a property must be associated with an important person's productive life and must be the property that is most closely associated with that person, qualities rarely found in engineering features. Furthermore, a property such as a dam that represents the work of a master engineer would be eligible under Criterion C, as the work of a master, rather than B, as representing an important person. There may be rare instances, however, when a water conveyance system would be eligible under Criterion B, notably when the person's association with the system is very strong and no properties more intimately associated with that person remain. Research did not reveal any individuals important in irrigation planning, construction, or engineering related to any of the canal segments evaluated on this form. Furthermore, none of the canals represent notable engineering accomplishments. Thus, even if there was an association with someone important, none of these canals would best represent their work. Therefore, none of the canal segments evaluated on this form are eligible for listing in the CRHR under Criterion 2 and none are considered a historic resource for the purposes of CEQA.

Under Criterion 4, a property must be likely to yield information important in history or prehistory. In order to be eligible under this criterion, the potential important information must be from the physical properties themselves. The properties most commonly found eligible under Criterion D are archeological sites; buildings, structures, and objects are infrequently found to be eligible for their information potential. A relevant example would be if a canal held potential information about construction techniques. Construction of the canals and the canal types represented on this form are well documented. Therefore, none of the canal segments in the MID evaluated on this form are eligible for listing in the CRHR under Criterion 4 and none are considered a historic resource for the purposes of CEQA.

*Recorded by M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Canal Creek

One of the first objectives of the FCC was to divert water from the Main Canal into the Canal Creek streambed north of the study area in Section 29 T5S/R14E MDBM. Downstream from this diversion, a portion of the channel now known as Canal Creek was a stream formerly known as Dry Creek. Water initially flowed through Canal Creek to the area northeast of Atwater in 1876 and it was the first canal in the FCC system to bring water out of the foothills for irrigation (Location Map 1).[27]

In 1879, the FCC built a major lateral, the Livingston Canal, off of Canal Creek at a point in Section 4, T7S/R13E between the current cities of Merced and Atwater (See Linear Feature Record MR1-LC and Location Map 8).[28] The entire flow of Canal Creek was diverted into the Livingston Canal for irrigation of lands west of this confluence.[29] South of this diversion, Canal Creek virtually stopped flowing. State engineer William Hammond Hall noted a small channel past this point the he described as a "ditch" which continued for about a mile.[30] By 1895, more than ten years after Crocker-Huffman acquired the former FCC system, Canal Creek had been extended further south below the Livingston Canal diversion, ultimately emptying into what is now Black Rascal Creek (Location Map 1). Canal Creek was realigned many times in subsequent decades both north and south of the head of Livingston Canal. Canal Creek also underwent periodic cleaning of brush and debris and channel excavation to facilitate efficient irrigation and reduce flooding. Levees were in place along Canal Creek above the Livingston Canal by 1915; below the canal they were constructed between 1946 and 1958.

After MID was formed and began their improvement program in 1920, the flow of Canal Creek above the Livingston Canal headgate was 400 second feet. At the time, it carried the second highest volume of water behind the Main Canal.[31] In the same year, acreage watered by Canal Creek and the Livingston Canal was 54,890 acres. This total constitutes more than half of the total acreage irrigated by canals in the MID system constructed before 1900.[32] A report in 1920 recommended the Canal Creek channel be improved below the Livingston Diversion as an outlet in the event of a breach in the Livingston Canal and to facilitate drainage, and eventually MID undertook this project. There is currently a lateral headgate into Canal Creek the junction with the Livingston Canal and the channel below this point appears to have been deepened, widened, and regularly maintained. Currently there are few diversions from Canal Creek upstream from the Livingston Canal and none below it (See Historic Photos, Figures 1, 2).[33]

In addition to the improvements discussed above, it is likely that the entire length of Canal Creek has undergone regular widening, excavating, and maintaining as needed. Within the study area, a major realignment of an approximately one mile

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27 Grunsky, *Irrigation Near Merced*, 34.
28 JRP, "Canals of California", 162.
29 Galloway, "Report on the Merced Irrigation District," 509.
30 Mark Howell, *Official Map of Merced County* (San Francisco: A.L. Bancroft, 1874); William Hammond Hall, *Detail Irrigation Map, Merced Sheet*, ([Sacramento]: California State Engineering Department, 1885); Charles D. Martin, *Official Map of Merced County* (San Francisco: Dakin Publising Company, 1888); Galloway, "Report on the Merced Irrigation District," 510, 672.
31 Galloway, "Report on the Merced Irrigation District," 510, 672; 515, 520.
32 Galloway, "Report on the Merced Irrigation District," 668, 669.
33 Crocker-Huffman, *Map Showing Lands of the Crocker-Huffman Land & Water Company* (1895, 1903, 1912); USGS, *Atwater Quadrangle* (1918, 1948, 1960); McSwain, *History of the Merced Irrigation District*, 134-136, 143, 149, 141, 146, 159, 198, 201, 337, 149, 194, 200; A.E. Cowell, *Official Map of the County of Merced, California* (1909); Galloway, "Report on the Merced Irrigation District," 510, 672.

section near the intersection of Bellevue and Fox Road, occurred between 1960 and 1973. More recently the MID constructed a reservoir just north of Bellevue Road.[34]

Under Criterion 1, Canal Creek appears to have important associations with events or patterns of events that are important to our history from the date of its construction, through the initial phase of irrigated agriculture development in the 1890s, although it does not retain integrity to this period. Canal Creek was one of the pioneering irrigation canals under an organized system in the Merced-Atwater region. As the principal lateral from the Main Canal until the early twentieth century, it functioned to bring water out of the foothills 16 miles to arable land. Indeed, until extension of the Main Canal in the late 1880s, Canal Creek was longer than the Main Canal and the majority of the Main Canal's flow went into Canal Creek. In turn, all of Canal Creek's water flowed into the Livingston Canal spawning development between Atwater and the Livingston area. As such, Canal Creek played a central role in the development of irrigated agriculture and settlement patterns of this region.

Although Canal Creek is potentially significant under Criterion 1, the portion within the study area does not retain integrity to its period of significance. An approximately one mile segment of the canal in Section 33, T6S/R13E was realigned between 1960 and 1973, and a section below the Livingston diversion was realigned between 1946 and 1958 and its channel has also been dredged and its banks enhanced and shaped to form levees. These actions greatly diminish the integrity of design, materials, location, and workmanship of Canal Creek as an engineering feature.[35] In addition, the construction of Castle Air Force Base in 1941 diminished the integrity of setting. Therefore, the approximately five mile portion of Canal Creek evaluated on this form is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion 3, Canal Creek is not important for its design, engineering, or method of construction. Being a natural waterway, is not a conventional canal. There was relatively little engineering involved in its initial conversion for use in conveying water. The practice of including natural waterways in engineered irrigation systems had been practiced in the San Joaquin Valley since the 1860s. It is possible that hand labor and scrapers were used on some portions of the canal, but these methods were also common in by the 1860s. When compared against other channels of this type, Canal Creek is typical and does not represent important design or engineering accomplishment or innovation. Therefore, Canal Creek is not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA.[36]

A 1993 report by JRP Historical Consulting titled "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension" also evaluated a segment of Canal Creek and found it ineligible for the NRHP. See Attachment A for a copy of the form from that report.

<u>Main Ashe/East Ashe Lateral</u>

The Crocker-Huffman Company constructed the Main Ashe and East Ashe Laterals around 1890. These canals drew their water from Canal Creek near its junction with the Livingston Canal and served the Ashe Colony in the vicinity of Section 9, T7S/R13E. Like Canal Creek, portions of these laterals flow in former natural streambeds. Initial construction was by hand

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[34] USGS, *Atwater Quadrangle*, 1960, 1987; WAC Corporation, Aerial Photographs of Merced County, 1985, Map Library, University of California, Davis; Merced Irrigation District, *Official Map of the Merced Irrigation District* (Merced: MID, 1973); Current aerial view from www.Google.com.
[35] Galloway, "Report on the Merced Irrigation District," photographs at end of report, no page number.
[36] Willison, "Past, Present, and Future of the Fresno Irrigation District," 78-79; Ingvart Teilman and W. H. Shafer, *The Historical Story of Irrigation in Fresno and Kings Counties in Central California* (Fresno: Williams and Son, 1943), 6.

labor and by horse and scraper. Major improvements were not made on these canals until after 1920 when MID began to generally upgrade the system. At some time MID lined portions of the Main Ashe Lateral, using methods similar to those shown in Figures 6-8.

Under Criterion 1, the Main Ashe Lateral and East Ashe Lateral do not have important associations with events or patterns of events that are important to our history. These structures were minor canals in a large system and did not play a major role in development of irrigated agriculture or settlement patterns of the Merced-Atwater region. Therefore, the Main Ashe Lateral and East Ashe Lateral are not eligible for listing in the CRHR under Criterion 1 and are not considered a historic resource for the purposes of CEQA.

Under Criterion 3, the Main Ashe Lateral and East Ashe Lateral are not important for their design, engineering, or method of construction. Constructed around 1890, the Main Ashe Lateral and East Ashe Lateral are common structural types. They were likely originally constructed by hand and by horse and scraper, methods common to the era. Subsequently, they were formed into a trapezoidal shape the Main Ashe Lateral was lined using established design and construction techniques. There is no indication the Main Ashe Lateral and East Ashe Lateral are important examples of the science of irrigation canal construction and maintenance. Therefore, the Main Ashe Lateral and East Ashe Lateral are not eligible for listing in the CRHR under Criterion 3 and are not considered a historic resource for the purposes of CEQA.

In addition to lacking significance, the Main Ashe Lateral and East Ashe Lateral also lack integrity. The concrete lining of the Main Ashe Lateral and the routine maintenance of the East Ashe Lateral diminish the integrity of design, materials, and workmanship of both canals. A 1993 report by JRP Historical Consulting titled "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension" also evaluated a segment of the Main Ashe Lateral and found it ineligible for the NRHP. See Attachment B for a copy of the form from that report.

Bear Creek/Meadowbrook Lateral

Farmers began to divert water from Bear Creek onto their adjacent land via small, hand dug channels beginning in the 1860s. More intensive use of Bear Creek water did not begin until the later nineteenth century. The Crocker-Huffman Company constructed the Crocker Dam on Bear Creek in 1888 in Section 22, T7S/R13E MDBM, west of Merced outside the study area. Past the dam, Bear Creek split into two channels, both labeled "Bear Creek" at the time. The company also diverted Black Rascal Creek into Bear Creek just upstream from the Crocker Dam. This occurred at some point between 1885 and 1895, and likely coincided with construction of the dam. After 1915, the north channel downstream from Crocker Dam changed in name from "Bear Creek" to "Black Rascal Creek," which it holds to this day (Location Map 2).[37]

During the first decade of the twentieth century, the Crocker-Huffman Company enhanced the flow of Bear Creek with construction of the Fairfield Canal, which carried water from Lake Yosemite into Bear Creek at a point northeast of Merced. The water then flowed through Bear Creek and irrigated land along its course including the area southwest of Merced in the study area. Levees were in place along the banks of Bear Creek by 1915. In the 1920s, Bear Creek ceased receiving water from the Fairfield Canal after the MID realigned the latter to pass under Bear Creek and irrigate land south and east of Merced. Bear Creek currently receives water from the Applegate Lateral and Black Rascal Creek. [38]

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[37] Willison, "Past, Present, and Future of the Fresno Irrigation District," 78-79; Teilman and Shafer, *The Historical Story of Irrigation in Fresno and Kings Counties*, 6; Hall, *Map of Irrigation Near Merced*, 1885; USGS, *Atwater Quadrangle*, 1918; McSwain, *History of the Merced Irrigation District*, 6.

[38] JRP, "Historic Resource Evaluation Report: Ten Canals of the Merced Irrigation District, Campus Parkway Project, Merced County, California, June 2001," 4; USGS, *Merced Quadrangle*, 1918, 1948, 1961, 1980.

Research did not reveal specific references to creek cleaning and excavation work on Bear Creek, but it is likely that it did occur in the 1930s, if not before. Use of machinery for canal excavation and cleaning was the norm, especially because of the availability of surplus equipment from World War I. MID rebuilt the Bear Creek side of Crocker Dam, where Black Rascal Creek splits off from Bear Creek in 1941. Sometime from 1946 to 1948, work concluded on the Meadowbrook Lateral, which commenced at Crocker Dam and ran parallel to Bear Creek on the east side (Figures 1-4). In the post-World War II years, MID has continued to maintain all of the waterways under its jurisdiction including Bear Creek and the Meadowbrook Lateral (Figures 3-5).[39]

Under Criterion 1, Bear Creek does not have important associations with events or patterns of events that are important to our history. By the time the Crocker-Huffman Company delivered water to Bear Creek for irrigation via the Fairfield Canal in the early twentieth century, the practice of using existing streambeds for this purpose was about 50 years old. Furthermore, extensive irrigation canals had been in place in the region for decades and there was no radical change in regional land use after Bear Creek became a conduit for canal water. In addition, prior to its stream being enhanced, farmers along Bear Creek had dug small canals from its channel, tapping its natural flow. Thus, land along parts of its course had been irrigated for some time. Bear Creek is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion C, Bear Creek is not important for its design, engineering, or method of construction. Bear Creek, being a natural waterway, is not a conventional canal and there was relatively little engineering involved in its initial conversion for use as an irrigation canal. By 1915, it did have embankments constructed along its banks and portions of its channel were likely realigned. It was also periodically cleaned of brush and debris and possibly excavated. When compared against other channels of this type, Bear Creek is typical and does not represent important design or engineering accomplishment or innovation. The canals are useful irrigation conduits that display modern methods of canal maintenance and are generally workmanlike in their construction. There is no indication, however, that this canal is an important example of the science of irrigation canal construction and maintenance, Bear Creek and the Meadowbrook Lateral are not eligible for listing in the CRHR under Criterion 3 and are not considered historic resources for the purposes of CEQA.

In addition to lacking historic significance, Bear Creek lacks integrity to its potential period of significance. This period is defined as the first years after canal water was diverted into the creek for the purposes of irrigation. Routine maintenance performed on Bear Creek over the years has resulted in changes to the shape of the channel and banks. Additional changes affecting the integrity include the replacement of the Crocker Dam, an integral component of Bear Creek as an irrigation canal, the change in design of the related Fairfield Canal, and the construction of the Meadowbrook Lateral. These factors have diminished the integrity of materials, workmanship, setting, and design.

Under Criterion 1, the Meadowbrook Lateral does not have important associations with events or patterns of events that are important to our history. Constructed between 1946 and 1958, irrigation was already well established in the region and it did not drastically alter land use. Therefore, the Meadowbrook Lateral is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion C, the Meadowbrook Lateral is not important for its design, engineering, or method of construction. Constructed between 1946 and 1958, the Meadowbrook Lateral is a common type as well, and such canals have existed in the region and in the MID since at least the early twentieth century. Therefore, the Meadowbrook Lateral is not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA. The

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[39] McSwain, *History of the Merced Irrigation District*, 134-136, 143, 149, 141, 146, 159, 198, 201, 337; USGS *Atwater Quadrangle*, 1918; Holleran, *Historic Context for Irrigation*, 59.

*Recorded by M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Meadowbrook Lateral generally retains integrity to its potential period of significance defined as the years construction, but this canal lacks historic significance.

A 1998 report by Caltrans titled "Historic Resources Evaluation Report, Rehabilitation of Bear Creek Bridge and the El Capitan Canal Bridge" also evaluated the Meadowbrook Lateral and found it ineligible for the NRHP. It did not consider Bear Creek a cultural resource and did not evaluate it. See Attachment C for a copy of the form from that report.

Black Rascal Creek/Hess Lateral History

Black Rascal Creek first appears on maps in 1874 as a short, unnamed stream that began northeast of Merced and drained into open land to the north of that town. As irrigation became organized in the later nineteenth century, the Bradley Lateral, Fahrens Creek, and canals passing through the Yosemite Colony north of Merced, began to empty into Black Rascal Creek. About the same time the Crocker-Huffman Company lengthened the channel of Black Rascal Creek west of Merced connecting it with Bear Creek. Immediately west of this confluence the company also constructed the Crocker Dam in 1888 where the channel split into two channels (see above and Location Map 3). Canal Creek empties into Black Rascal Creek downstream from Crocker Dam.[40]

Black Rascal Creek remained part of the system after MID took control of irrigation in the Merced region. The recognition of Black Rascal Creek as a viable irrigation canal was apparent in 1920 when the MID made filings for water rights on Black Rascal Creek in the event that water might be brought to the Planada-Le Grand area northeast of Merced and conveyed to this creek.[41] By 1915, there were levees on both banks of the creek. Research did not reveal specific references to cleaning and excavation of Black Rascal Creek in the 1930s, but it is likely that it did occur at this time if not earlier. In the 1940s, MID performed excavation and "berm" removal on the creek. Reconstruction of the Black Rascal Creek side of Crocker Dam, where Black Rascal Creek splits off from Bear Creek, occurred in 1942. Regular maintenance has been performed on the channel and banks of Black Rascal Creek by MID. Some time between 1946 and 1958, work concluded on the Hess Lateral, which commenced at the Crocker Dam and ran parallel to Black Rascal Creek on the north side, then passed under the creek via a siphon and continued on the south side. Currently some of the flow of Black Rascal Creek is diverted to Bear Creek northeast of Merced (Figures 3-5).[42]

Under Criterion 1, Black Rascal Creek does not have important associations with events or patterns of events that are important to our history. By the time the Crocker-Huffman Company began diverting water into Black Rascal Creek from its canals north of Merced and altered its channel into Bear Creek, the practice of using existing streambeds as part of irrigation infrastructure was already well established in the region. Furthermore, extensive irrigation canals had already been in place in the area for decades and there was no radical change in regional land use after Black Rascal Creek became a conduit for canal water. Therefore, Black Rascal Creek is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion C, Black Rascal Creek is not important for its design, engineering, or method of construction. Black Rascal Creek, being a natural waterway, is not a conventional canal and there was relatively little engineering involved in its initial conversion. As stated above, irrigators had been using and manipulating natural waterways to convey irrigation water since

[40] Willison, "Past, Present, and Future," 78-79; Teilman and Shafer, *The Historical Story of Irrigation in Fresno and Kings Counties*, 6; Hall, *Map of Irrigation Near Merced,* 1885; USGS *Atwater Quadrangle*, 1918.
[41] McSwain, *History of the Merced Irrigation District* 19.
[42] McSwain, *History of the Merced Irrigation District*, 134-136, 143, 149, 141, 146, 159, 198, 201, 337; USGS, *Atwater Quadrangle*, 1918; JRP, "Historic Resource Evaluation Report: Ten Canals of the Merced Irrigation District," 4; USGS, *Merced Quadrangle*, 1918, 1948, 1961, 1980.

the 1860s and this conversion does not represent an engineering innovation. When compared against other channels of this type, Black Rascal Creek is typical and does not represent important design or engineering accomplishment or innovation. There is no indication that this canal is an important example of the science of irrigation canal construction and maintenance. Black Rascal Creek is not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA. In addition to lacking significance, Black Rascal Creek lacks integrity. Its channel has been excavated and its banks have been altered and enhanced degrading the integrity of design, materials, and workmanship. Construction of the Hess Lateral also diminished Black Rascal Creek's integrity of setting.

Under Criterion 1, the Hess Lateral does not have important associations with events or patterns of events that are important to our history. Constructed between 1946 and 1958, irrigation was already well established in the region and it did not drastically alter land use. The Hess Lateral is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion C, the Hess Lateral is not important for its design, engineering, or method of construction. The Hess Lateral is a common type of lateral, and such canals have existed in the region and in the MID since at least the early twentieth century. The Hess Lateral appears to generally retain integrity, but lacks historic significance. Therefore, the Hess Lateral are not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA.

Henderson Lateral/Mason Curtis Lateral

The Henderson Lateral follows a natural creek channel for part of its course, which begins in Section 18 T6S/R14E MDBM off of the Main Canal and runs roughly north to south (Location Map 4). The Crocker-Huffman Company built the canal around 1910 to water land in the area northwest of Merced. Its alignment has remained largely unchanged since its original construction. As with all of the canals in the MID, the Henderson Lateral has received routine maintenance such as cleaning, excavating, and bank enhancement. Field observation at the time of this survey revealed that such actions continue to the present. The Henderson Lateral has a short branch canal that runs parallel to Bellevue Road on the south side to Franklin Road.[43]

The Mason Curtis Lateral, which branches off the Henderson Lateral north of Bellevue Road is an extension of the MID system likely constructed during the 1920s as part of the development of the Mason and Curtis Colony, a small subdivision located along the west side of Franklin road that was laid out during this time.[44] This lateral today crosses Fox Road north of Bellevue and then parallels and empties into Canal Creek. Between 1960 and 1973 the MID realigned the Mason Curtis Lateral near Fox Road, including piping a portion of the lateral.[45]

Under Criterion 1, the Henderson Lateral and the Mason Curtis Lateral do not have important associations with events or patterns of events that are important to our history. By the time the Crocker-Huffman Company constructed the Henderson Lateral in the early twentieth century, and MID constructed the Mason Curtis Lateral, extensive irrigation canals had already been in place in the region for decades and there was no significant change in regional land use after the Henderson Lateral

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[43] McSwain, *History of the Merced Irrigation District*, 134-136, 143, 149, 141, 146, 159, 198, 201, 337, 149, 194, 200.
[44] McSwain, *History of the Merced Irrigation District*, 73; Crocker-Huffman, "Map Showing Lands and Canals of Crocker-Huffman Land & Water Company Near Merced, California," 1912; USGS, *Atwater Quadrangle*, 1918; Merced Irrigation District, "Official Map of the Merced Irrigation District, Merced County, California," 1927; USGS, *Atwater Quadrangle*, 1946.
[45] Adams, *Irrigation Districts*, 190, 195; USGS *Atwater Quadrangle*, 1948, 1960, 1987; Aerial image provided by Google.com; Merced Irrigation District, *Official Map of the Merced Irrigation District*.

or the Mason Curtis Lateral were built. Therefore, the Henderson Lateral and the Mason Curtis Lateral are not eligible for listing in the CRHR under Criterion 1 and are not considered a historic resource for the purposes of CEQA.

Under Criterion 3, the Henderson Lateral and the Mason Curtis Lateral are not important for their design, engineering, or method of construction. Conveying water through natural waterways had been practiced in the Merced area and the San Joaquin Valley for decades. In addition, small, lateral canals of this shape and dimensions were also very common. When compared against other channels of this type, the Henderson Lateral and the Mason Curtis Lateral are typical and do not represent important design or engineering accomplishment or innovation. There is no indication that these canals are an important example of the science of irrigation canal construction and maintenance. Therefore, the Henderson Lateral and the Mason Curtis Lateral are not eligible for listing in the CRHR under Criterion 3 and are not considered a historic resource for the purposes of CEQA.

In addition to lacking historic significance, the Henderson Lateral and the Mason Curtis Lateral lack integrity. The Henderson Lateral has had its channel altered at some point in the 1950s diminishing its integrity of design, materials, and workmanship. The Mason Curtis Lateral has also had its channel altered and part of it piped. Both canals have undergone routine maintenance further diminishing its integrity. In addition, recent construction of an earthen basin or reservoir near the Henderson Lateral crossing of Bellevue Road further degrades the integrity of setting.

A 2005 report by JRP Historical Consulting titled "Historic Resource Inventory And Evaluation Report, Bellevue Substation And Transmission Line Project" also evaluated the Henderson Lateral and the Mason Curtis Lateral and found them ineligible for the NRHP and CRHP. See Attachments D and E for copies of the form from that report.

Buhach Lateral

During the late nineteenth century the Crocker-Huffman Company established many agricultural colonies in the vicinity of Merced, including the Buhach Colony, created in the 1890s. The Buhach Lateral supplied water to this colony, tapping into the Livingston Canal to the north. From this point of origin, the canal flowed south through the Buhach Colony, then southwest before draining into Black Rascal Creek in the NE1/4 of Section 20 T7S/R13E MDBM (Location Map 5). The lateral functioned as an irrigation canal, watering colony fields, and continued to serve in that capacity in the ensuing decades. In the 1930s, the MID undertook a program of improvements to its system and lined many canals with concrete. This work continued into the 1940s and 1950s, when lining of the Buhach Lateral occurred. It remains a lined canal today and still delivers water to the fields of the area, although it currently empties into Canal Creek, just north of its confluence with Black Rascal Creek (Figures 6-8).[46]

Under Criterion 1, the Buhach Lateral does not have important associations with events or patterns of events that are important to our history. By the time the Crocker-Huffman Company built the Buhach Lateral to deliver water to it colony, the practice of irrigation in the region was about 30 years old. An extensive system of irrigation canals was already in place and the Buhach Lateral did not bring about a radical change in regional land use. Therefore, the Buhach Lateral is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion 3, the Buhach Lateral is not important for its design, engineering, or method of construction. Constructed in the late 1890s, the Buhach Lateral, when compared against other channels of this type, is typical and does not represent any important design or engineering accomplishment or innovation. There is no indication that this canal is an important example of the science of irrigation canal construction and maintenance. Therefore, the Buhach Lateral is not eligible for

[46] Martin, *Official Map of Merced County*, 1888); USGS, *Atwater Quadrangle*, 1960 (1987).

listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA. In addition to lacking historic significance, The Buhach Lateral also lacks integrity. It has been lined with concrete and had its alignment altered. These factors compromise its integrity of design, materials, and workmanship.

A 1993 report by JRP Historical Consulting titled "Historic Sites Survey and Evaluation on the Proposed Mojave Natural Gas Pipeline Mojave Pipeline Northern Extension." also evaluated the Buhach Lateral found it ineligible for the NRHP. See Attachment F for a copy of the form from that report.

Drainage Ditch

Drainage has been a problem in the irrigated areas of Merced County since the 1880s. The land is flat and does not naturally drain well. In addition, the ground water table is near the surface and it rose rapidly with irrigation. These factors, combined with intensive irrigation and the local soil type, can create water-logged fields. To resolve the issue, farmers formed drainage districts beginning in 1918 and employed drainage pumps and ditches to drain the fields. The ditches allow excess water to flow out of the fields and into irrigation ditches or natural waterways. MID constructed the drainage ditches in the study area sometime between 1957 and 1960. Since that time ditches have undergone routine maintenance and excavation and a section of it in Section 35 T6S/R13E MDBM just north of Bellevue Road has been piped (See Location Map 6 and Figures 9-11).[47]

Under Criterion 1, the drainage ditch does not have important associations with events or patterns of events that are important to our history. By the time the MID constructed this segment of ditch in the late 1950s the practice of constructing such ditches was already well established. This relatively small segment (approximately four miles) did not result in major changes to land use in the region and the drainage ditch is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion 3, the drainage ditch is not important for its design, engineering, or method of construction. Historic photographs of other ditches from the 1920s reveal that this ditch does not represent an unusual, exceptional, or innovative design. The drainage ditch is not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA.

In addition to lacking historic significance, the drainage ditch also lack integrity. The recent piping and filling of a segment of the ditch as well as routine maintenance and excavation compromise its integrity of design, materials, and workmanship.

Livingston Canal

The Farmers' Canal Company constructed the Livingston Canal in 1879 using hand labor and horse-drawn scrapers. This method of construction would have created a channel with a shallow U-shape and timber control structures. Considering the general program of improvement undertaken by the MID in the 1920s, it is likely that some work was undertaken on the Livingston Canal at that time, and certainly the current headgate and canal lining date to much more recent years (See Linear Record Forms MR1-LC, Location Map 7, Figures 1 and 2, and Photographs 49 and 50). The canal was originally designed to take the entire flow of Canal Creek, and did so for many years. As such, it has watered a considerable amount of land

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[47] McSwain, *History of the Merced Irrigation District*, 138; Adams, *Irrigation Districts*, 195; WAC Corporation, Aerial Photographs of Merced County, 1957, Map Library, University of California, Davis; USGS, *Atwater Quadrangle*, 1960.

between Atwater and Livingston and contributed to the agricultural development of that area. The Livingston Canal continues to be primary lateral canal in the MID system.[48]

Under Criterion 1, the Livingston Canal appears to have important associations with events or patterns of events that are important to our history from the date of its construction, through the initial phase of irrigated agriculture development in the 1890s, but does not retain historic integrity. The Livingston Canal was one of the pioneering irrigation canals under an organized system in the Merced-Atwater region. Since its construction it received almost the entire flow of Canal Creek and distributed it to farmland in the area between Atwater and Livingston spawning development. As such, the Livingston Canal played a central role in the development of irrigated agriculture and settlement patterns of this region.

Although the Livingston Canal appears to be potentially eligible under Criterion 1, the portion within the study area lacks integrity of design, materials, feeling, setting, and workmanship to its potential period of significance in the late nineteenth century. The canal has undergone significant alterations such as lining, shaping, and replacement of the original structures. Most of these changes occurred after the establishment of MID in 1919, including replacement of the headgate. Such replacement of gates, structures, and other equipment was common along the entire length of the canal. Furthermore, the construction of housing along the Livingston Canal has diminished its integrity of setting. This portion of the Livingston Canal evaluated on this form is not eligible for listing in the CRHR under Criterion 1 and is not considered a historic resource for the purposes of CEQA.

Under Criterion 3, the Livingston Canal is not important for its design, engineering, or method of construction. This canal is a common type, constructed by common methods. The canal was originally formed by Fresno scraper, but has subsequently been re-graded into a trapezoidal shaped cross section. The canal has been partially concrete lined. Both were established design and construction techniques by the 1890s and there is no indication that the Livingston Canal is an important example of irrigation canal construction and maintenance. Therefore, the Livingston Canal is not eligible for listing in the CRHR under Criterion 3 and is not considered a historic resource for the purposes of CEQA.

A 1998 report by JRP Historical Consulting titled “Historic Resource Evaluation Report, Livingston Canal, Merced Irrigation District, Merced County, California” evaluated a different segment of the canal and found it ineligible for the NRHP and CRHP. The California Office of Historic Preservation concurred with this finding. See Attachment G for a copy of the form from that report.

[48] JRP, “Historic Evaluation Report, Livingston Canal,” December 1998, 5-6.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Historic Photographs

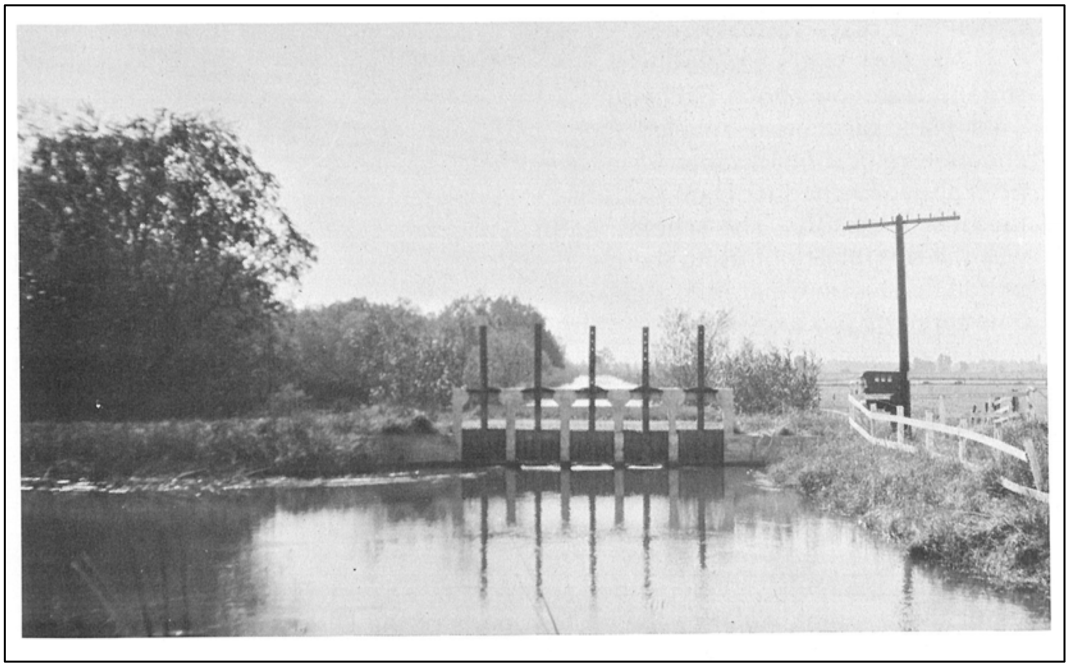


Figure 1. Canal Creek at headgate to Livingston Canal in 1920. (McSwain 29)

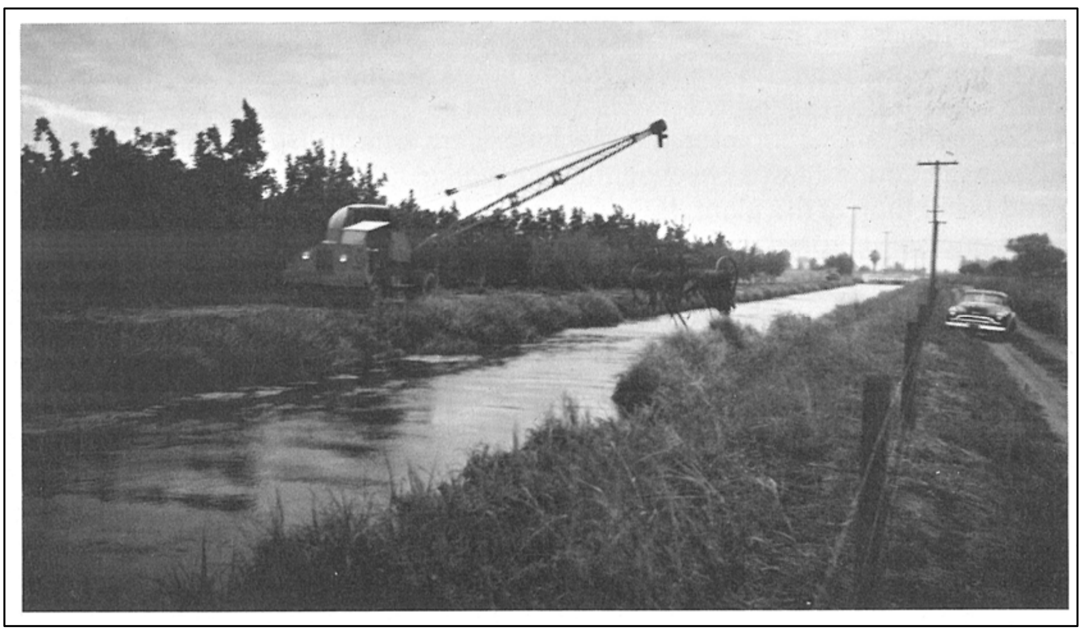


Figure 2. Crane cleaning weeds from an unknown canal in 1949. (McSwain 172)

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

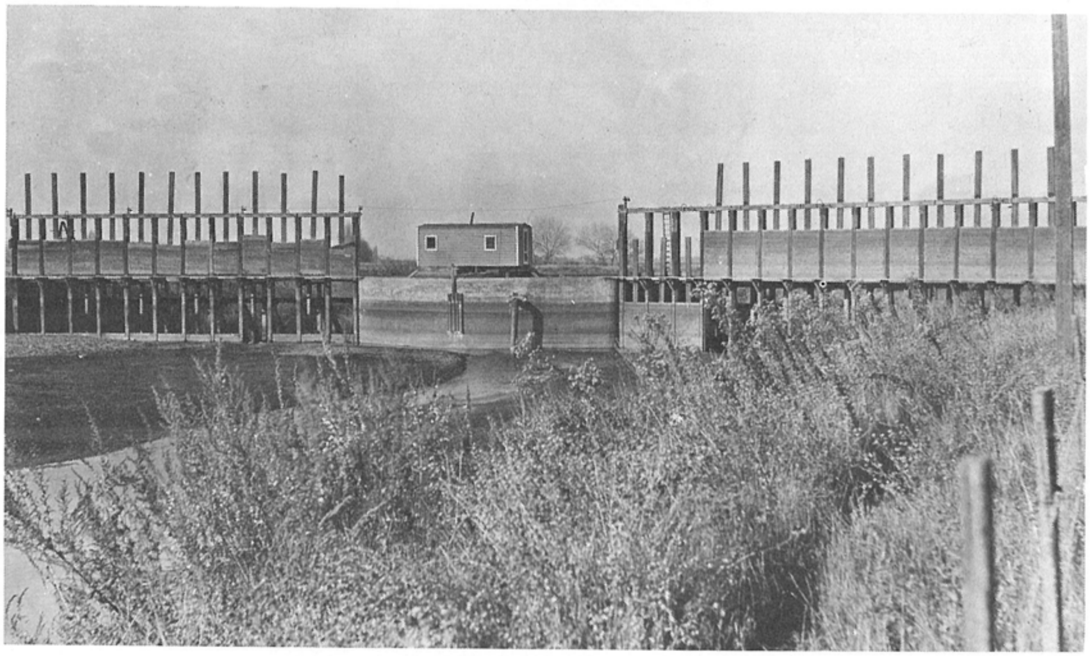


Figure 3. Upstream face of Crocker Dam across Bear Creek in 1913. (McSwain 6)

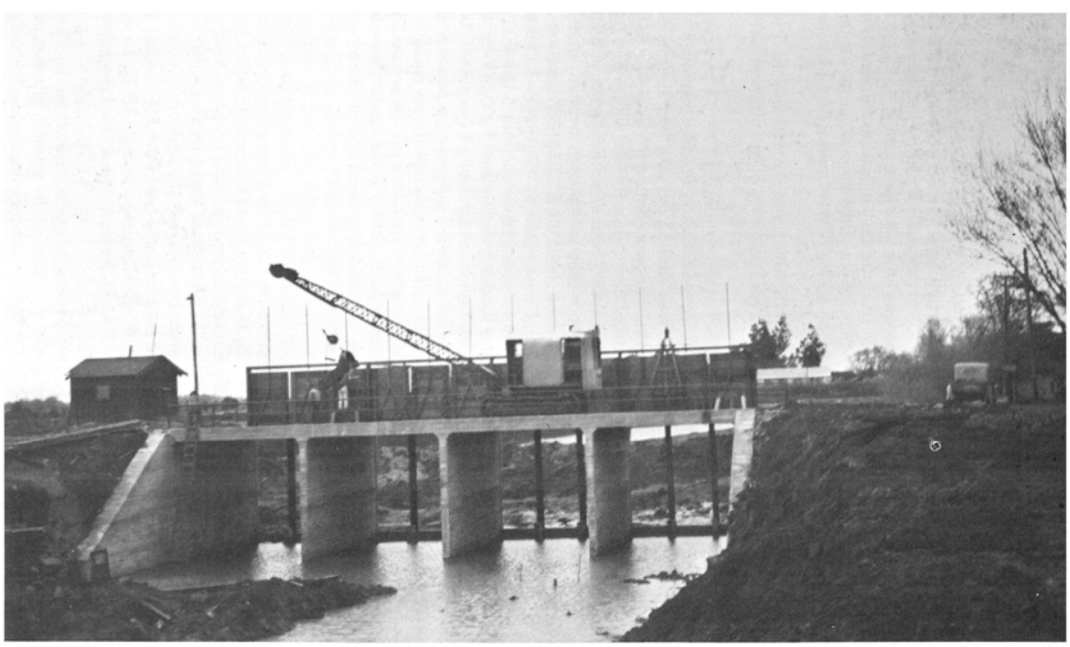


Figure 4. Bear Creek side of Crocker Dam as being rebuilt in 1940. (McSwain 145)

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Figure 5. Spillway into Bear Creek from the Fairfield Canal in 1920. (McSwain 37)

Figure 6. Arena Canal being shaped for concrete lining in 1950. (McSwain 174)

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Figure 7. Concrete lining of unknown canal in 1930. (McSwain 105)

Figure 8. Newly lined McSwain Lateral in 1930.(McSwain, 102).

Figure 9. Photo from 1920 showing water-logged land north of Atwater. (McSwain, 33)

Figure 10. Photo from 1920 showing drainage ditch near Atwater. (McSwain, 35)

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Figure 11. Dragline in 1929 digging a drainage ditch. (McSwain 95)

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Field Survey Photographs

Photograph 29. Canal Creek at Fox Road (point CC1), camera facing west. 12/12/06

Photograph 30. Canal Creek at Ladino Road (point CC8), camera facing north. 1/22/07.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 31. Control gates on Main Ashe Lateral at point MA2, camera facing south. 12/12/06.

Photograph 32. Main Ashe Lateral Flume over Canal Creek at point MA2, camera facing south. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 33. Main Ashe Lateral showing slide gates at point MA3, camera facing southeast. 12/12/06.

Photograph 34. Main Ashe Lateral at SP Avenue showing the canal passing under the UPRR at point MA4, camera facing north. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 35. Main Ashe Lateral at SP Avenue showing concrete culvert passing under SP Avenue at point MA4, camera facing southeast. 12/12/06.

Photograph 36. East Ashe Lateral near Trinidade Road showing concrete and metal control gates at point EA6, camera facing southeast. 12/12/06

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 37. Meadowbrook Lateral siphon pipes at point MB1, camera facing east. 12/12/06.

Photograph 38. Black Rascal Creek at point BR1, camera facing east. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 39. Henderson Lateral at point HN1, camera facing north. 12/12/06.

Photograph 40. Henderson Lateral at point HN1, camera facing southeast. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 41. Pump, lower left, timber supports for access road, lower right, fenced basin in background, camera facing northeast, near Henderson Lateral, point HN1. 12/12/06.

Photograph 42. Pump and vertical pipe near Henderson Lateral point HN1, camera facing northeast. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 43. Control Box at point HN2, camera facing northwest. 12/12/06.

Photograph 44. Pump at point HN2, camera facing northeast. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 45. Buhach Lateral at point BH1, camera facing north. 12/12/06.

Photograph 46. Culvert under Elliot Avenue at point BH1, Buhach Lateral, camera facing northeast. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 47. Drainage Ditch at point DR1, camera facing west. 12/12/06

Photograph 48. Former site of an open drainage ditch that has been piped and covered (west of point DR1), camera facing north. 12/12/06.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 49. Livingston Canal headgate (point LC1), Canal Creek in foreground camera facing west. 1/22/07.

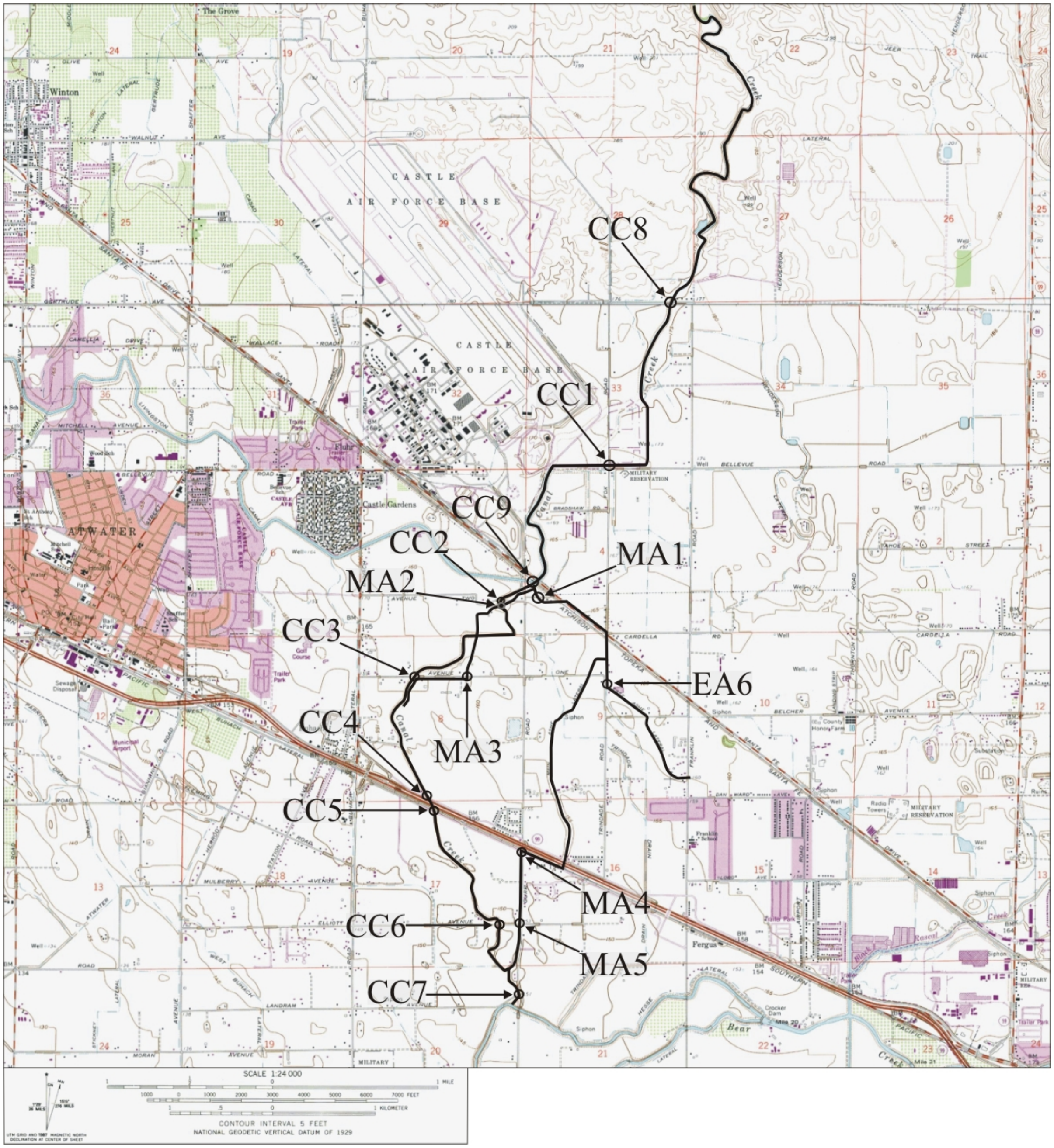
Photograph 50. Lateral gates off of Livingston Canal (point LC1), camera facing northwest. 1/22/07.

***Recorded by** M. Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Photograph 51. Canal Creek passing at point CC9 passing under the SFBN railroad, camera facing northeast. 1/22/07.

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)
Map Name: Winton, California, 7.5' USGS Quadrangle ***Date of Map:** 1961 (1987)



Location Map 1. Map showing portion of Canal Creek, Main Ashe Lateral, and East Ashe Lateral.

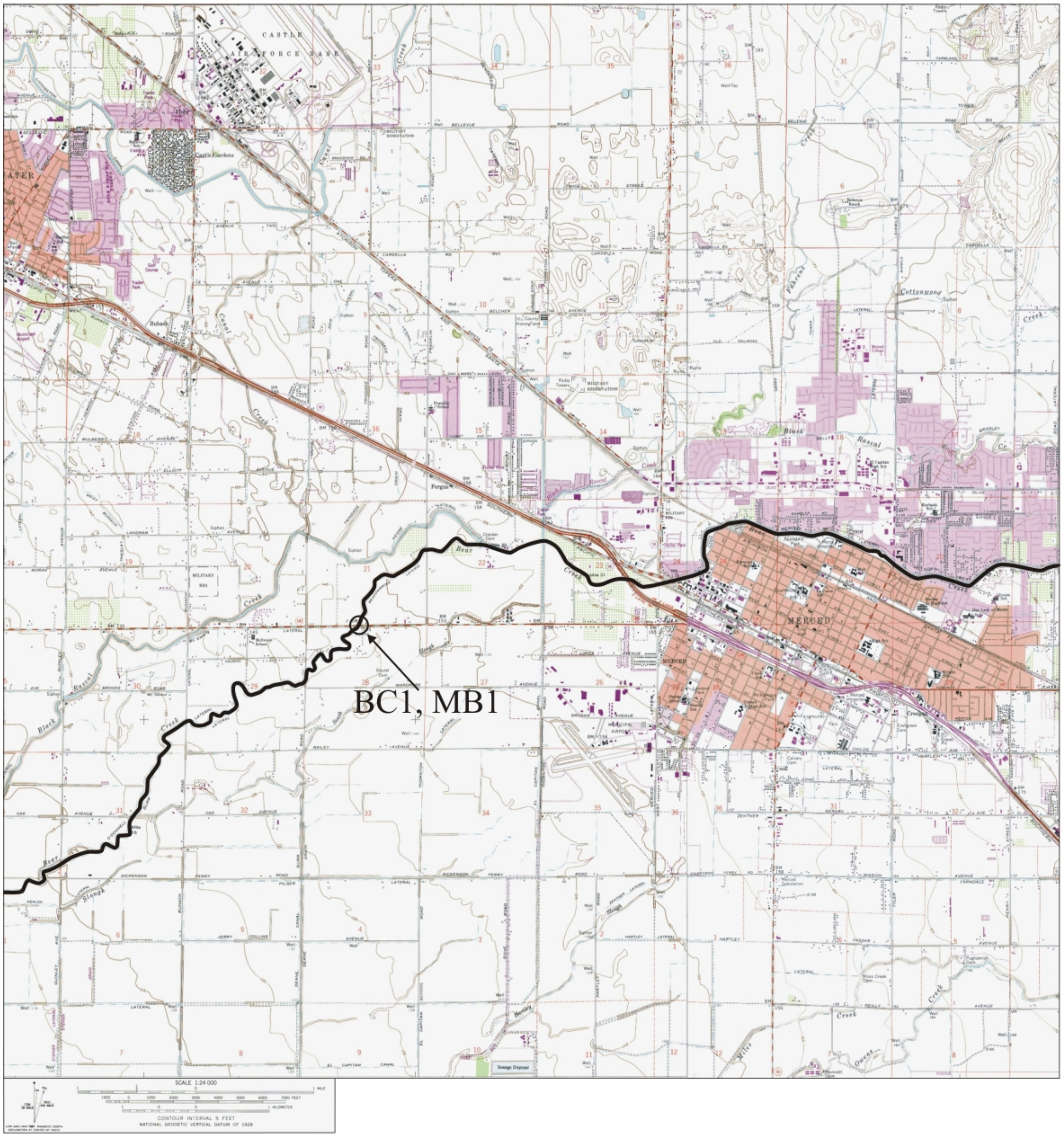
Primary # ______________________
HRI # ______________________

 ***Resource Name or #** MR1

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)

Map Name: Merced, California, 7.5' USGS Quadrangle ***Date of Map:** 1961 (1987)



Location Map 2. Map showing portion of Bear Creek and Meadowbrook Lateral

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

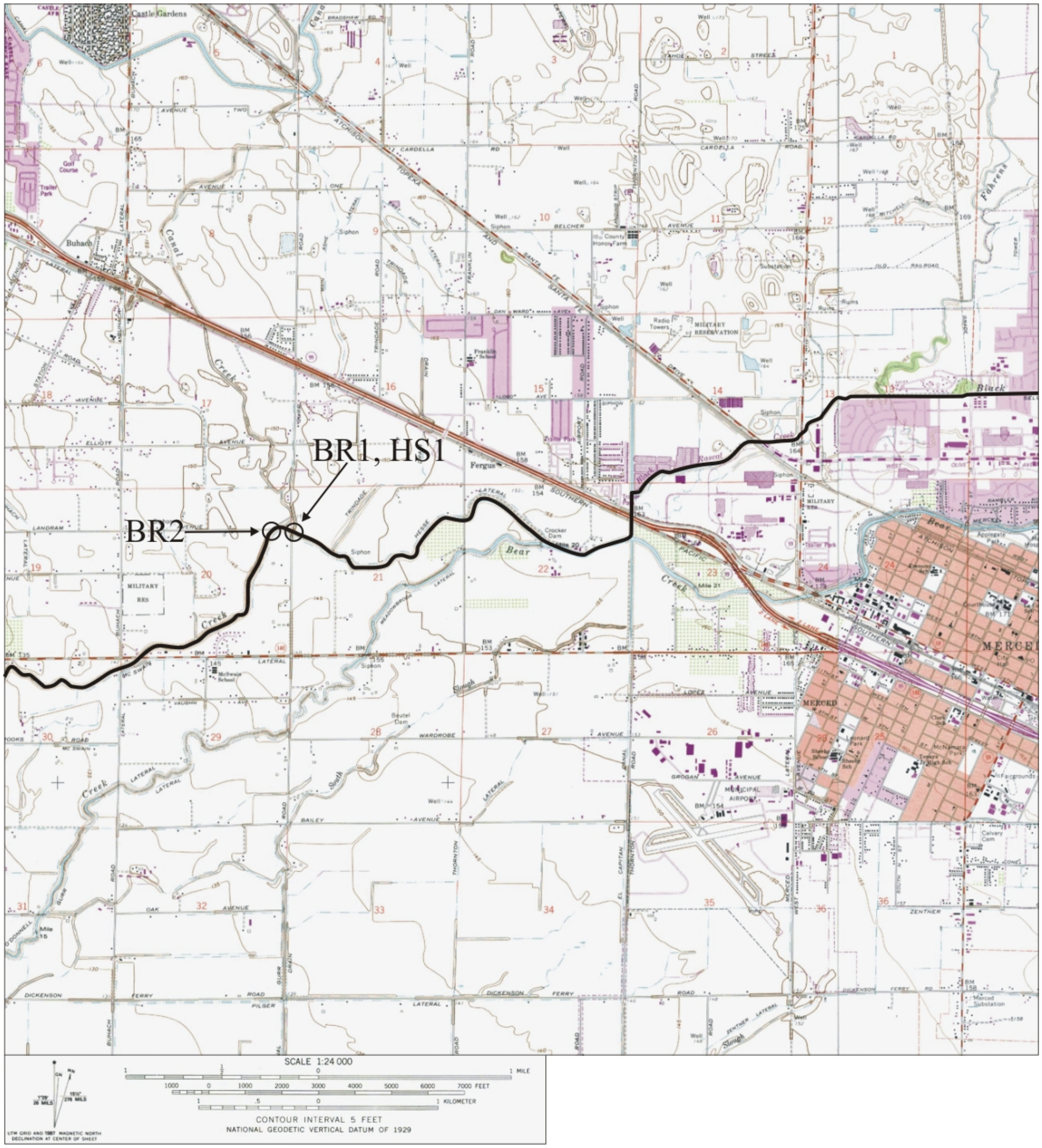
Primary # ______________________
HRI # ______________________

 ***Resource Name or #** MR1

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)

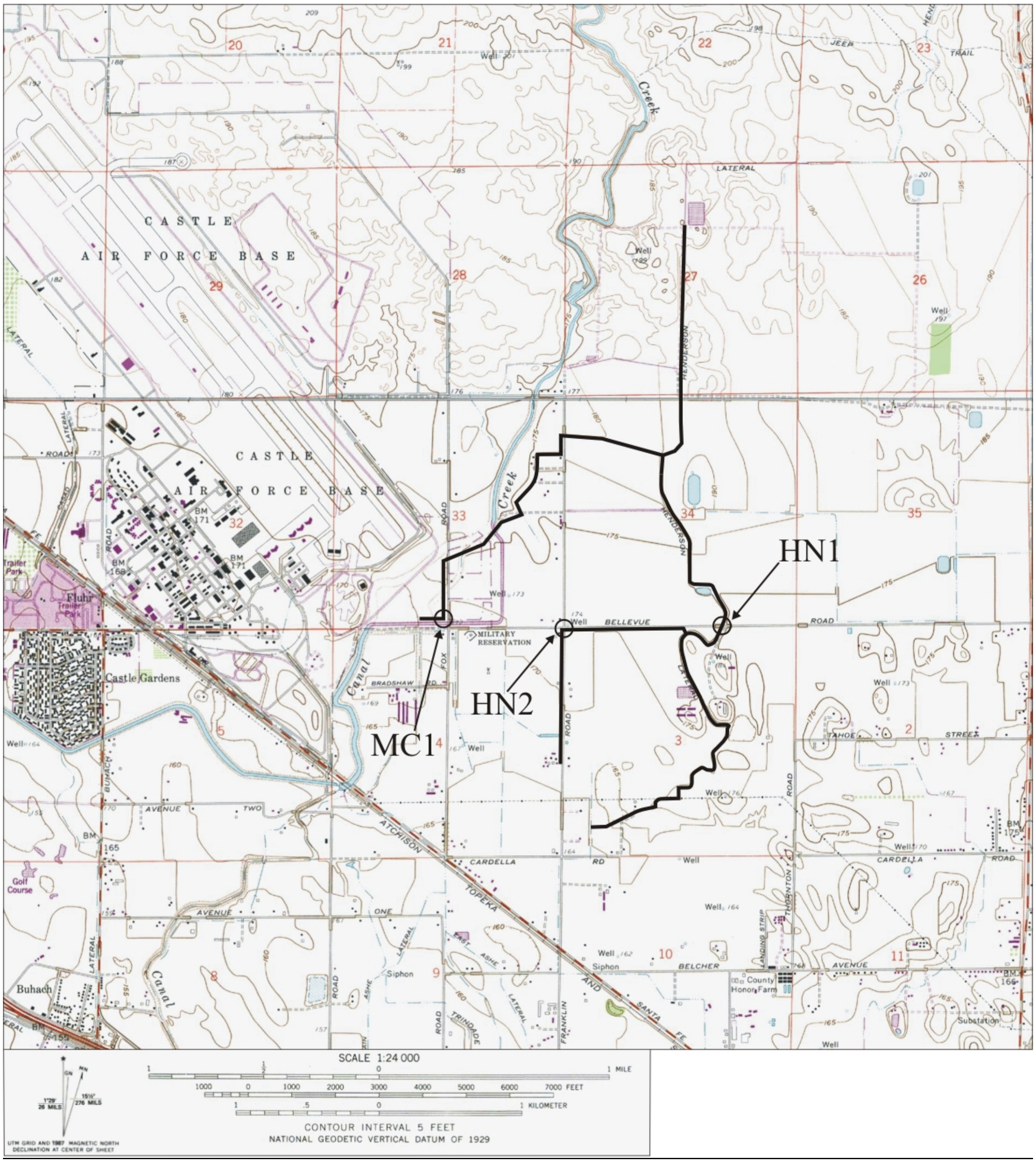
Map Name: Merced, California, 7.5' USGS Quadrangle ***Date of Map:** 1961 (1987)



Location Map 3. Map Showing portion of Black Rascal Creek and Hess Lateral.

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)
Map Name: Winton, California, 7.5' USGS Quadrangle ***Date of Map:** 1961 (1987)

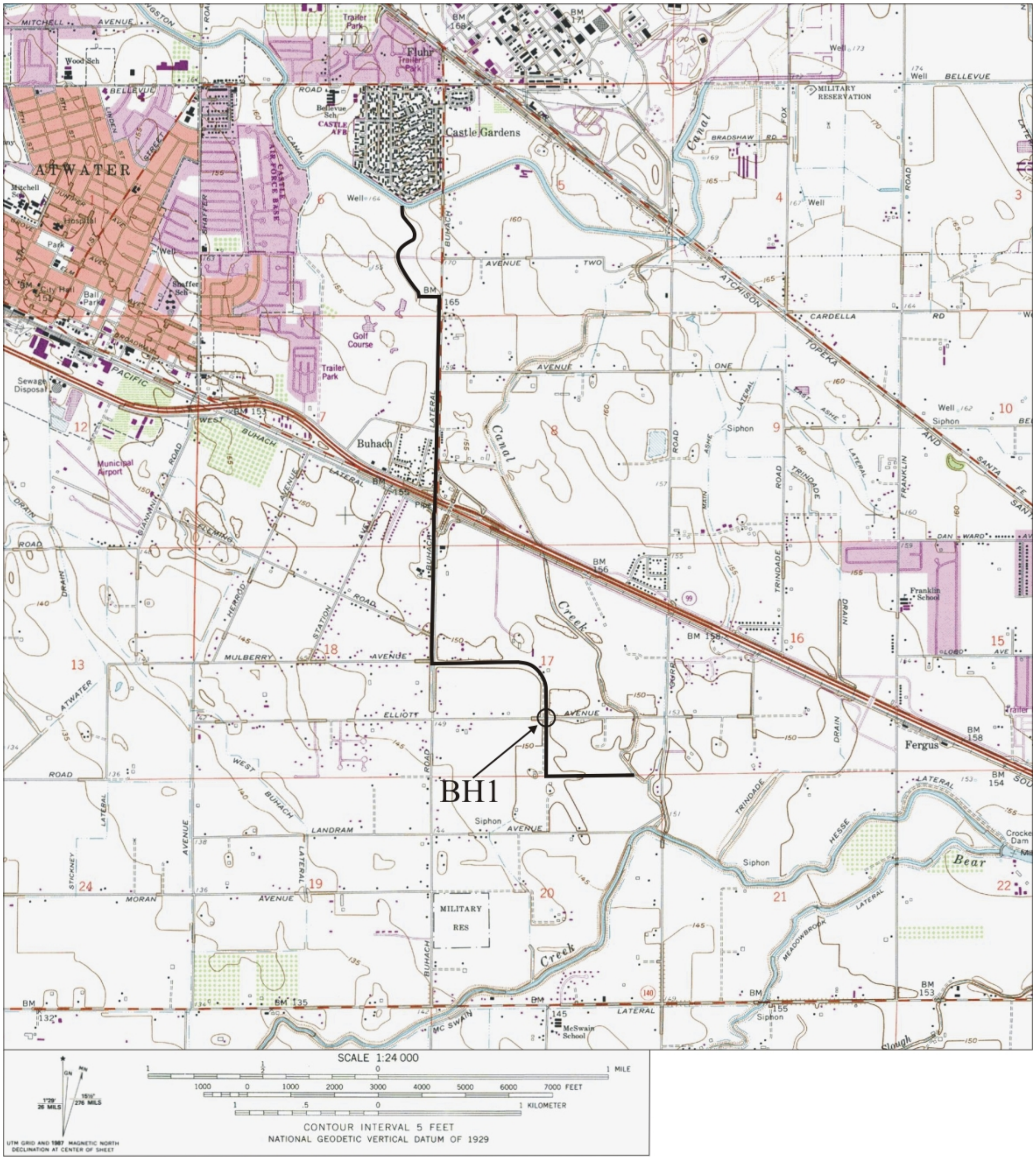


Location Map 4. Map showing portion of Henderson Lateral and Mason-Curtis Lateral.

***Resource Name or #** MR1

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)



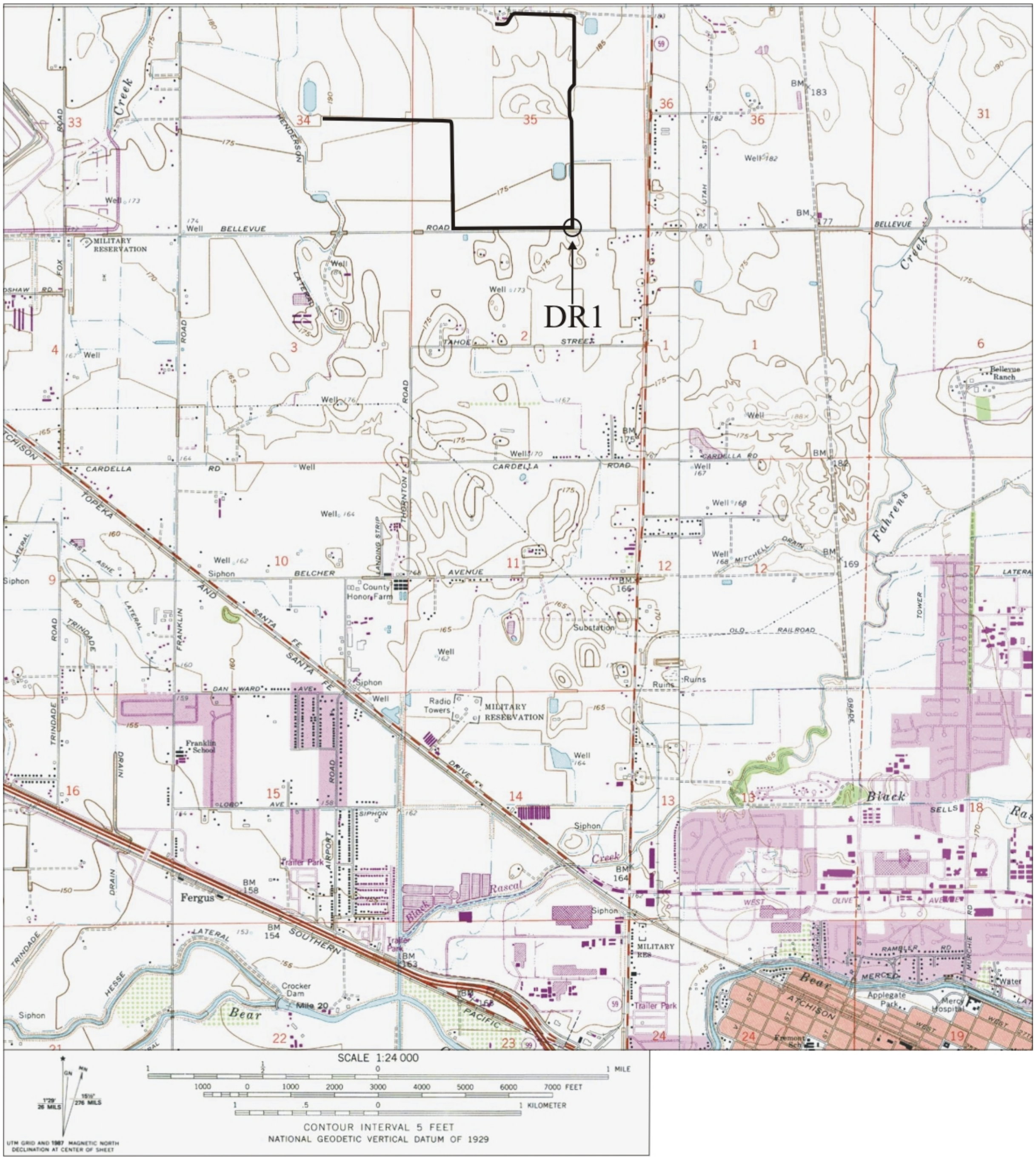
Location Map 5. Map showing location of Buhach Lateral.

***Resource Name or #** MR1

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update

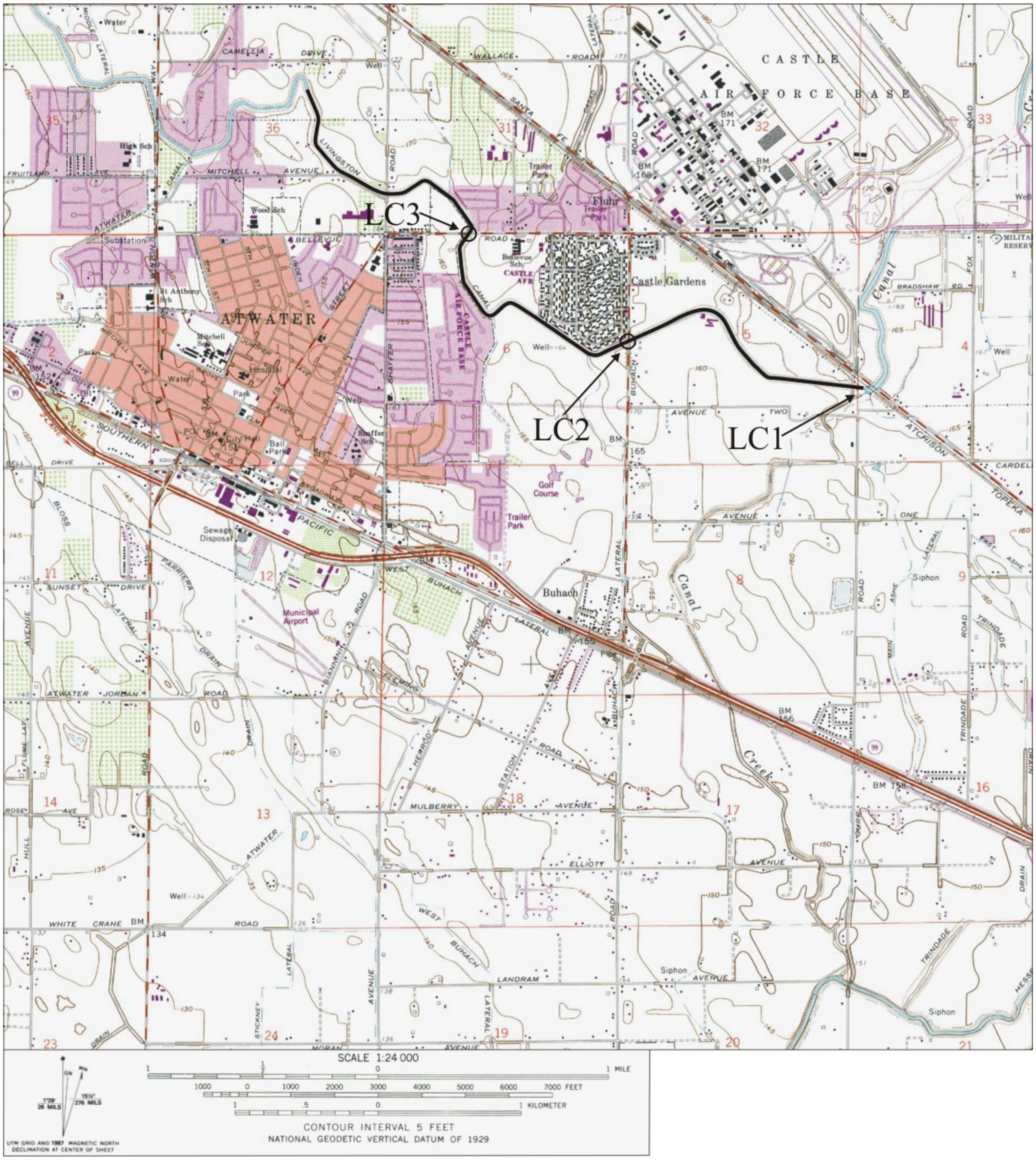
Map Name: Atwater, California, 7.5' USGS Quadrangle ***Date of Map:** 1960 (1987)

Map Name: Merced, California, 7.5' USGS Quadrangle ***Date of Map:** 1961 (1987)



Location Map 6. Map showing location of the drainage ditch.

*Recorded by: M.Bunse/S.J. Melvin *Date 12/12/06; 1/22/07 ☒ Continuation ☐ Update



Location Map 7. Map showing portion of the Livingston Canal.

Appendix E

DEPARTMENT OF PARKS AND RECREATION 523 FORMS

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** LG-01

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Planada **Date:** 1961 **T** 7S; **R** 15E; NE¼ **of** SE¼ **of Sec** 23; MD **B.M.**
c. Address: 10518 CA-140 City: Le Grand Zip: 95333
d. UTM: Zone: Northwest terminus of recorded segment: 10N, 738890 mE, 4133243 mN; Intersection with Highway 140: 10N, 739943 mE, 4132540 mN.
e. Other Locational Data:
From Planada travel northeast on Highway 140 for approximately 1.8 miles. The road will be on the left (west side of the Le Grand Canal)

***P3a. Description:** LG-01 consists of a recorded segment of a graded dirt road constructed ca. 1922-1927. The road follows the course of the southwest bank of the Le Grand Canal between Hayden Road and California Highway 140. The recorded segment is approximately 15 feet wide and 4,970 feet long. LG-01 is visible on historic aerials form 1945 and appears essentially the same as it does today. The USGS map from 1948 identifies the road as an unimproved road (USGS 1948). The road is located adjacent to a pumping station associated with the Le Grand Canal and was likely constructed for the operation and maintenance of the pumping station.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of LG-01 from Highway 140 intersection, facing north. Turkey farm observed on left.
September 20, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1922-1927 (historical research)

***P7. Owner and Address:**
Merced Irrigation District
744 W. 20th Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 20, 2021

***P10. Survey Type:** Intensive

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1922-1927; maintenance and possible regrading (Date unknown, based on field observations)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: Unknown b. Builder: Unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Rural road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

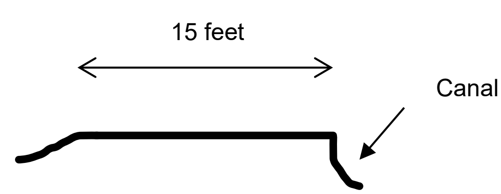
Please see attached

L1. Historic and/or Common Name: N/A
L2 a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**
b. Location of point segment:
End of recorded segment to northwest: 10N 738890 mE, 4133243 mN
Intersection with Highway 140: 10N 739943 mE, 4132540 mN.

L3. Description:
The resource consists of an unnamed graded dirt road on the west side of the Le Grand Canal.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)
- **a. Top Width** 15 feet
- **b. Bottom Width** 15 feet
- **c. Height or Depth** 2 feet high
- **d. Length of Segment** 4,970 feet (SE-NW)

L4e. Sketch of Cross-Section (Include scale) **Facing:** N



L5. Associated Resources:
N/A

L6. Setting: The road is located on the west side of the Le Grand Canal. Almond orchards and turkey farms are currently on the south and west sides of the road. The road is intermittently on a small berm above separate orchard access roads and the canal itself. Slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The road is in good condition with minor impacts from use as an orchard and canal access road.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: Middle of the recorded segment, facing northwest.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. It is comprised of a recorded segment of graded dirt road constructed adjacent to the Le Grand Canal providing access to an associated pumping station. Research has yielded no information to suggest that the road is specifically associated with important historical events nor does the road exemplify any historical themes to a sufficient degree that it may be considered historically important. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. The road is a common example of a dirt road that is indistinguishable from dirt roads constructed before and after the time of construction. The road represents no innovation is road design or construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-01 is not a historic property fort he purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1948 Planada, California. 1:24,000 scale.

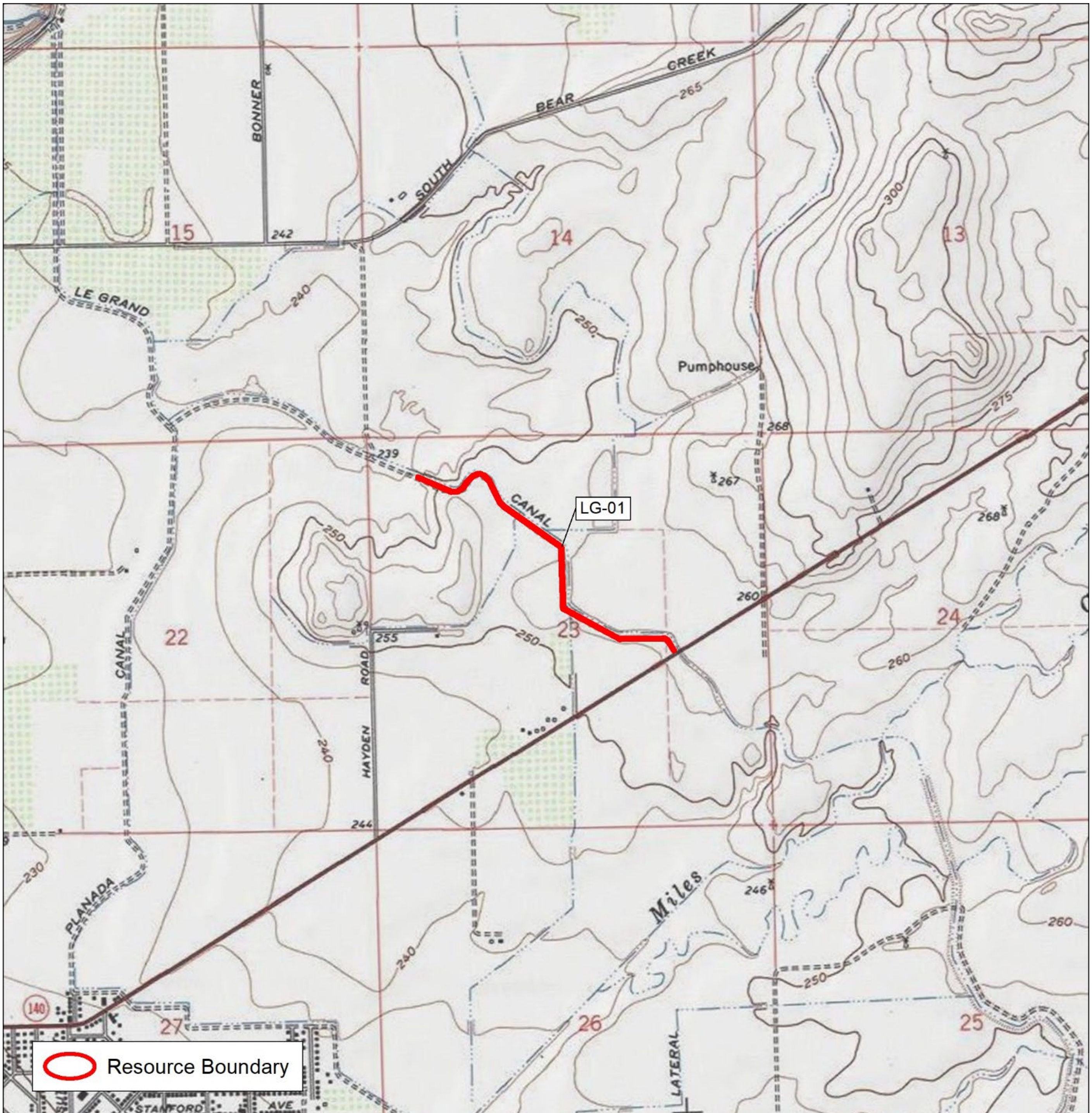
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-01

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-01
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-01

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-01
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** California Highway 140 (LG-02)

P1. Other Identifier: California Highway 140

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada **Date:** 1961 **T** 7S; **R** 15E; NE of SE of Sec 23; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: 10N; 739953 mE, 4132538 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From Planada travel northeast on Highway 140 for approximately 1.8 miles where it will cross the Le Grand Canal. The recorded section of highway intersects with this canal.

***P3a. Description:** LG-02 consists of a two-lane asphalt paved portion of California Highway 140 initially constructed in ca. 1922. The recorded segment is approximately 35-feet wide and has a northeast-southwest alignment. The highway crosses over the Le Grand Canal via a culvert. While the alignment appears to be unaltered from its historic path, the materials comprising the road are non-historic due to continued maintenance over time.

California Highway 140, also known as the All-Year Highway, was constructed to provide access to Yosemite Valley year-round (NPS 2021). A highway map of the State of California in 1922 depicts the route as paved from Merced to the Mariposa County line, after which it is depicted as graded but not paved to Yosemite (California Highway Commission 1922). By 1934 the entire expanse from Merced to Yosemite was completely paved (California Department of Public Works, Division of Highways 1934). California Highway 140 is visible on the 1946 aerial and appears as a two-lane concrete roadway. By 1958, it appears that the road was widened and paved with asphalt (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials

***P3b. Resource Attributes:** AH7 Road

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

Highway 140 at the intersection with Le Grand Canal. Facing southwest. September 20, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1922 (historical research)

***P7. Owner and Address:**
California Department of Transportation, District 10
1976 E Dr Martin Luther King Jr Blvd.
Stockton, CA 95205

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 20, 2021

***P10. Survey Type:** Intensive

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List)

BUILDING, STRUCTURE, AND OBJECT RECORD

 *Resource Name or # **(Assigned by recorder)** California Highway 140 (LG-02)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: California Highway 140, All-Year Highway
B2. Common Name: California Highway 140
B3. Original Use: highway **B4. Present Use:** highway
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1922; widened and re-paved ca. 1958 (NETR 2021); regular maintenance and repaving (dates unknow, based on field observations)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** Roadways and Highways as Reflections of Culture **Area:** Merced County, CA
Period of Significance: ca. 1922 **Property Type:** Highway **Applicable Criteria:** A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

(Sketch Map with north arrow required.)

Please see attached

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

*Resource Name or # **(Assigned by recorder)** California Highway 140 (LG-02)

L1. Historic and/or Common Name: State Route 140

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

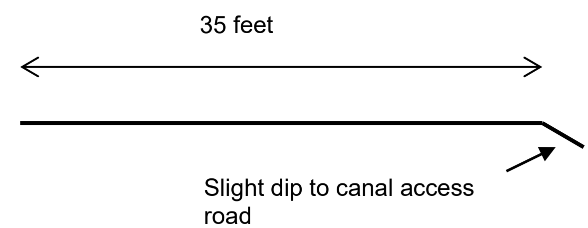
b. Location of point segment: California Highway 140 intersection with Le Grand Canal: 10N 739953 mE, 4132538 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)

The resource consists of the recorded portion of California Highway 140. The resource is a two-lane asphalt highway. The highway extends beyond the recorded portion to the northeast and southwest for an undetermined distance.

L4. Dimensions:
- **a. Top Width** 35 feet
- **b. Bottom Width** 35 feet
- **c. Height or Depth** 2 feet high
- **d. Length of Segment** 275 feet SW/NE

L4e. Sketch of Cross-Section (Include scale) **Facing:** NE

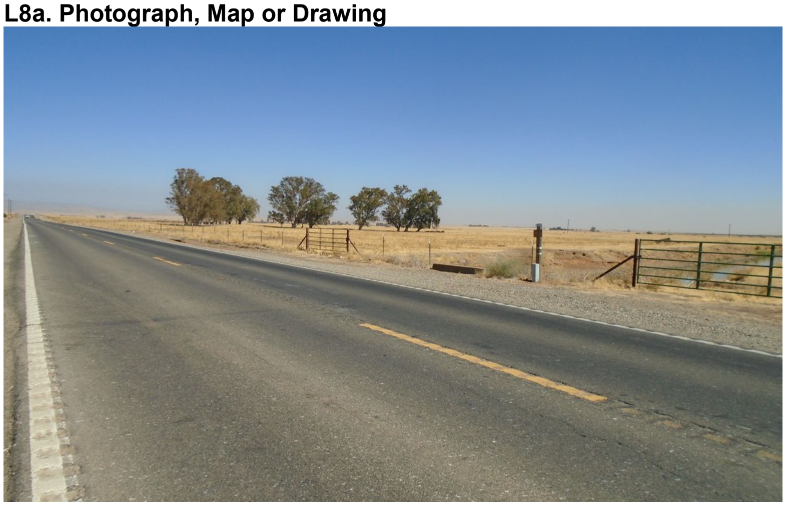


L5. Associated Resources:
N/A

L6. Setting:
The recorded segment of highway is situated adjacent to an almond orchard to the northeast and a turkey farm to the northwest. Other vegetation consists of grasses, cottonwood, and water reeds in the canal. Slope is under 1% with an open aspect. Soils surrounding the highway consist of tan sandy loam with 0-2% shale pebble inclusions. Deposition is alluvial. Either side of the highway has a thin layer of gravel.

L7. Integrity Considerations: The site is in good condition with minor impacts from automobile use. The highway has undergone regular maintenance over time. While the alignment is the same, much of the historical material has been replaced. A distribution line runs on the northern side.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: Overview of the recorded segment of road, facing northwest.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>
NRHP Criterion A/ CRHR Criterion 1: This resource does meet NRHP Criterion A or CRHR Criterion 1 at the national level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. California Highway 140 was constructed to provide better all-year access to Yosemite National Park. It is indicative of the growing interest in automobile leisure during the early- and mid-twentieth century and the increasing important of the National Parks. The period of significance for this resource dates to its period of construction, ca. 1922. Therefore, this resource is eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that any persons of historical significance are specifically associated with this resource. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that California Highway 140 represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other highways constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Integrity: The NRHP and CRHR recognizes a property's historic integrity through seven aspects or qualities. These include location, design, setting, materials, workmanship, feeling, and association. California Highway 140 retains integrity of location, setting, and association. The alignment has not significantly changed and, while there have been changes in the setting due to new construction, it is still relatively rural. Further, the highway is still specifically associated with access to Yosemite National Park. California Highway 140 does not, however, retain integrity of design, materials and workmanship due to the widening of the road between 1946 and 1958 and regular maintenance and repairs conducted on the road over its history. California Highway 140 also does not retain integrity of feeling and association. It is essentially indistinguishable from other highways throughout the state and the country. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance.

Because California Highway 140 does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

California Highway Commission
1922 "Road Map of the State of California, 1922." The David Rumsey Map Collection accessed at: www.davidrumsey.com on December 1, 2021.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

National Park Service (NPS)
2021 "Yosemite Roads and Bridges." Accessed at https://www.nps.gov/parkhistory/online_books/hih/yosemite/yosemite3.htm on December 1, 2021.

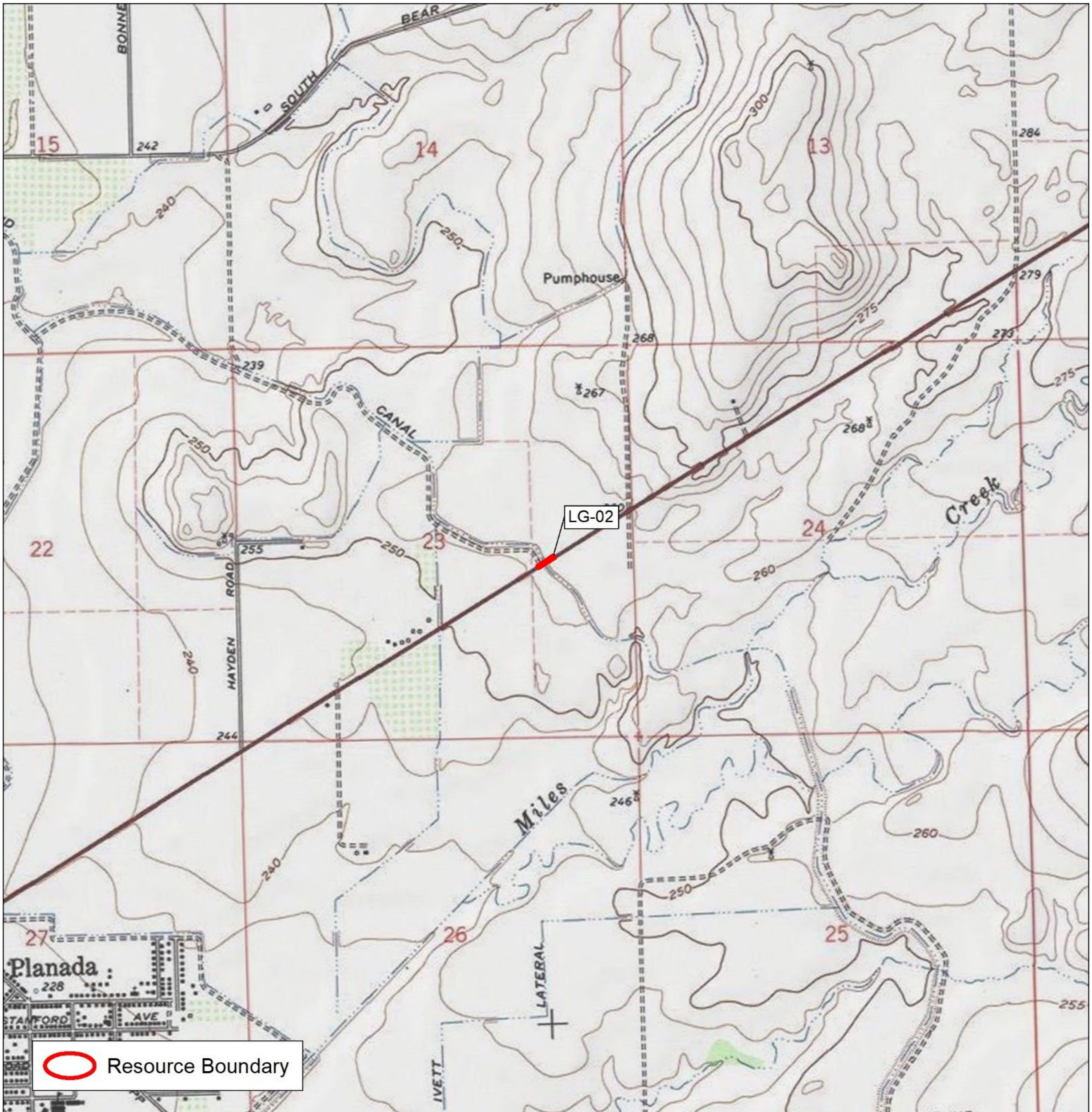
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

Overview of canal underneath LG-02. The canal is associated with site P-24-000608 (the Le Grand Canal). View southeast

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

Page **9** **of** **10**
*Resource Name or # **(Assigned by recorder)** California Highway 140 (LG-02)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-02
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **10 of 10** *Resource Name or # **(Assigned by recorder)** California Highway 140 (LG-02)
*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-02
Merced County, California

P1. Other Identifier: East Childs Avenue

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada **Date** 1961 **T** 7S; **R** 15E; SE **of** SE **of Sec** 36; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: 10N, 741330 mE, 4130233 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada take East Childs Avenue east approximately 2.2 miles and park on the side of the road. The site will intersect the Le Grand Canal.

***P3a. Description:** LG-03 consists of two interrelated features: a bridge spanning the Le Grand Canal (Feature 1) and a recorded segment of East Childs Avenue (Feature 2). The road alignment was constructed prior to 1918 and previously identified as "Merced Road" (USGS 1918b), however; the bridge was likely initially constructed concurrent to the Le Grand Canal ca. 1922-1927. The bridge is a single-span concrete bridge with non-historic metal railings that facilitates East Childs Avenue crossing the Le Grand Canal. The bridge is approximately 40 feet by 30 feet. A tag reading "09383 1 X 1 14" was observed on the bridge. East Childs Avenue is a two-lane asphalt road with an east-west orientation. The recorded segment is approximately 20 feet wide and 220 feet long. The road and bridge appear essentially the same in the historic aerials from 1945 as they do today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** (List attributes and codes) AH7 (road), HP19 (bridge)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Bridge overview, facing southwest.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918-1927 (Historic Aerials, USGS)

***P7. Owner and Address:**
California Department of Transportation, District 10
1976 E Dr Martin Luther King Jr Blvd,
Stockton, CA 95205

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** East Childs Avenue (LG-03)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. **Historic Name:** Merced Road
B2. **Common Name**: East Childs Avenue
B3. **Original Use:** road **B4.** **Present Use:** road
***B5.** **Architectural Style:** utilitarian
***B6.** **Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918; bridge constructed ca. 1922-1927 (historical research), repaving and regular maintenance 9dates unknown, based on field observations)
***B7.** **Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8.** **Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance:** **Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. **Additional Resource Attributes:** **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

*Resource Name or # **(Assigned by recorder)** East Childs Avenue (LG-03) [Feature 1]

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☒ **Entire Resource** ☐ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Middle of bridge – 10N 741329 ME, 4130233 mN

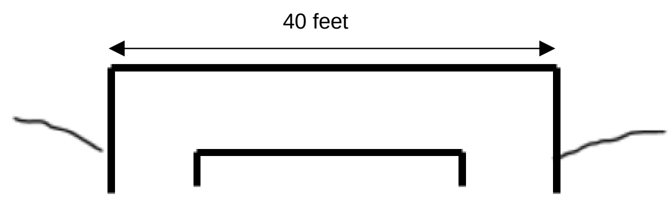
L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)

Feature 1 is a concrete bridge allowing Childs Avenue to span the Le Grand Canal. The bridge is of concrete construction. A tag reading “09383 1 X 1 14” was observed on the bridge.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- **a. Top Width** 40 feet
- **b. Bottom Width** 40 feet
- **c. Height or Depth** 8 feet high
- **d. Length of Segment** 30 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** N

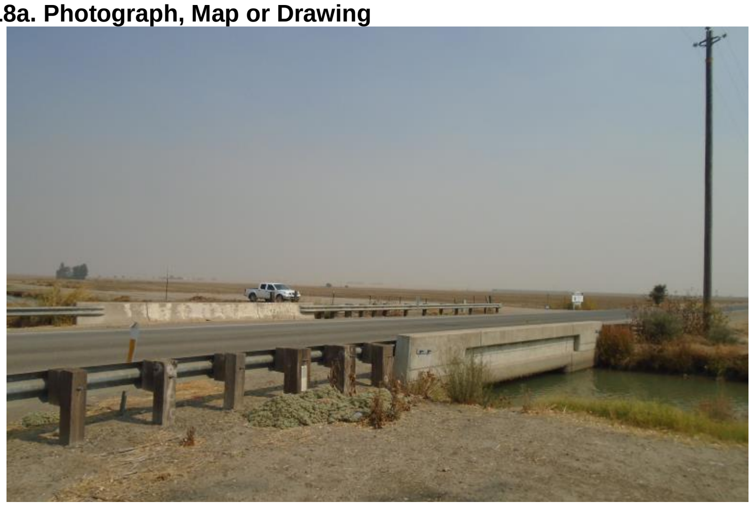


L5. Associated Resources: LG-03, Feature 2: East Child’s Avenue
P-24-000608 – The Le Grand Canal

L6. Setting: Vegetation consists of almond trees, non-native grasses, swamp brush. Slope is under 1% with an open aspect. Soils consist of tan sandy loam with 0-5% semi-rounded shale inclusions ranging in size from pebbles to cobbles. Deposition is alluvial.

L7. Integrity Considerations: The feature is in good condition with minor impacts from erosion, automobile use, and adjacent canal wear.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Resource overview, facing northeast.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

State of California—The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

 *Resource Name or # **(Assigned by recorder)** East Childs Avenue (LG-03) [Feature 2]

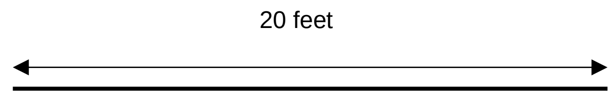
L1. Historic and/or Common Name: East Childs Avenue
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**
b. Location of point segment: Center of recorded segment: 10N 741330 mE, 4130233 mN

L3. Description: East Childs Avenue (Feature 2) consists of a two-lane asphalt highway. The recorded segment spans the Le Grand Canal. East Childs Avenue extends both east and west beyond the recorded segment to an indeterminate distance. Feature 1 (bridge), which is associated with East Childs Avenue, spans the road over the Le Grand Canal.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 220 feet

L5. Associated Resources: P-24-000608: The Le Grand Canal
LG-03 Feature 1: bridge spanning the Le Grand Canal

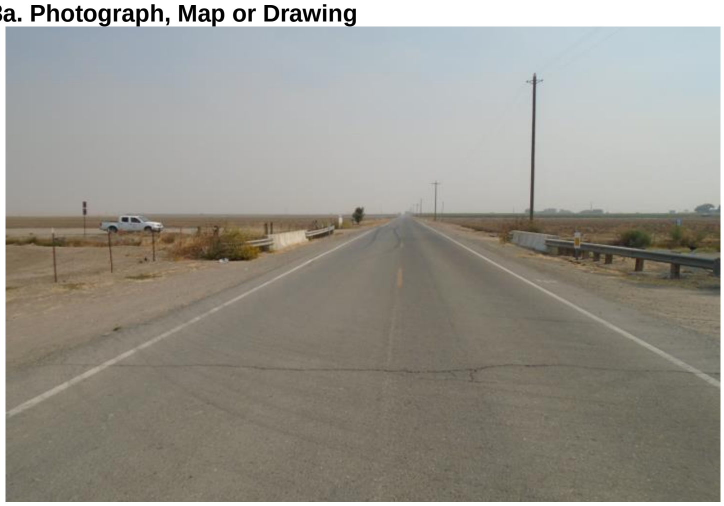
L4e. Sketch of Cross-Section (Include scale) **Facing:** East



L6. Setting: Vegetation consists of almond trees, non-native grasses, swamp brush. Slope is under 1% with an open aspect. Soils consist of tan sandy loam with 0-5% semi-rounded shale inclusions ranging in size from pebbles to cobbles. Deposition is alluvial.

L7. Integrity Considerations: Historical materials have been lost due to regular maintenance and wear over time, however; the alignment and configuration appear unchanged.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: Overview of East Childs Avenue, facing east.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>

bridge does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Planada and Merced. The period of significance for this resource dates to its period of construction, ca. 1918. Therefore, this resource is eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that any persons of historical significance are specifically associated with this resource. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other highways constructed before and after the period of construction Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Integrity: The NRHP and CRHR recognizes a property's historic integrity through seven aspects or qualities. These include location, design, setting, materials, workmanship, feeling, and association. East Childs Avenue retains integrity of location, setting, and association. The alignment has not significantly changed and, while there have been changes in the setting due to new construction, it is still primarily rural. East Childs Avenue is still a primary east-west route between rural properties and the communities of Planada and Merced. East Childs Avenue does not, however, retain integrity of design, materials and workmanship due to regular maintenance and repairs conducted on the road over its history. East Childs Avenue also does not retain integrity of feeling and association. It is essentially indistinguishable from other roads throughout the state and the country. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance.

Because East Childs Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918b Planada, California. 1:13,680 scale.

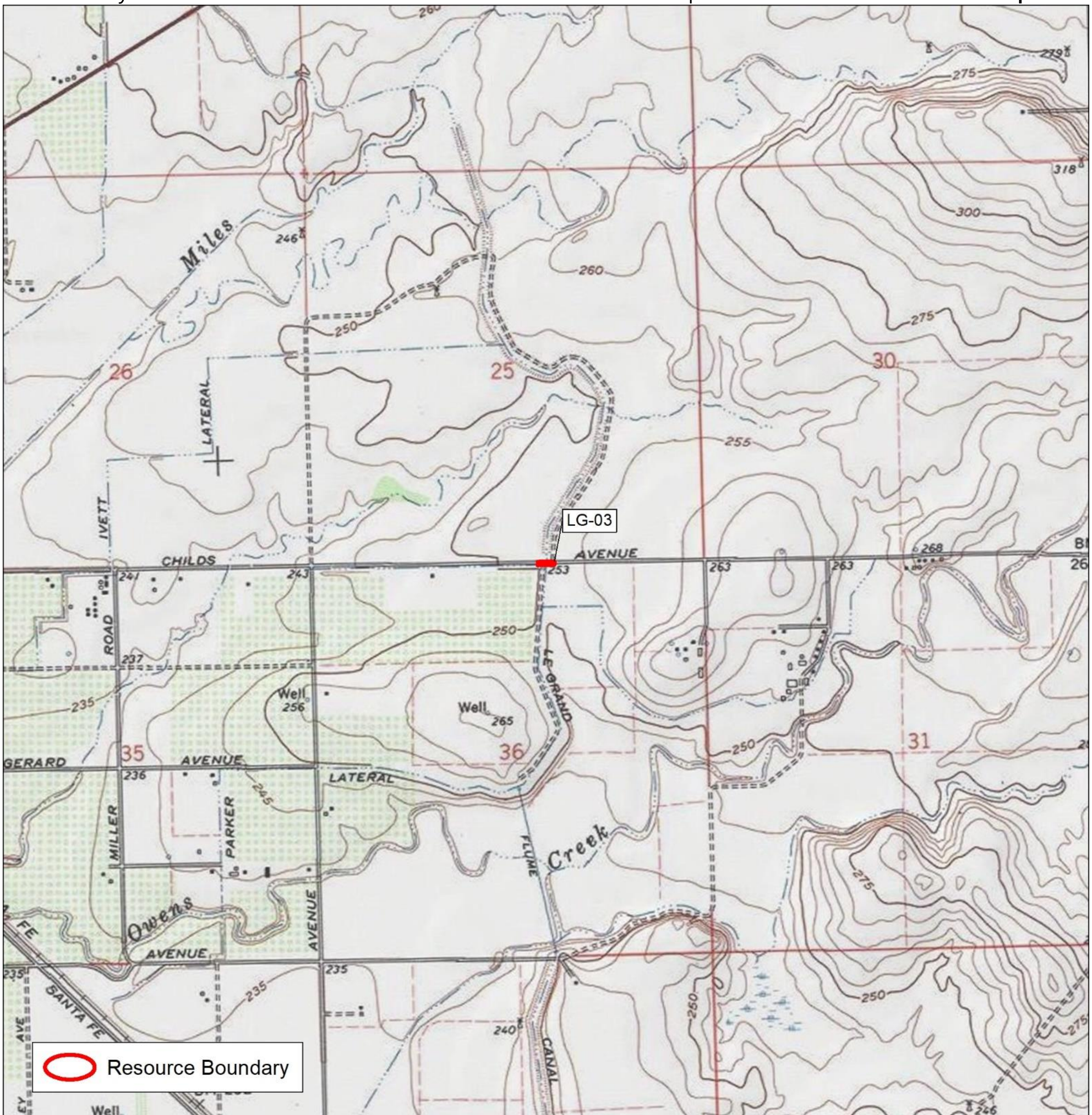
Overview of East Childs Road, facing west.

Metal tag located on Feature 1.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # HRI# Trinomial

Page **10** **of** **11** *Resource Name or # **(Assigned by recorder)** East Childs Avenue (LG-03)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-03
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** East Childs Avenue (LG-03)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** LG-04

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada **Date** 1961 **T** 7S; **R** 15E; **of Sec** 36; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip 95333

d. UTM: Zone: 10N, 741294 mE, 4129806 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada take East Childs Avenue east approximately 2.2 miles and turn right onto the west side of the Le Grand Canal. The recorded road segment extends approximately 3,050 feet along the canal.

***P3a. Description:** LG-04 is an approximately 15-foot-wide graded dirt road constructed ca. 1922-1927 running roughly north-south on the west side of the Le Grand Canal. LG-04 was depicted as an unnamed, unfinished road on a historic topographic map from 1948 (USGS 1948) and is visible in the 1946 historic aerials (NETR 2021). The road was likely constructed concurrent with the Le Grand Canal, ca. 1922-1927.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
Overview of road facing north, middle of recorded segment. September 22, 2021.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1922-1927 (historical research)

***P7. Owner and Address:**
Private

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1922-1927
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land that comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

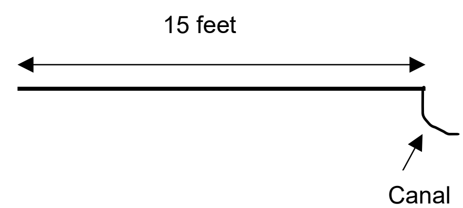
b. Location of point segment: North end: Zone 10N, 741320 mE, 4130218 mN
South end of recorded segment: Zone 10N, 741230 mE, 4129341 mN

L3. Description: The resource consists of a dirt road. The road runs roughly north-south on the west side of Le Grand Canal.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- a. **Top Width** 15 feet
- b. **Bottom Width** 25 feet
- c. **Height or Depth** N/A
- d. **Length of Segment** 3,070 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** N

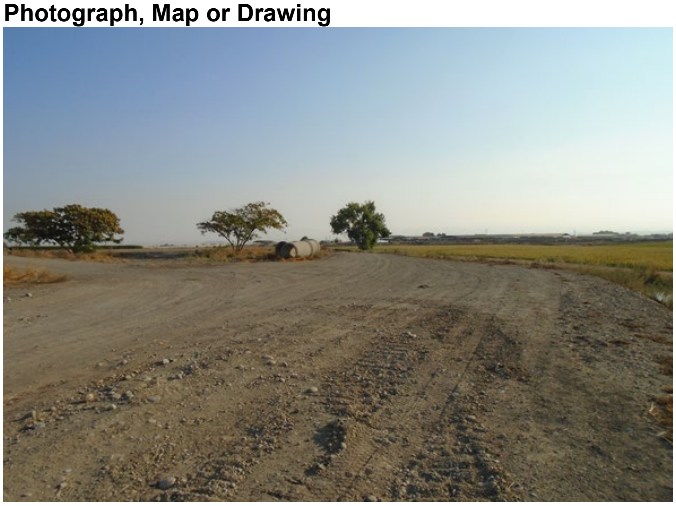


L5. Associated Resources: P-24-000608 – the Le Grand Canal

L6. Setting: Vegetation at the site consists of row crows (corn), non-native grasses, star thistle, Maltese star thistle, Persian silk tree, and cedar. Slope is under 2% with an open aspect. Soils consist of tan sandy loam with 0-5% semi-rounded shale inclusions ranging in size from pebbles to cobbles. Deposition is alluvial.

L7. Integrity Considerations: The resource is in good condition with minor impacts from nearby farm and cattle ranch use.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of road segment. View northeast. September 22, 2021

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history of irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. It is comprised of a recorded segment of graded dirt road constructed adjacent to the Le Grand Canal. Research has yielded no information to suggest that the road is specifically associated with important historical events nor does the road exemplify any historical themes to a sufficient degree that it may be considered historically important Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-04 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1948 Planada, California. 1:24,000 scale.

Primary #
HRI#

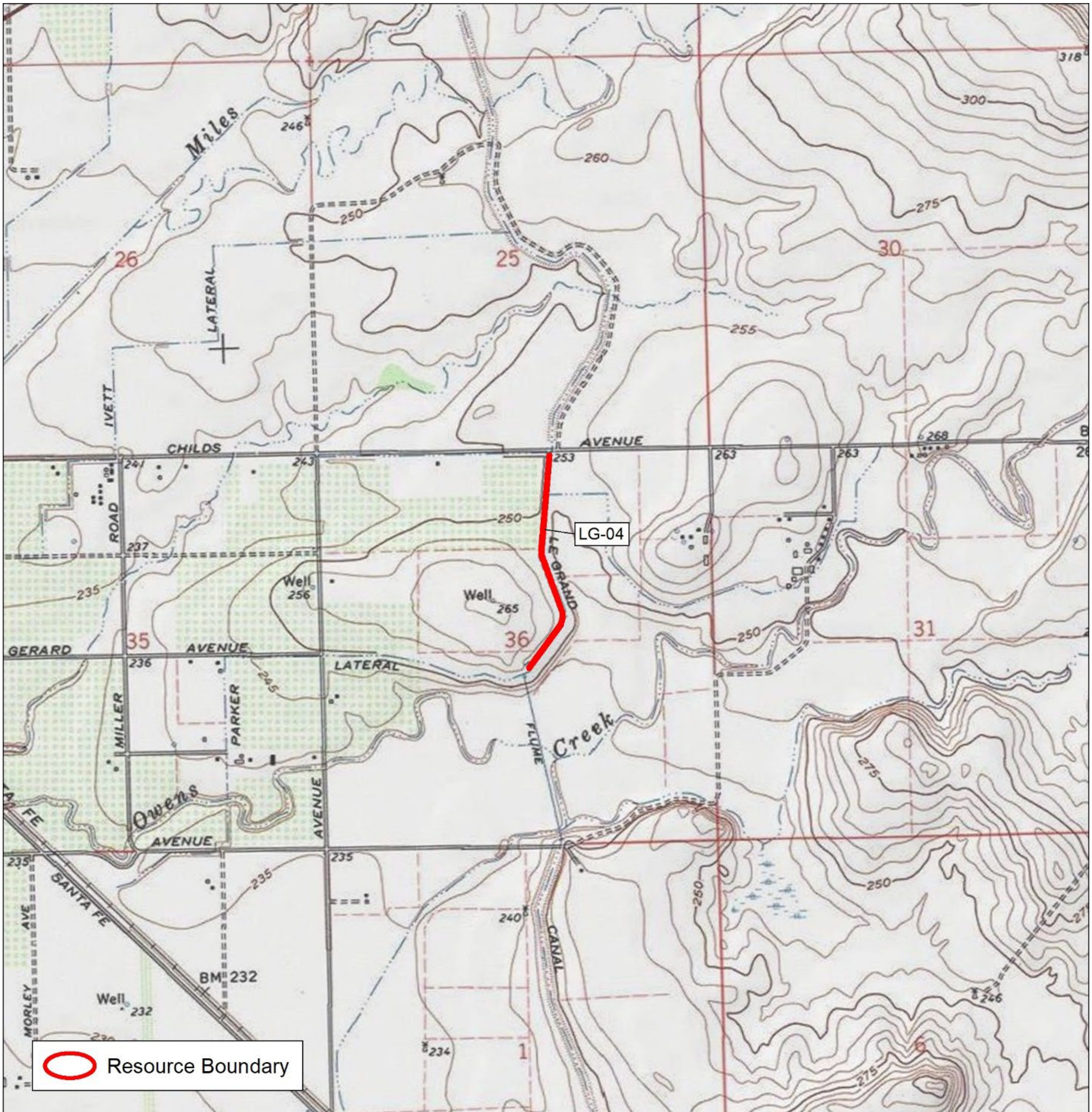
LOCATION MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** LG-04

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



Project Location

USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-04
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # (Assigned by recorder) LG-04

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Sketch Map
LG-04
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

*Resource Name or #: East Mission Avenue (LG-06)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada **Date** 1961 **T** 8S; **R** 15E; NE **of** NE **of Sec** 1; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: 10N, 741391 mE, 4128624 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel southeast on Santa Fe Ave. for approximately 1.44 miles and turn left onto E. Mission Ave. Cross the railroad tracks and travel east for approximately 0.25 miles and turn right to stay on E. Mission Ave. Travel east for approximately 1.1 miles and park on the side of the road. The recorded segment of the site will be at the intersection of E. Mission Ave. and the Le Grand Canal

***P3a. Description:** LG-06 consists of two features: Feature 1 is a bridge spanning the Le Grand Canal (P-24-000806) and Feature 2 is a segment of East Mission Avenue composed of dirt. The bridge is a single-span concrete bridge with metal guard rails constructed prior to 1946 (NETR 2021). It is approximately 25-feet wide and 45-feet long. The recorded segment of East Mission Avenue is composed of a graded dirt road approximately 20-feet wide that was constructed prior to 1918 (USGS 1918b). It has an east-west orientation and appears to have been constructed to provide access to local agricultural properties and homes.

***P3b. Resource Attributes:** AH7 (road) and HP19 (bridge)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
Overview of bridge (Feature 1) and recorded segment of East Mission Avenue (Feature 2), facing southwest. September 22, 2021.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918b)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: East Mission Avenue
B2. Common Name: East Mission Avenue
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918; bridge constructed ca. 1922-1927
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☒ **Entire Resource** ☐ **Segment** ☐ **Point Observation** **Designation:**

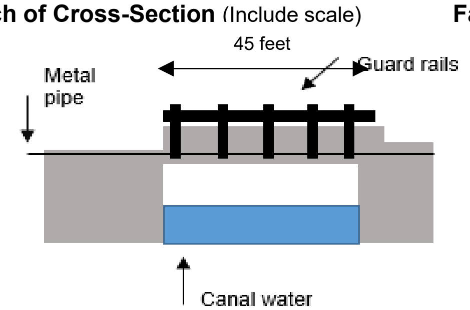
b. Location of point segment: (Provide UTM coordinates, decimal degrees, legal description, and any other useful location data. Show the area that has been field inspected on a Location Map.)
Middle of bridge: Zone: 10N, 741381 mE, 4128623 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
Feature 1 is a concrete bridge spanning the Le Grand Canal (P-24-000806). Metal guard railings extend the length on the bridge on the north and south sides.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 25 feet
- **c. Height or Depth:** 8 feet tall
- **d. Length of Segment:** 45 feet

L5. Associated Resources:
LG-06 Feature 2 (segment of East Mission Avenue) and P-24-000608 – the Le Grand Canal

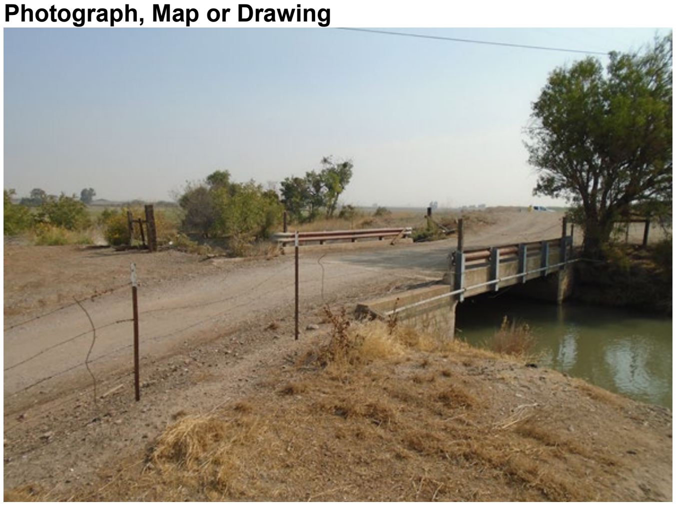
L4e. Sketch of Cross-Section (Include scale) **Facing:** N



L6. Setting: Vegetation at the site consists of almond trees, ash trees, non-native grasses, datura, and buffalo gourd. Slope is less than 2% with an open aspect. Soils consist of tan sandy loam. Deposition is alluvial. No natural inclusions were observed though road gravel was prevalent on the shoulders.

L7. Integrity Considerations: The resource is in good condition with minor impacts from automobile use, canal wear, and the distribution line right-of-way on the north side of the road.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Feature 1 spanning the Le Grand Canal. View west

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

L1. **Historic and/or Common Name:** East Mission Avenue

L2 a. **Portion Described:** ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

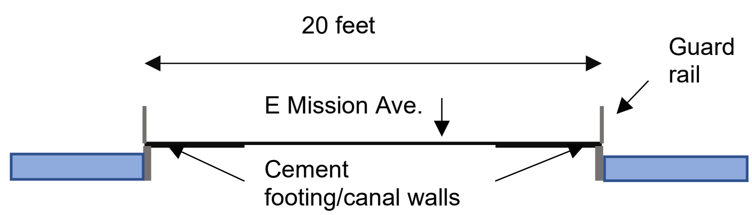
b. **Location of point segment:** Intersection with the Le Grand Canal (P-24-000806): Zone 10N, 741382 mE, 4128624 mN.

L3. **Description:** The feature consists of a dirt road, East Mission Avenue, that predominantly runs east-west. Only a segment of the road adjacent to the Le Grand Canal was recorded. The road extends east and west beyond the recorded segment to an indeterminate distance.

L4. **Dimensions:**
- **a.** **Top Width** 20 feet (N/S)
- **b.** **Bottom Width** 15 feet
- **c.** **Height or Depth** N/A
- **d.** **Length of Segment** 212 feet (E/W)

L5. **Associated Resources:**
LG-06 Feature 1 (canal bridge)

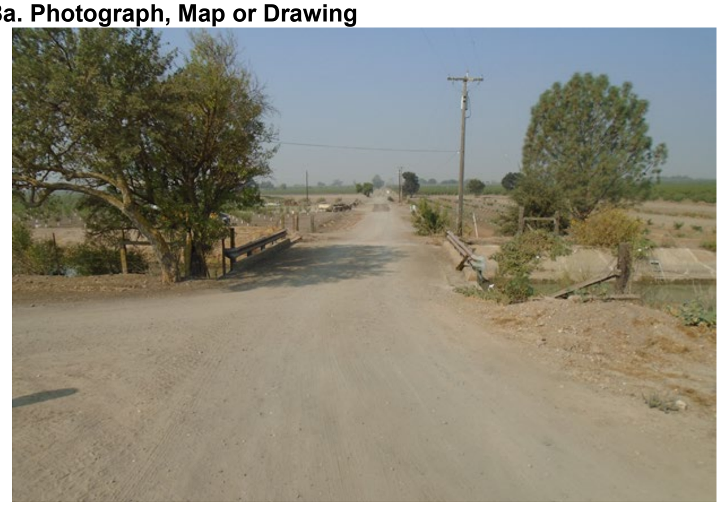
L4e. **Sketch of Cross-Section** E. Mission Ave. intersection with Le Grand Canal **Facing:** W



L6. **Setting:** Vegetation at the site consists of almond trees, ash trees, non-native grasses, datura, and buffalo gourd. Slope is less than 2% with an open aspect. Soils consist of tan sandy loam. Deposition is alluvial. No natural inclusions were observed though road gravel was prevalent on the shoulders.

L7. **Integrity Considerations:** The resource is in good condition with minor impacts from automobile use, canal wear, and the distribution line right-of-way on the north side of the road.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of E. Mission Ave. as it crosses the Le Grand Canal and heads west. Photo facing west. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. East Mission Avenue was constructed prior to 1919. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-07 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918b Planada, California. 1:13,680 scale.

Overview of LG-06, facing northeast.

Overview of the east side of the recorded road segment, facing east.

Primary #
HRI#

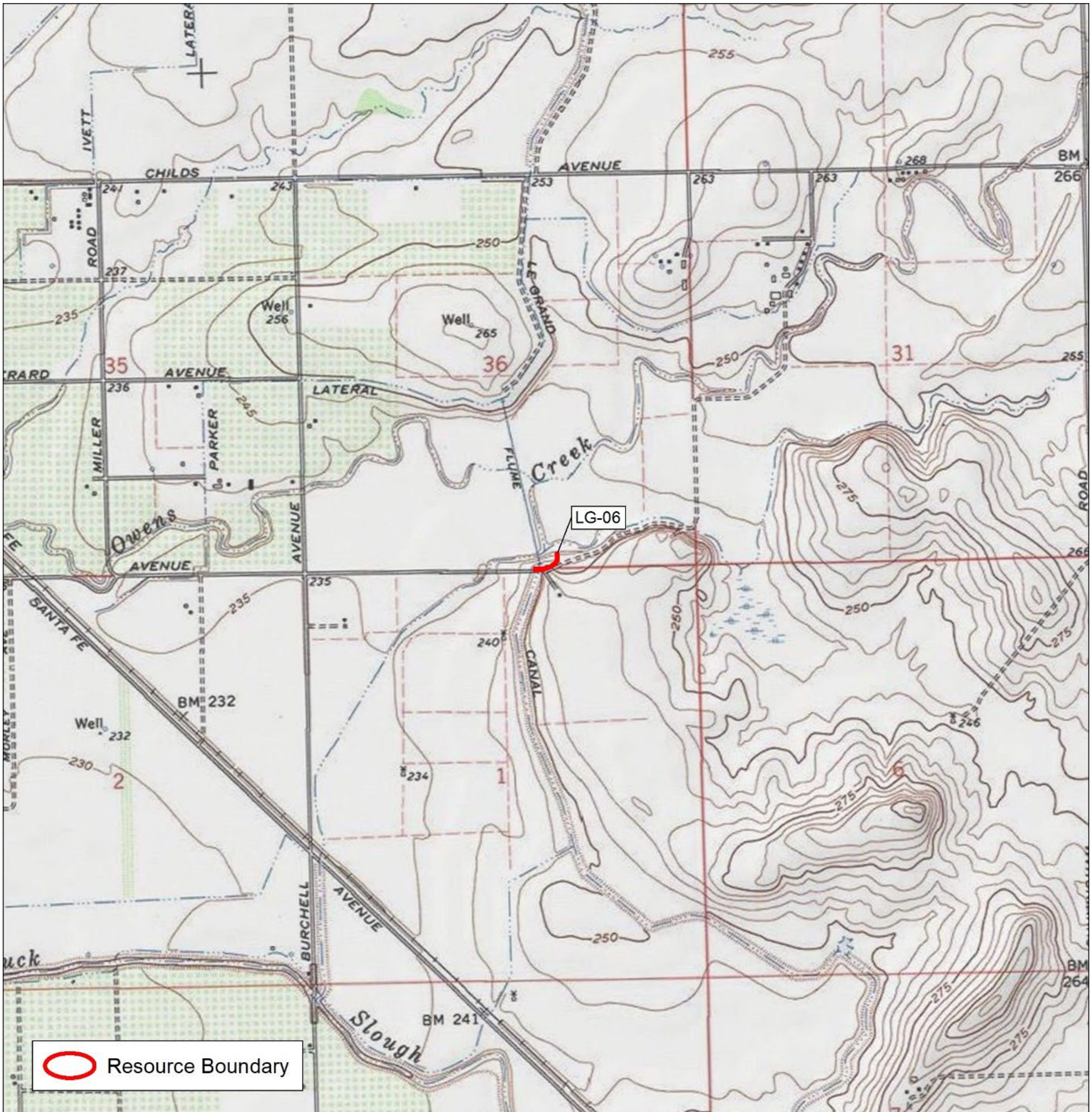
LOCATION MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** East Mission Avenue (LG-06)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36; T08S, R15E, SEC 1
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-06
Merced County, California

SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** East Mission Avenue (LG-06)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**

Sketch Map
LG-06
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 of 11 | *Resource Name or #: Dump Yard Road (LG-07)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Plainsburg Date 1960 T 8S; R 16E; SW of SW of Sec 7; M.D. B.M.
c. Address: N/A City: Le Grand Zip: 95333
d. UTM: Zone: 10N 742885 mE, 4125510 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From Planada travel southeast on Santa Fe Ave. for approximately 4.5 miles and turn left onto Dump Yard Road. Cross the railroad tracks and travel north on Dump Yard Road for approximately 0.2 miles until the intersection of Le Grand Canal. Note: the site lies beyond a gate leading to a private orchard and requires special permission to enter

***P3a. Description:** LG-07 consists of two features: Feature 1 is an approximately 12-foot wide and 25-foot long wooden bridge constructed ca. 1922-1927 spanning the Le Grand Canal. Feature 2 is a segment of Dump Yard Road which consists of a graded dirt road with a north-south orientation constructed ca. 1919 (USGS 1919). The recorded segment is approximately 25-feet wide and 305 feet long. LG-07 is visible in the 1946 historic aerial and appears essential the same as it does today, however the road was bisected immediately north of the recorded segment by a retention pond constructed between 1959 and 1998 (NETR 2021).

***P3b. Resource Attributes:** HP19 (bridge) and AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the bridge and road associated with LG-07. Facing southeast

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca.1919 (USGS 1919)

***P7. Owner and Address:**
Private

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Dump Yard Road (LG-07)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Dump Yard Road
B2. Common Name: Dump Yard Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1919; bridge constructed 1922-1927
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

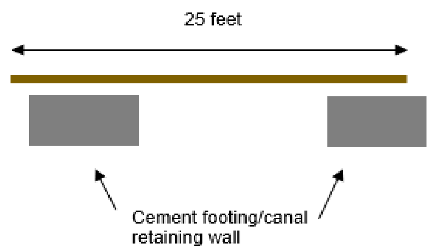
L2 a. Portion Described: ☒ **Entire Resource** ☐ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment:
Middle of bridge: 742885 mE, 4125510 mN

L3. Description: Feature 1 is a wooden bridge spanning the Le Grand Canal. The bridge rests on cement footings on the north and south sides of the canal. A tag reading "001176Y1 17" was observed on the cement footing.

L4. Dimensions:
- **a. Top Width:** 12 feet
- **b. Bottom Width:** 12 feet
- **c. Height or Depth:** 6 feet tall
- **d. Length of Segment:** 25 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W



L5. Associated Resources: LG-07 Feature 2: Dump Yard Rd. and P-24-000608: the Le Grand Canal

L6. Setting: The resource is surrounding by an almond orchard. A large modern holding pond with a cedar-lined walkway, is located to the north. Additional adjacent vegetation includes non-native grasses and willow. Soils consist of tan sandy loam with 5% semi-rounded shale inclusions ranging in size from pebbles to cobbles. Slope is under 2% with an open aspect. Deposition is alluvial.

L7. Integrity Considerations: The bridge is in poor condition with major impacts from use and erosion. The bridge is no longer safe to allow access across the canal.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Feature 1 with observable impacts. View northeast

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

L1. Historic and/or Common Name: Dump Yard Road

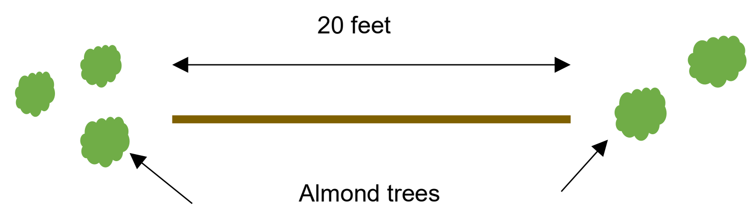
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment:
Southern end of recorded segment: 742885 mE, 4125450 mN
Northern end of recorded segment: 742884 mE, 4125544 mN

L3. Description: Graded dirt road with a north-south orientation.

L4. Dimensions:
- **a. Top Width** 25 feet (E/W)
- **b. Bottom Width** 15 feet
- **c. Height or Depth** N/A
- **d. Length of Segment** 305 feet (N/S)

L4e. Sketch of Cross-Section (Include scale) **Facing:** S

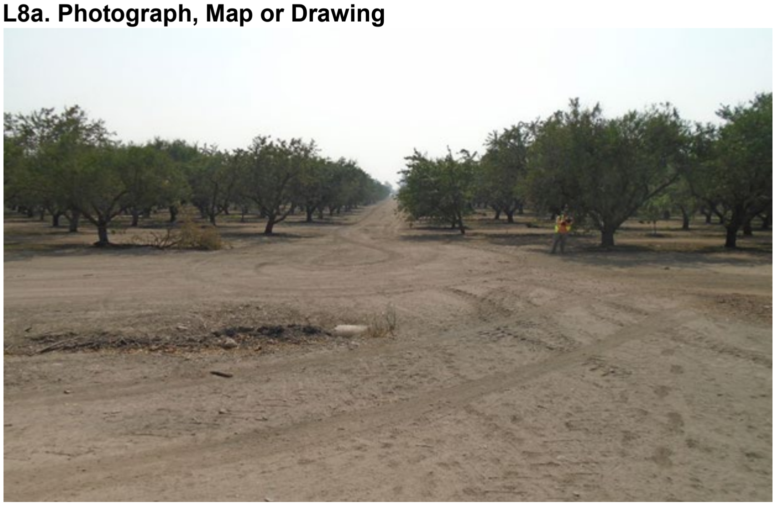


L5. Associated Resources: Feature 1 (bridge)

L6. Setting: The resource is surrounding by an almond orchard. A large modern holding pond with a cedar-lined walkway, is located to the north. Additional adjacent vegetation includes non-native grasses and willow. Slope is under 2% with an open aspect. Soils consist of tan sandy loam with 5% semi-rounded shale inclusions ranging in size from pebbles to cobbles. Deposition is alluvial.

L7. Integrity Considerations: The road is in good condition with minor impacts from automobile use.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Feature 2, facing south towards the almond orchard. Photo taken just south of Feature 1, the bridge spanning the Le Grand Canal. September 22, 2021

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

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In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

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<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

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In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>**NRHP and CRHR Evaluation**</u>
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. East Mission Avenue was constructed prior to 1919. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-07 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1919 Plainsburg, California. 1:62,500 scale.

Detail photo of the metal tag observed on the cement footing.

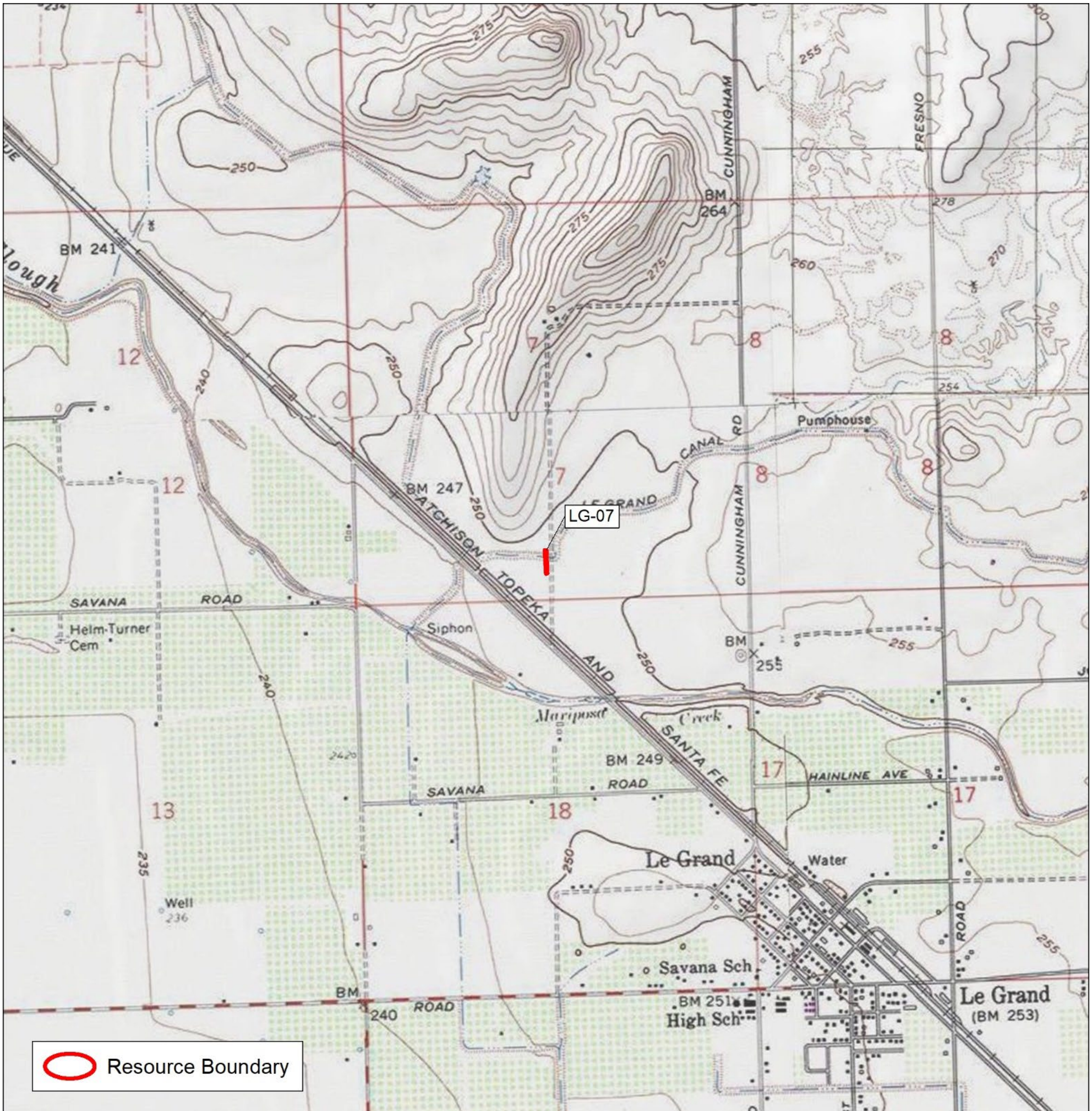
Primary #
HRI#
Trinomial

LOCATION MAP

*Resource Name or # **(Assigned by recorder)** Dump Yard Road (LG-07)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLAINSBURG (1976)
Legal Description: T08S, R16E, SEC 7
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-07
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Dump Yard Road (LG-07)

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-07
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** South Fresno Road (LG-10)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SE of NW of Sec 8; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: 10N; 744493 mE, 4125716 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Le Grand take S. Santa Fe Ave. southeast and turn right onto Le Grand Ave. and cross the railroad tracks. Travel east approximately 600 feet and turn left onto S. Fresno Rd. Travel north for approximately 1.2 miles until the road crosses the Le Grand Canal. The recorded segment of road lies on either side of the canal.

***P3a. Description:** LG-10 consist of a segment of South Fresno Road constructed prior to 1918. The road is a graded gravel road with a north-south alignment. The recorded segment is approximately 25-feet wide and 456 feet long. The recorded segment pans the Le Grand Canal via a culvert which would have been constructed concurrent with the canal ca- 1922-1927. The road appears on the 1918 USGS map and is depicted as a light duty road (USGS 1918a).

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of S. Fresno Rd. spanning the Le Grand Canal. View south.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918a)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** South Fresno Road (LG-10)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: South Fresno Road
B2. Common Name: South Fresno Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: South Fresno Road

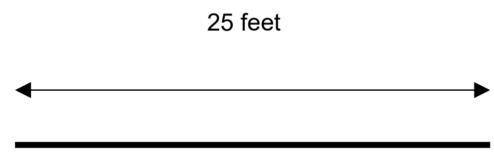
L2 a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point segment: North end of recorded segment: 744495 mE, 4125772 mN
South end of recorded segment: 744497 mE, 4125632 mN

L3. Description: Graded gravel road with a north-south alignment. The road continues both north and south. A single cement culvert pipe channels canal water underneath the road. Barbed-wire fencing and sheet metal line the road to prevent access to the canal and private property to the east and west.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 25 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 465 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** N

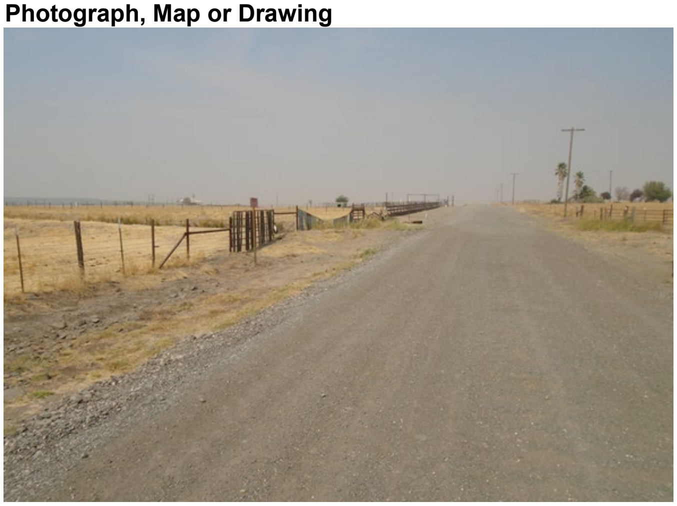


L5. Associated Resources:
P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the resource consists of swamp brush and non-native grasses. The slope is under 2% with an open aspect. The soil is tan sandy loam. Deposition is alluvial. No natural inclusions were observed within the roadway.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use and erosion.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of recorded segment of S. Fresno Rd. View north

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

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***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. East Mission Avenue was constructed prior to 1918 to provide access from the community of Le Grand to East Childs Avenue and Buchanan Hollow Road, two east-west transportation corridors in the region. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. While it would have been heavily used and was undoubtably important to the community of Le Grand, it does not have sufficient historical significance, even at a local level, to be considered eligible under this criterion. The road is one of several secondary access roads to a more significant commercial and transportation route. It is a common property type found throughout California and the United States and not significantly linked to any important historical themes. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-10 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.
.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

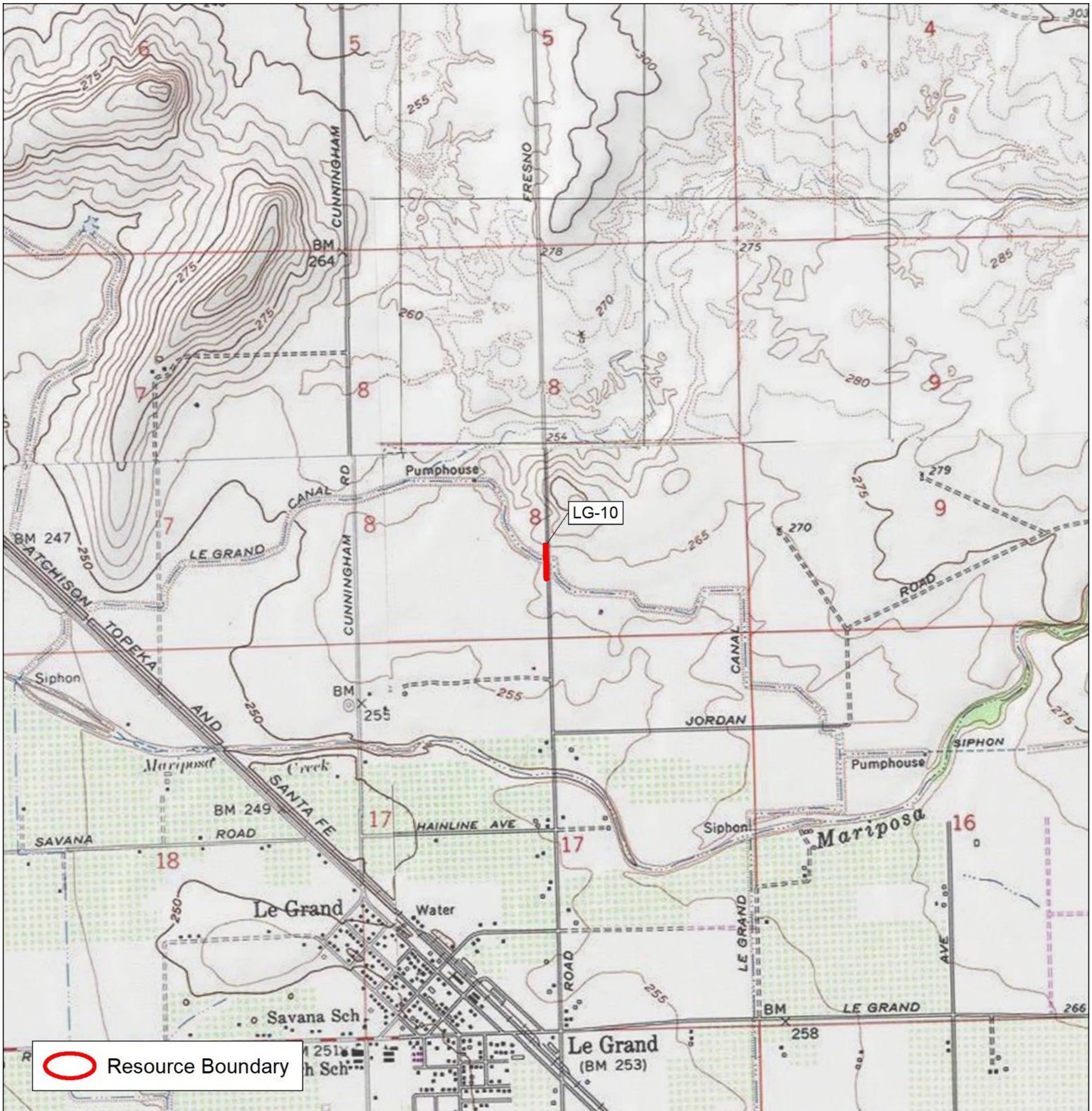
Primary #
HRI#
Trinomial

LOCATION MAP

*Resource Name or # **(Assigned by recorder)** South Fresno Road (LG-10)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 8
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-10
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** South Fresno Road (LG-10)

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-10
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** Le Grand Road (LG-11)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SW of SW of Sec 15; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Eastern end of recorded segment: 10N 745828 mE, 4123836 mN
Western end of recorded segment: 10N 745689 mE, 4123834 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand take Le Grand Rd. east for approximately .88 miles and park on the side of the road.

***P3a. Description:** LG-11 consists of a recorded segment of Le Grand Road constructed prior to 1918 (USGS 1918). The recorded segment of Le Grand Road consists of a two-lane asphalt highway with an east-west alignment. The recorded segment is approximately 30-feet wide and 450 feet long. LG-10 is visible in the 1946 historic aerial as an unpaved road and appears to have been paved between 1946 and 1951 (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the recorded segment of Le Grand Rd. View east.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918a)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Le Grand Road (LG-11)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Le Grand Road
B2. Common Name: Le Grand Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918; paved between 1946 and 1951 (NETR 2021), regular maintenance (dates unknown, based on field observations)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: Le Grand Road

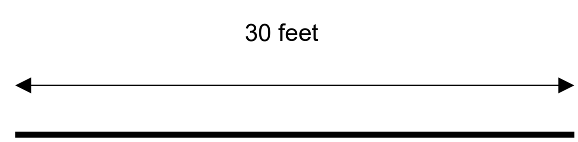
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Eastern end of recorded segment: 745826 mE, 4123834 mN
Western end of recorded segment: 745689 mE, 4123834 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.) Two-lane asphalt highway with an east-west alignment.

L4. Dimensions:
- **a. Top Width:** 30 feet
- **b. Bottom Width:** 30 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 450 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W

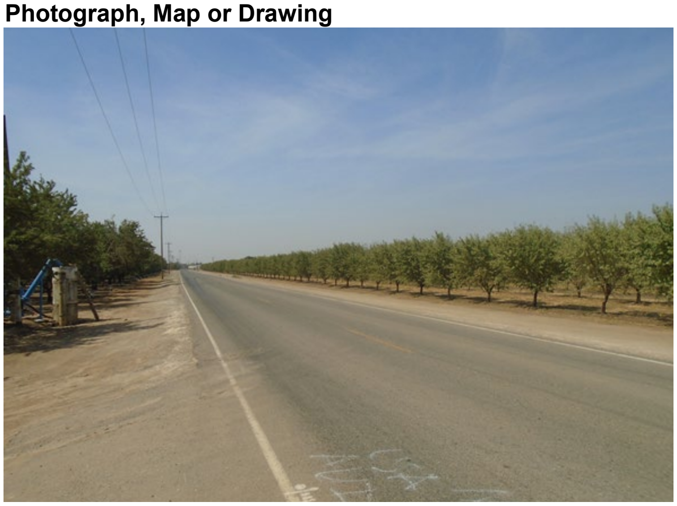


L5. Associated Resources: N/A

L6. Setting: Vegetation surrounding the site consists of almond trees (from nearby orchards), ash trees, and non-native grasses. Soil deposition is alluvial and composed of tan sandy loam. Slope is under 2% with an open aspect.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use and erosion.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Le Grand Rd. and nearby almond orchards. View west.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource, which is comprised of Le Grand Road and does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road is one of the earliest primary east-west routes within the area, predating 1918. It was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand. The period of significance for this resource dates to its period of construction, ca. 1918. Therefore, this resource is eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that any persons of historical significance are specifically associated with this resource. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Integrity: The NRHP and CRHR recognizes a property's historic integrity through seven aspects or qualities. These include location, design, setting, materials, workmanship, feeling, and association. Le Grand Road retains integrity of location, setting, and association. The alignment has not significantly changed and, while there have been changes in the setting due to new construction, it is still primarily rural. Le Grand Road is still a primary east-west route between rural properties and the community of Le Grand. Le Grand Road does not, however, retain integrity of design, materials and workmanship due to regular maintenance and repairs conducted on the road over its history. Le Grand Road also does not retain integrity of feeling and association. It is essentially indistinguishable from other roads throughout the state and the country. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance.

Because Le Grand Road does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

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Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

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2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

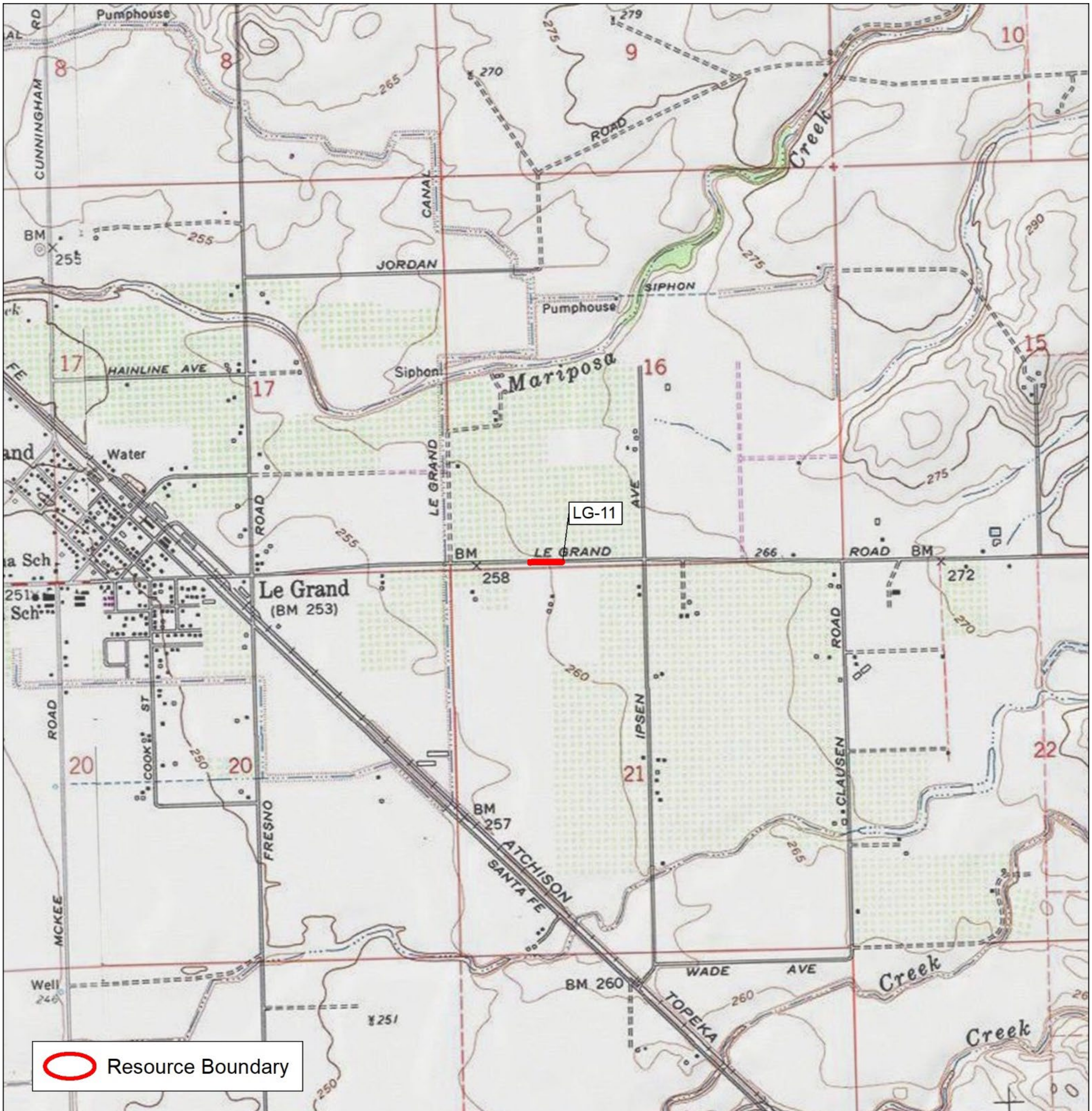
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Le Grand Road (LG-11)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 16
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-11
Merced County, California

Primary #
HRI#
Trinomial

SKETCH MAP

*Resource Name or # **(Assigned by recorder)** Le Grand Road (LG-11)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N
Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-11
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** LG-12

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5'** Le Grand **Date** 1961 T 8S; R 16E; NW of NW of Sec 21; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95222

d. UTM: Zone: Northern end of recorded segment: 10N, 745746 mE, 4123831 mN
Southern end of recorded segment: 10N, 745748 mE, 4123718 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand take Le Grand Rd. east for approximately .88 miles and turn right onto the dirt and gravel road

***P3a. Description:** LG-12 consists of a graded dirt and gravel road constructed prior to 1918 (USGS 1918a). The recorded segment is approximately 6-feet wide and 370 feet long. The 1918 USGS map depicts it as a light duty road and is visible on historic aerials from 1946 appearing essentially the same as it does today (USGS 1918, NETR 2021).

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the road heading south from the intersection with Le Grand Rd. View south.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918a)

***P7. Owner and Address:**
Private

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** LG-12

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed 1918, regraded (dates unknown, based on field observation)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☒ **Entire Resource** ☐ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with Le Grand Rd.: 745746 mE, 4123831 mN
Southern end of resource: 745748 mE, 4123718 mN

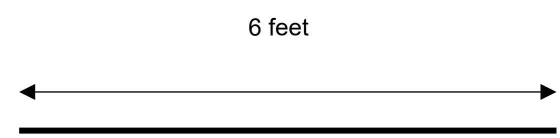
L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)

Graded dirt and gravel road. The road intersects to the north with Le Grand Rd. and terminates south into a private residence. A distribution line runs along the west side of the road. Almond orchards lie farther west and a fence line denoting private property runs along the eastern side of the road.

L4. Dimensions:
- **a. Top Width:** 6 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 370 feet

L5. Associated Resources: LG-11: Le Grand Rd.

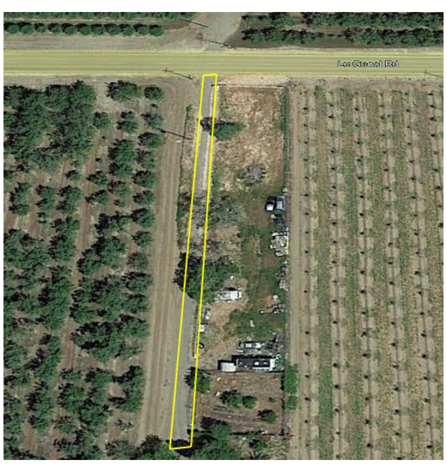
L4e. Sketch of Cross-Section (Include scale) **Facing:** S



L6. Setting: Vegetation near the site consists of almond trees (orchard), non-native grasses, and ash trees. Deposition is alluvial. Soil consists of tan sandy loam. Slope is under 2% with an open aspect.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use and erosion.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Aerial image of the recorded road. From Google Earth 2022.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1918 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-12 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

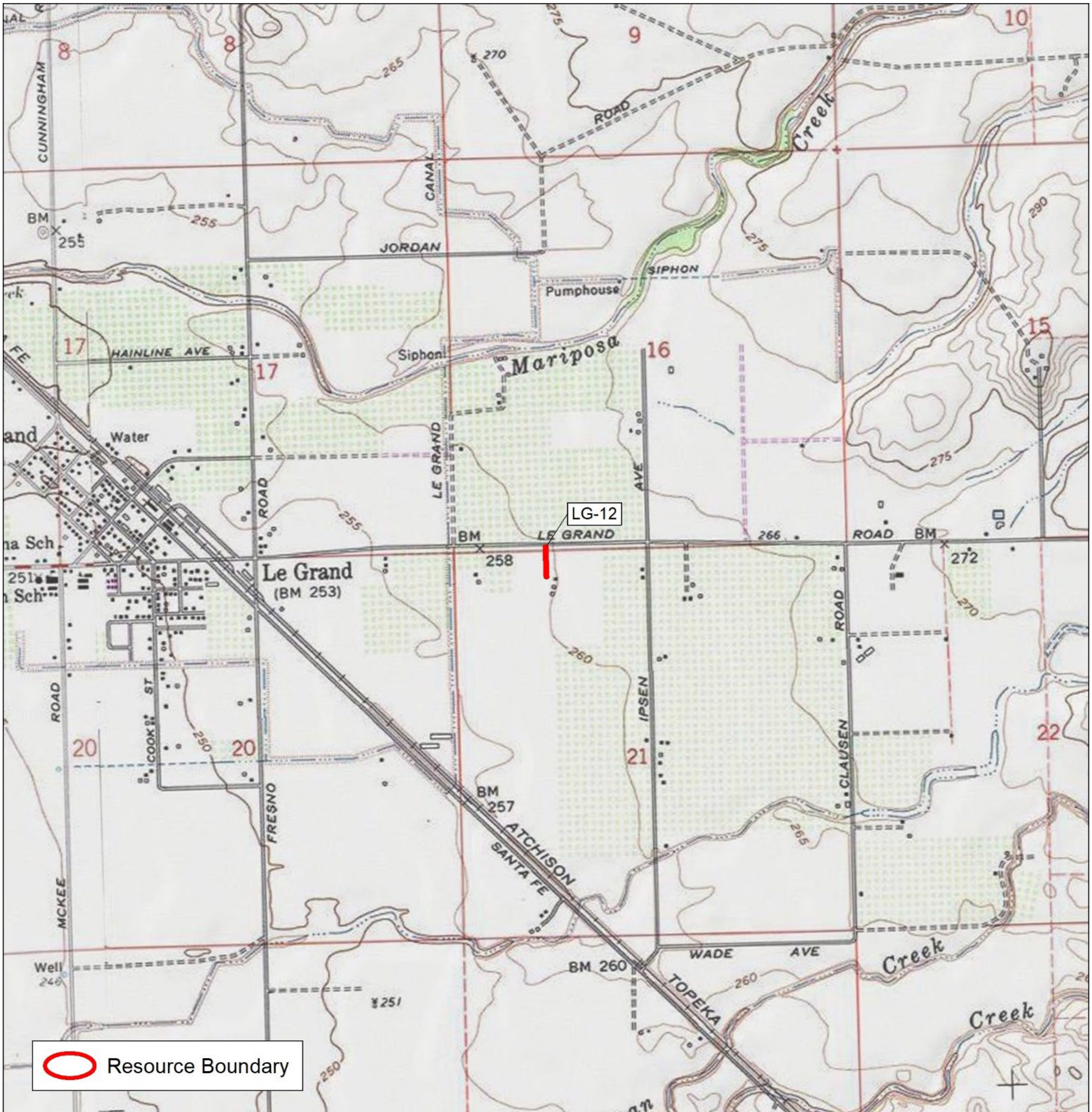
Primary #
HRI#
Trinomial

Page **8** **of** **9**

*Resource Name or # **(Assigned by recorder)** LG-12

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 16, 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-12
Merced County, California

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-12
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** S. Ipsen Avenue (LG-15)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 8S; **R** 16E; NW **of** NE **of Sec** 28; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northeastern end of recorded segment: 10N, 746175 mE, 4122162 mN
Southwestern end of recorded segment: 10N, 746127 mE, 4122110 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel southeast on S. Santa Fe Ave. for approximately 1.5 miles and turn left on S. Ipsen Ave. The recorded segment of the road intersects with the Santa Fe Railroad in this location

***P3a. Description:** LG-15 consists of a segment of South Ipsen Avenue constructed prior to 1946 (USGS 1946). The recorded segment of South Ipsen Avenue is comprised of a two-lane asphalt road with a northeast-southwest alignment. It is approximately 15 feet wide and 230 feet long. The road is visible on historic aerials from 1946 and appears essentially the same as it does today (NETR 2021). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
Overview of the road. View northeast.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca, 1946 (USGS 1946)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:** (Name, affiliation, and address)
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** S. Ipsen Avenue (LG-15)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: S. Ipsen Road
B2. Common Name: S. Ipsen Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946; regular maintenance and repaving (dates unknown, based on field observations)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

LINEAR FEATURE RECORD

*Resource Name or # **(Assigned by recorder)** S. Ipsen Avenue (LG-15)

L1. Historic and/or Common Name: South Ipsen Avenue

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

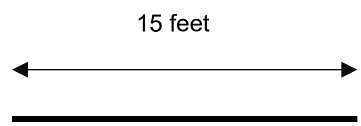
b. Location of point segment: Northeastern end of recorded segment: 746175 mE, 4122162 mN
Southwestern end of recorded segment: 746127 mE, 4122110 mN

L3. Description: The resource consists of a two-lane road composed of asphalt. The road continues to the northeast and southwest.

L4. Dimensions:
- **a. Top Width:** 15 feet
- **b. Bottom Width:** 15 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 230 feet

L5. Associated Resources: P-24-001881: Santa Fe Railroad

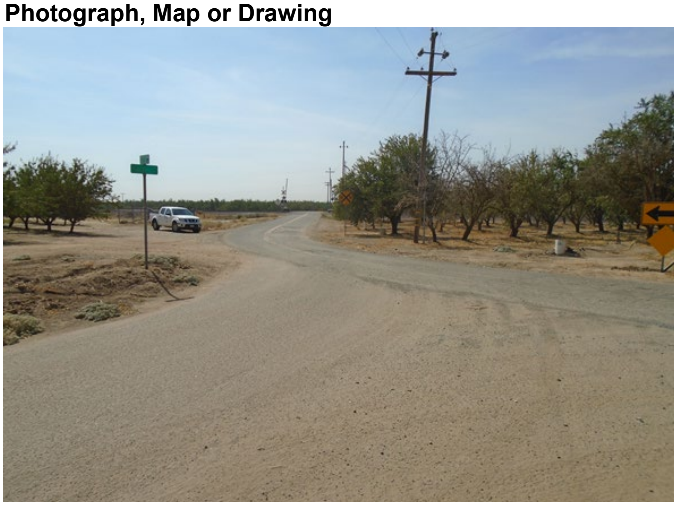
L4e. Sketch of Cross-Section (Include scale) **Facing:** NE



L6. Setting: Vegetation near the site consists of almond trees (orchards) and non-native grasses. Slope is under 2% with an open aspect. Deposition is alluvial. Soil is tan sandy loam.

L7. Integrity Considerations: The resource is in poor condition with major impacts from use and erosion.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of S. Ipsen Ave. from E. Wade Ave. View southwest

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1918 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-15 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1946 Le Grand, California. 1:62,500 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

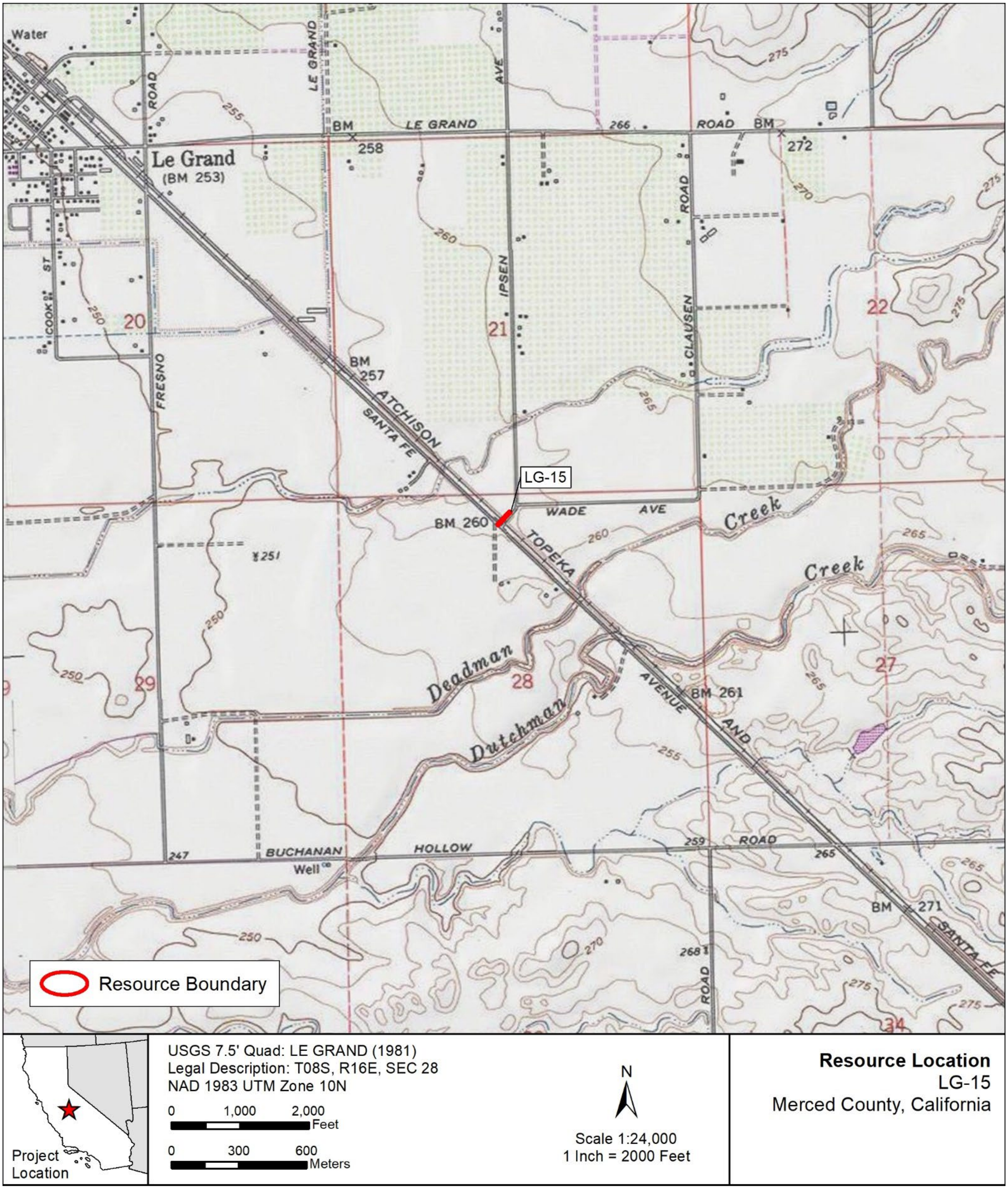
Primary #
HRI#
Trinomial

Page **8** of **9**

*Resource Name or # **(Assigned by recorder)** S.Ipsen Avenue (LG-15)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



DPR 523B (1/95)

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#

SKETCH MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** S.Ipsen Avenue (LG-15)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-15
Merced County, California

***Resource Name or #:** S. Santa Fe Ave. (LG-16)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; NW of SW of Sec 27; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northwestern end of recorded segment: 10N, 747070 mE, 4121188 mN
Southeastern end of recorded segment: 10N 747127 mE, 4121134 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Le Grand take S. Santa Fe Ave. southeast for approximately 2.35 miles. The recorded segment of road is east of the private residence

***P3a. Description:** LG-16 consists of a segment of South Santa Fe Avenue constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with a northwest-southeast orientation. The recorded segment is approximately 25 feet wide and 255 feet long. It was identified as “Sharon Road” on the 1918 USGS map and depicted as a light duty road (USGS 1918a). Between 1918 and 1946 the road was upgraded to a secondary highway (USGS 1946) and appears on historic aerials essential the same as it does today (NETR 2021). By 1961 the road had been relabeled as “Santa Fe Avenue” (USGS 1961). The road appears to have been initially constructed as a service road for the adjacent Santa Fe Railroad alignment. While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including paving between 1959 and 1998 (NETR 2021) and repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** (List attributes and codes) AH7 (road)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the recorded segment of S. Santa Fe Ave. View southeast. September 28, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918a)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 28, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List)

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Sharon Road
B2. Common Name: South Santa Fe Avenue
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918; paving (between 1959 and 1998), regular maintenance and repaving (dates unknown, based on field observations)
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** Roads and highways as symbols of commerce and trade **Area:** Merced County, CA
Period of Significance: ca.1918 **Property Type:** Road **Applicable Criteria:** A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: South Santa Fe Avenue

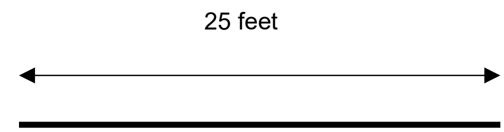
L2 a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point segment: Northwestern end of recorded segment: 10N 747070 mE, 4121188 mN
Southeastern end of recorded segment: 10N 747127 mE, 4121134 mN

L3. Description: Two-lane highway composed of asphalt. This segment of the road parallels the Santa Fe Railroad.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 25 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 255 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** NW



L5. Associated Resources: N/A

L6. Setting: Vegetation near the site consists of pistachio trees (orchard), non-native grasses, and starthistle. The slope is under 2% with an open aspect. Deposition is alluvial. Soil consists of tan sandy loam.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use and erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the recorded segment of S. Santa Fe Ave. View northwest. September 28, 2021

L9. Remarks: N/A

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Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

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Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>

NRHP Criterion A/ CRHR Criterion 1: This resource, which is comprised of Santa Fe Avenue does meet NRHP Criterion A or CRHR Criterion 1 at a local level for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was a major route connecting the community of Le Grand with Planada, predating 1918, and followed the alignment of the Burlington Northern-Santa Fe Railroad. While the fact that it followed the railroad alignment is not significant, the road was essential for fostering agricultural, residential, and commercial growth in the area and served as the primary access route for rural properties with Le Grand and Planada. The period of significance for this resource dates to its period of construction, ca. 1918. Therefore, this resource is eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that any persons of historical significance are specifically associated with this resource. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Integrity: The NRHP and CRHR recognizes a property's historic integrity through seven aspects or qualities. These include location, design, setting, materials, workmanship, feeling, and association. Santa Fe Avenue retains integrity of location, setting, and association. The alignment has not significantly changed and, while there have been changes in the setting due to new construction, it is still primarily rural. Santa Fe Avenue is still a significant route between the community of Le Grand and Planada. Santa Fe Avenue does not, however, retain integrity of design, materials and workmanship due to regular maintenance and repairs conducted on the road over its history, including paving between 1959 and 1998. Santa Fe Avenue also does not retain integrity of feeling and association. It is essentially indistinguishable from other roads throughout the state and the country. There is not sufficient historical material present within the recorded segment to specially associate the road with its period of significance.

Because Santa Fe Avenue does not retain sufficient integrity to convey its historical significance, it is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

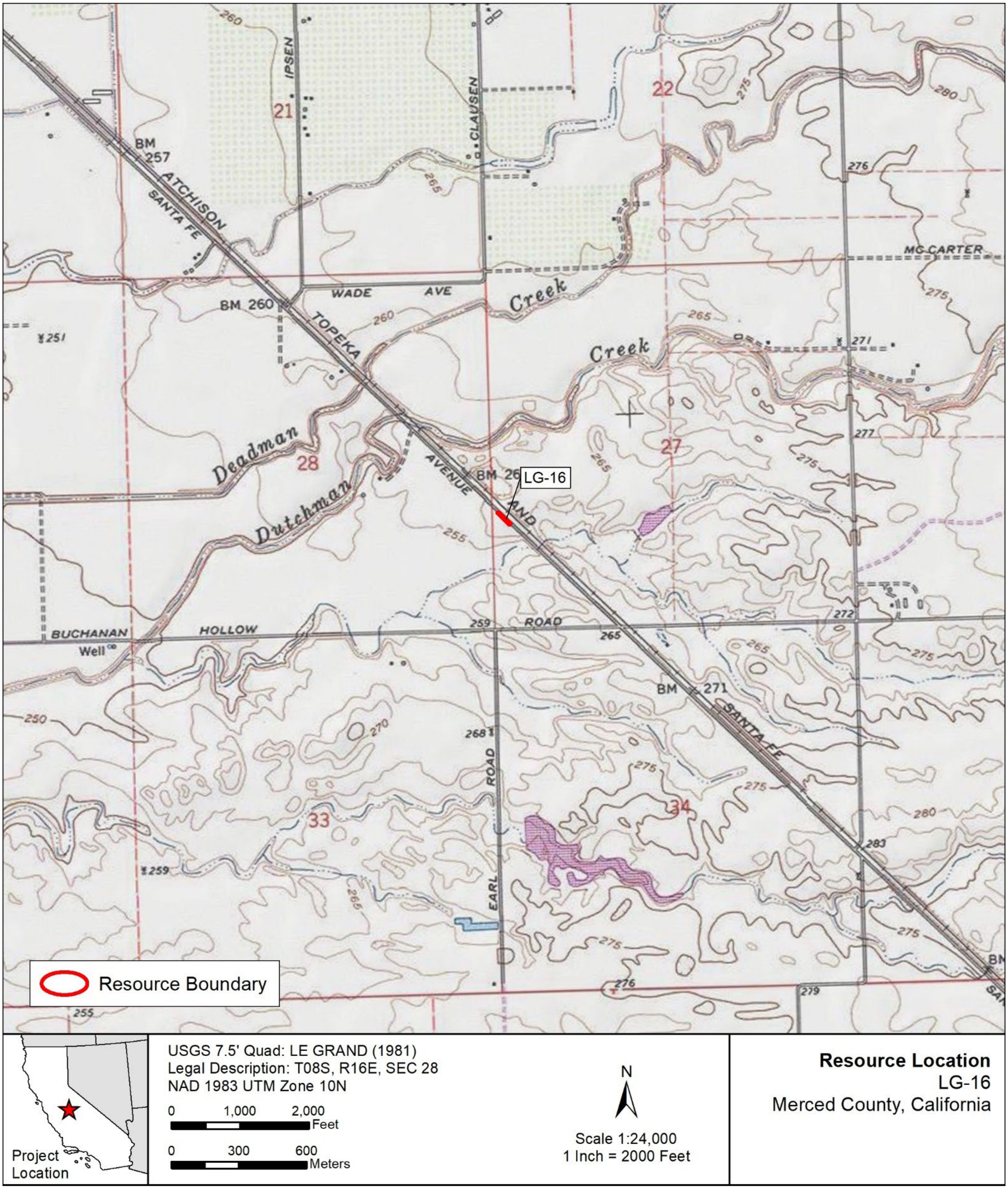
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.
1946 Le Grand, California. 1:62,500 scale

LOCATION MAP

Primary #
HRI#
Trinomial

Page **8** **of** **9**
*Resource Name or # **(Assigned by recorder)** S. Santa Fe Ave. (LG-16)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 28
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-16
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page **9 of 9** *Resource Name or # **(Assigned by recorder)** S. Santa Fe Ave. (LG-16)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-16
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code

Other Listings
Review Code   Reviewer   Date

 ***Resource Name or #:** Buchanan Hollow Road (LG-17)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 T 8S; R 16E; SE of SE of Sec 28; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Eastern end of recorded segment: 10N, 747098 mE, 4120674 mN
Western end of recorded segment: 10N 746987 mE, 4120674 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel southeast on S. Santa Fe Ave. for approximately 2.8 miles and turn right onto Buchanan Hollow Rd. Travel west for approximately .35 miles. The recorded segment of road is at the intersection with Earl Rd.

***P3a. Description:** LG-17 consists of a recorded segment of Buchanan Road constructed prior to 1918 (USGS 1918a). It is comprised of a two-lane asphalt road with an east-west alignment. The recorded segment is approximately 20 feet wide and 320 feet long. It was identified as “Athelone and Buchanan Road” on the 1918 USGS map and depicted as a light duty road (USGS 1918a). It is visible on the 1946 historic aerials and appears essentially similar to its current appearance (NETR 2021). By 1961 the road was renamed “Buchanan Road” (USGS 1961). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** (List attributes and codes) AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of Buchanan Hollow Rd. near the intersection with Wade Rd. View west.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1918 (USGS 1918)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 24, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Buchanan Hollow Road (LG-17)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Athelone and Buchanan Road
B2. Common Name: Buchanan Hollow Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utlitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918; regular maintenance and repaving (dates unknown, based on field observation)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

*Resource Name or # **(Assigned by recorder)** Buchanan Hollow Road (LG-17)

L1. Historic and/or Common Name: Buchanan Hollow Road

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Eastern end of recorded segment: 10N 747098 mE, 4120674 mN
Western end of recorded segment: 10N 746987 mE, 4120674 mN

L3. Description: The resource is a two-lane road composed of asphalt. Due to time and budget constraints only a segment of the road was recorded. Buchanan Hollow Rd. extends both east and west, outside of the project location.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 370 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W

20 feet

L5. Associated Resources: LG-18: Earl Rd.

L6. Setting: Vegetation at the site is composed of almond trees (orchards) and non-native grasses. The slope is under 2% with an open aspect. Deposition is alluvial. Soils are tan sandy loam.

L7. Integrity Considerations: LG-17 is in fair condition with moderate impacts from use and erosion. Some of the asphalt is cracked.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Buchanan Hollow Rd. View east.
September 24, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California’s Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state’s farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. East Mission Avenue was constructed prior to 1918 to provide access from rural communities to other, larger transportation corridors such as Santa Fe Avenue. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. While it would have been heavily used and was undoubtably important to the rural community, it does not have sufficient historical significance, even at a local level, to be considered eligible under this criterion. The road is one of several secondary access roads to a more significant commercial and transportation route. It is a common property type found throughout California and the United States and not significantly linked to any important historical themes. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-17 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
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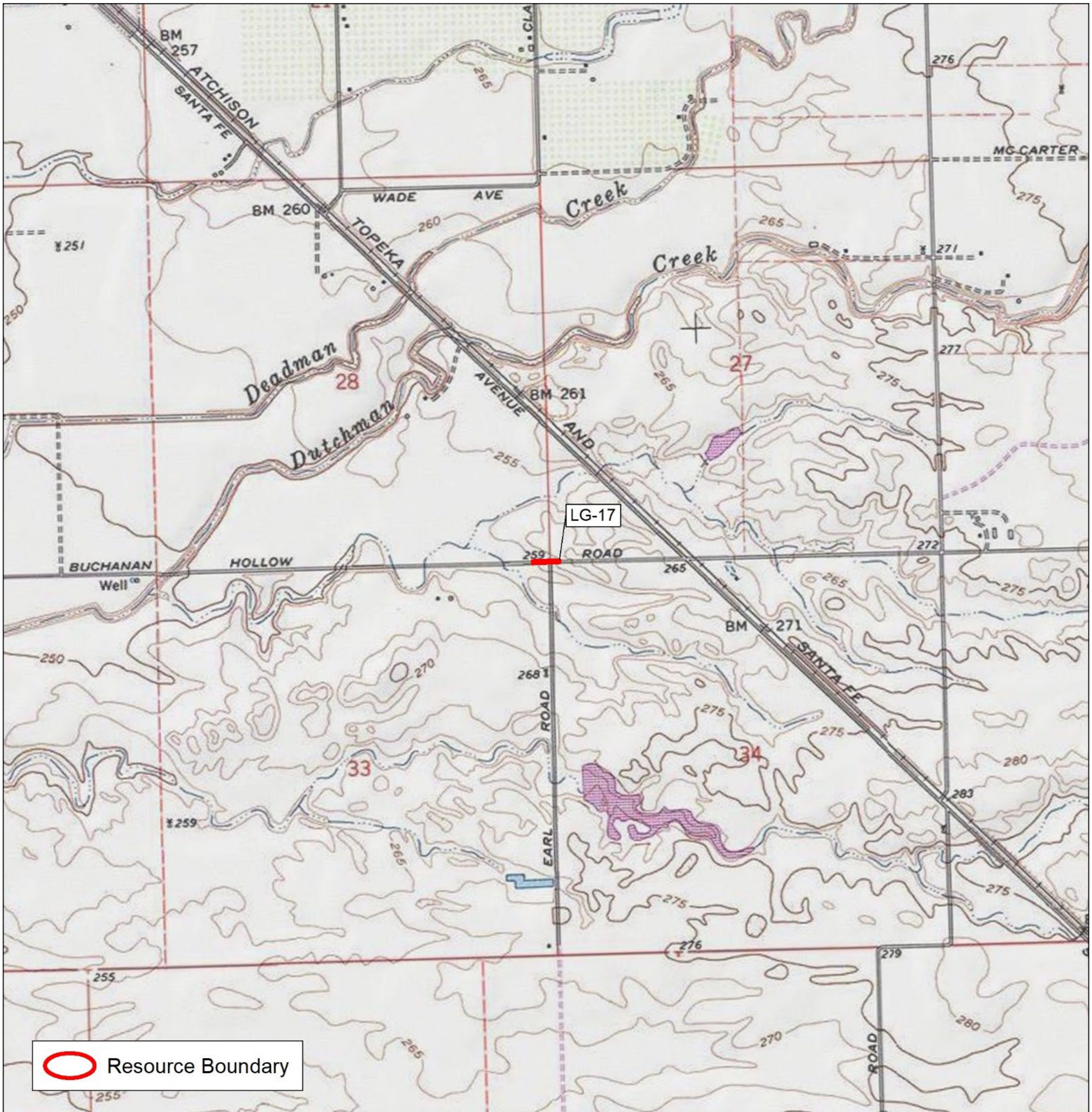
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.
1961 Le Grand, California. 1:24,000 scale.

LOCATION MAP

*Resource Name or # **(Assigned by recorder)** Buchanan Hollow Road (LG-17)

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 33
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-17
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9** *Resource Name or # **(Assigned by recorder)** Buchanan Hollow Road (LG-17)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-17
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** Earl Road (LG-18)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 T 8S; R 16E; Sec 33; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northern intersection with Buchanan Hollow: 10N, 747037 mE, 4120665 mN
Southern intersection with unnamed dirt road: 10N 747088 mE, 4119066 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel southeast on S. Santa Fe Ave. for approximately 2.8 miles and turn right onto Buchanan Hollow Rd. Travel west for approximately .35 miles and turn left onto Earl Rd.

***P3a. Description:** LG-18 consists of a recorded segment of Earl Road constructed prior to 1946 (USGS 1946). It is comprised of an approximately 15 foot wide and 5,280-foot-long asphalt road with a north-south alignment. It is depicted on the 1946 USGS map as an unpaved road (USGS 1946) and appears as such in historical aerials from that time (NETR 2021). By 1961 it had likely been paved and was upgraded to a light duty road (USGS 1961). It appears today as it likely did in 1961, however; the asphalt has significantly deteriorated.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

Overview of paved portion of Earl Rd. View south. September 24, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (USGS 1946)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 24, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Earl Road
B2. Common Name: Earl Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

LINEAR FEATURE RECORD

*Resource Name or # **(Assigned by recorder)** Earl Road (LG-18)

L1. **Historic and/or Common Name:** Earl Road

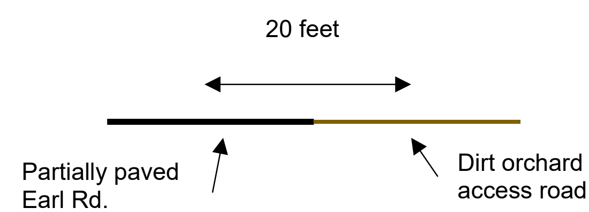
L2 a. **Portion Described:** ☒ **Entire Resource** ☐ **Segment** ☐ **Point Observation** **Designation:**

b. **Location of point segment:** Northern intersection with Buchanan Hollow: 747037 mE, 4120665 mN
Southern intersection with unnamed dirt road: 747088 mE, 4119066 mN

L3. **Description:** Approximately 15 foot wide and 5,280-foot-long asphalt road with a north-south alignment Decomposing asphalt was observed on portions of the road, in greater concentration towards the north. The road appears to have expanded to add a 20 feet wide dirt orchard access road running parallel on the west side of Earl Rd.

L4. **Dimensions:**
- a. **Top Width:** 15 feet (paved portion)
- b. **Bottom Width:** 45 feet (including expanded access road)
- c. **Height or Depth:** N/A
- d. **Length of Segment:** 5,280 feet

L4e. **Sketch of Cross-Section** (Include scale) **Facing:** S

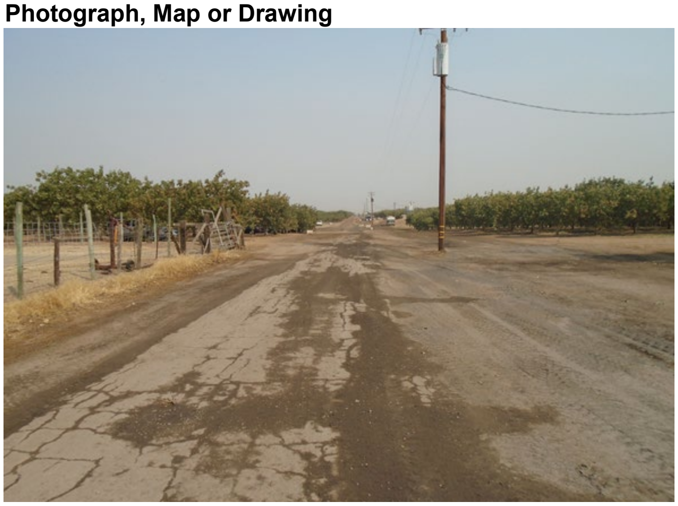


L5. **Associated Resources:** N/A.

L6. **Setting:** Vegetation at the site consists of almond trees (orchards) and non-native grasses. Slope is under 2% with an open aspect. Deposition is alluvial. The soil is tan sandy loam. Inclusions were composed of 5% pebble-sized shale.

L7. **Integrity Considerations:** The resource is in poor condition with major impacts from use and erosion. Much of the asphalt has eroded, particularly in the southern segment of the road.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Earl Rd., middle of segment. View north. September 24, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 9, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1946 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the mid-twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-20 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

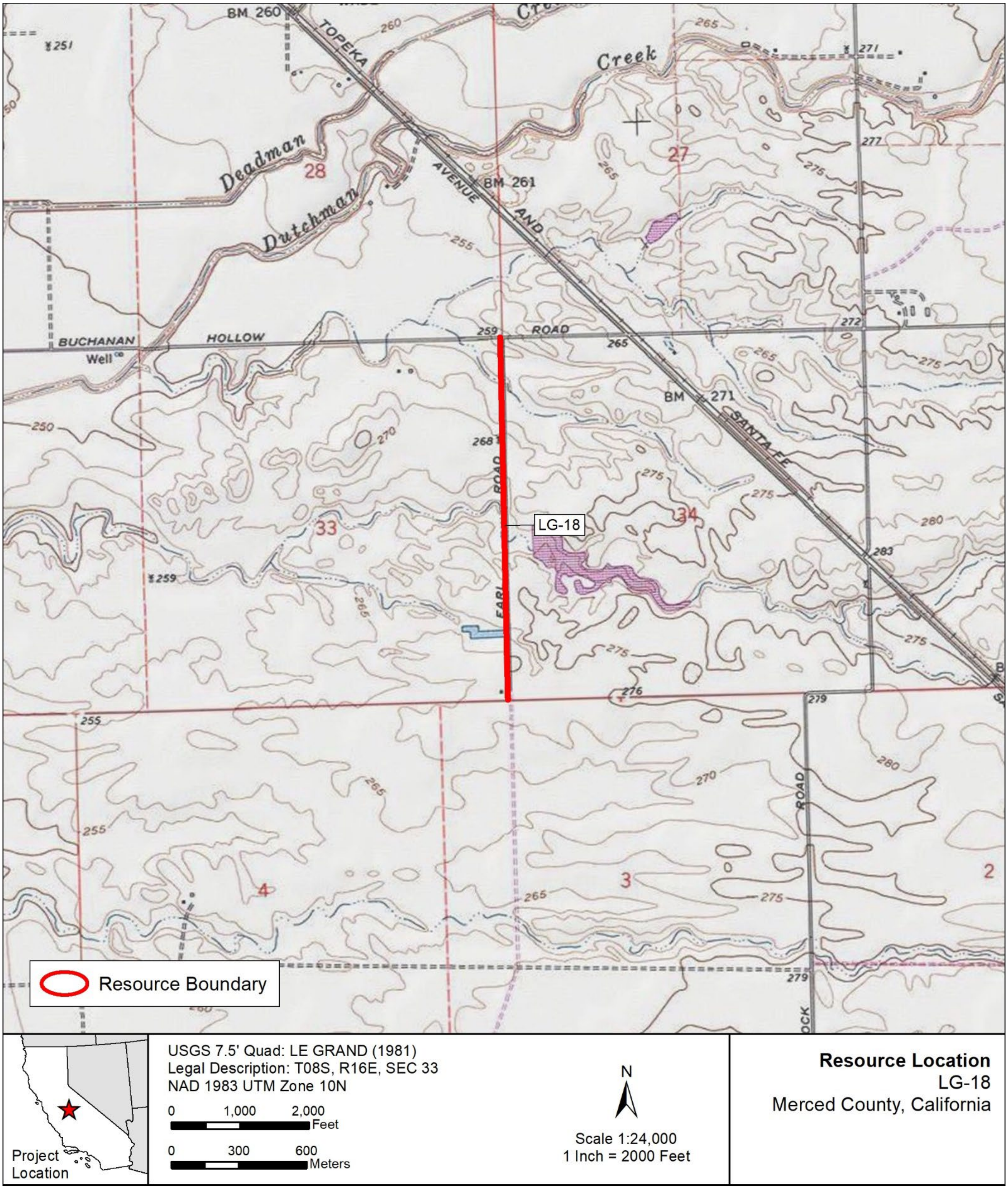
United States Geological Survey (USGS)
1946 Le Grand, California. 1:62,500 scale.
1961 Le Grand, California. 1:24,000 scale

LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Earl Road (LG-18)

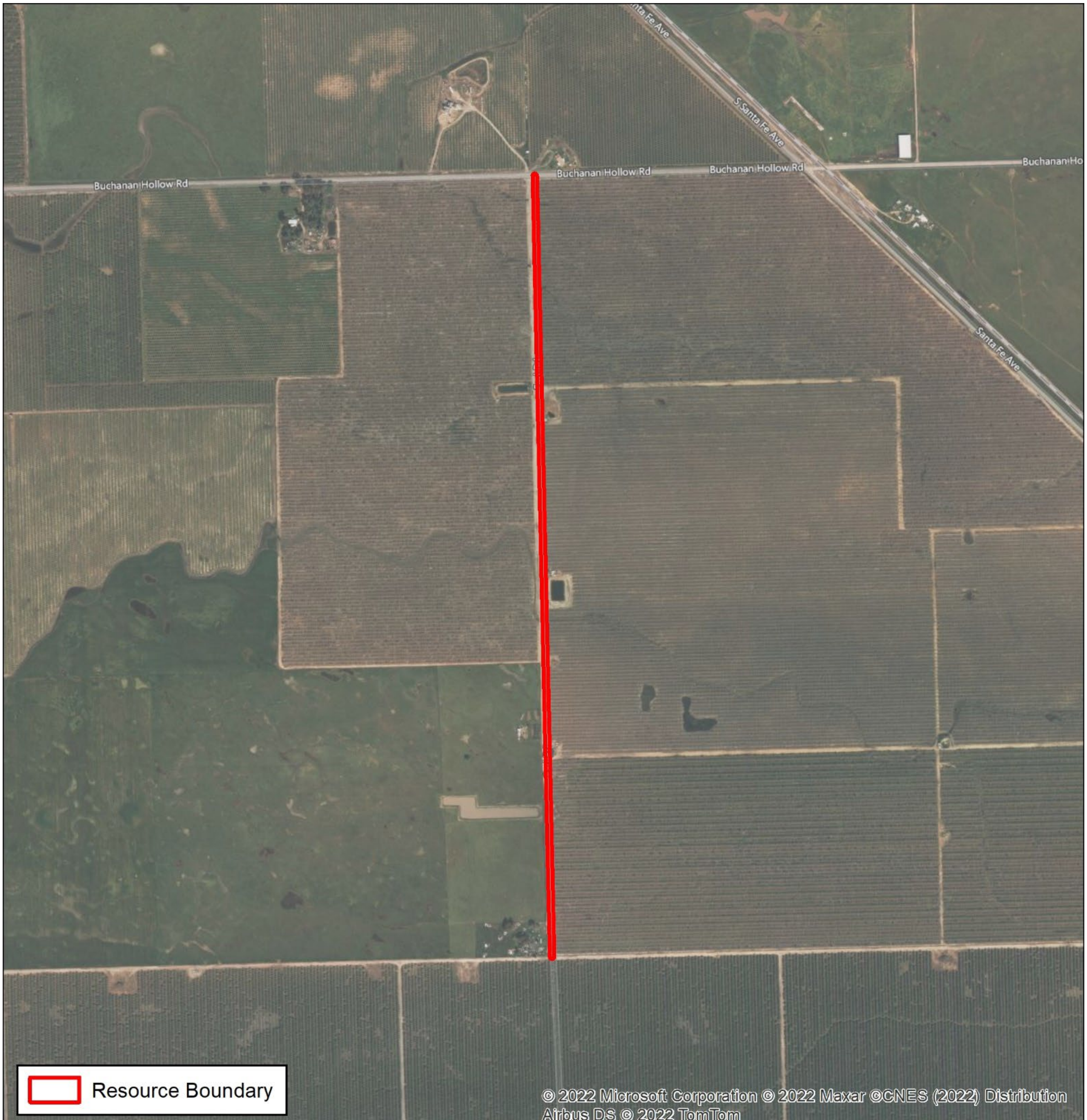
*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9**
*Resource Name or # **(Assigned by recorder)** Earl Road (LG-18)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer



NAD 1983 UTM Zone 10N

0 500 1,000 Feet
0 150 300 Meters

N
Scale 1:12,000
1 inch = 1,000 feet

Sketch Map
LG-18
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** LG-20

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 T 9S; R 16E; NW of SW of Sec 3; M.D. **B.M..**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: 10N, 746815 mE, 4117882 mN

e. Other Locational Data: From the town of Le Grand travel southeast on S. Santa Fe Ave. for approximately 3.7 miles. Turn right onto White Rock Rd. Travel south for approximately 1.3 miles and turn right onto the dirt road entrance to the Campos Orchard. Travel west for approximately 1 mile. The recorded segment of road will at the intersection with a north-south running orchard access road.

***P3a. Description:** LG-20 consists of a recorded segments of an unnamed graded dirt road constructed prior to 1946 (USGS 1946). The road is approximately 20-feet wide and 4845 feet long and has an east-west alignment. The road appears on the 1946 USGS map as an unimproved road (USGS 1946). Historic aerials form 1946 depict the road essentially similar to as it appears today (NETR 2021).

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of recorded segment of road. View west. September 24, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (USGS 1946)

***P7. Owner and Address:**
Campos Brothers Farms
15516 S Walnut Ave,
Caruthers, CA 93609

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 24, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

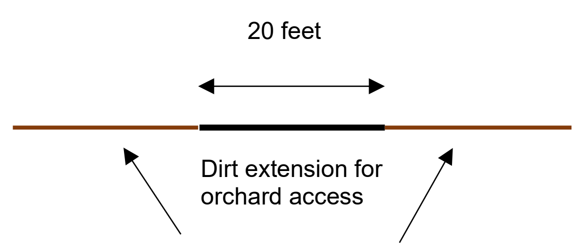
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Middle of recorded segment: 746815 mE, 4117882 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an unnamed dirt road that runs east to west. The road currently serves as an access road within the Campos almond orchards. The road appears to have been widened an additional 20 feet on either side to allow access to the nearby orchards. A distribution line currently runs along the south side of the road.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 485 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W

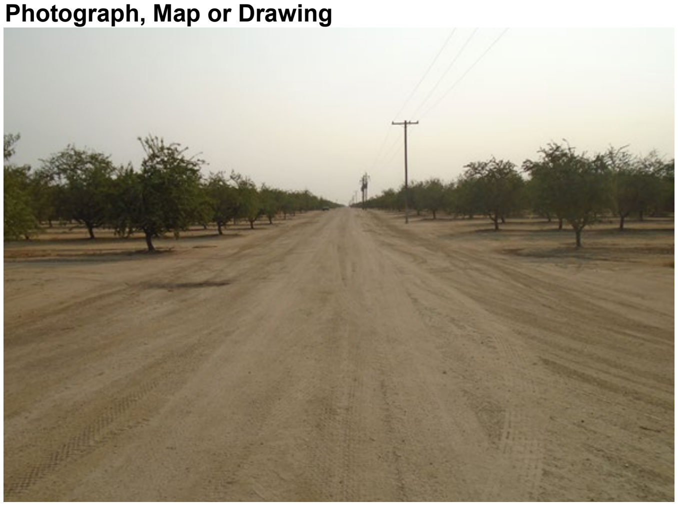


L5. Associated Resources: N/A

L6. Setting: Vegetation near the site consists of almond trees (orchards) and non-native grasses. Slope is under 2% with an open aspect. Deposition is alluvial. Soils consisted of tan sandy loam. 0-2% shale pebble inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use, erosion, and distribution line right-of-way maintenance.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of recorded segment of road. View east. September 24, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 10, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1946 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the mid-twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-20 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1946 Le Grand, California. 1:62,500 scal.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

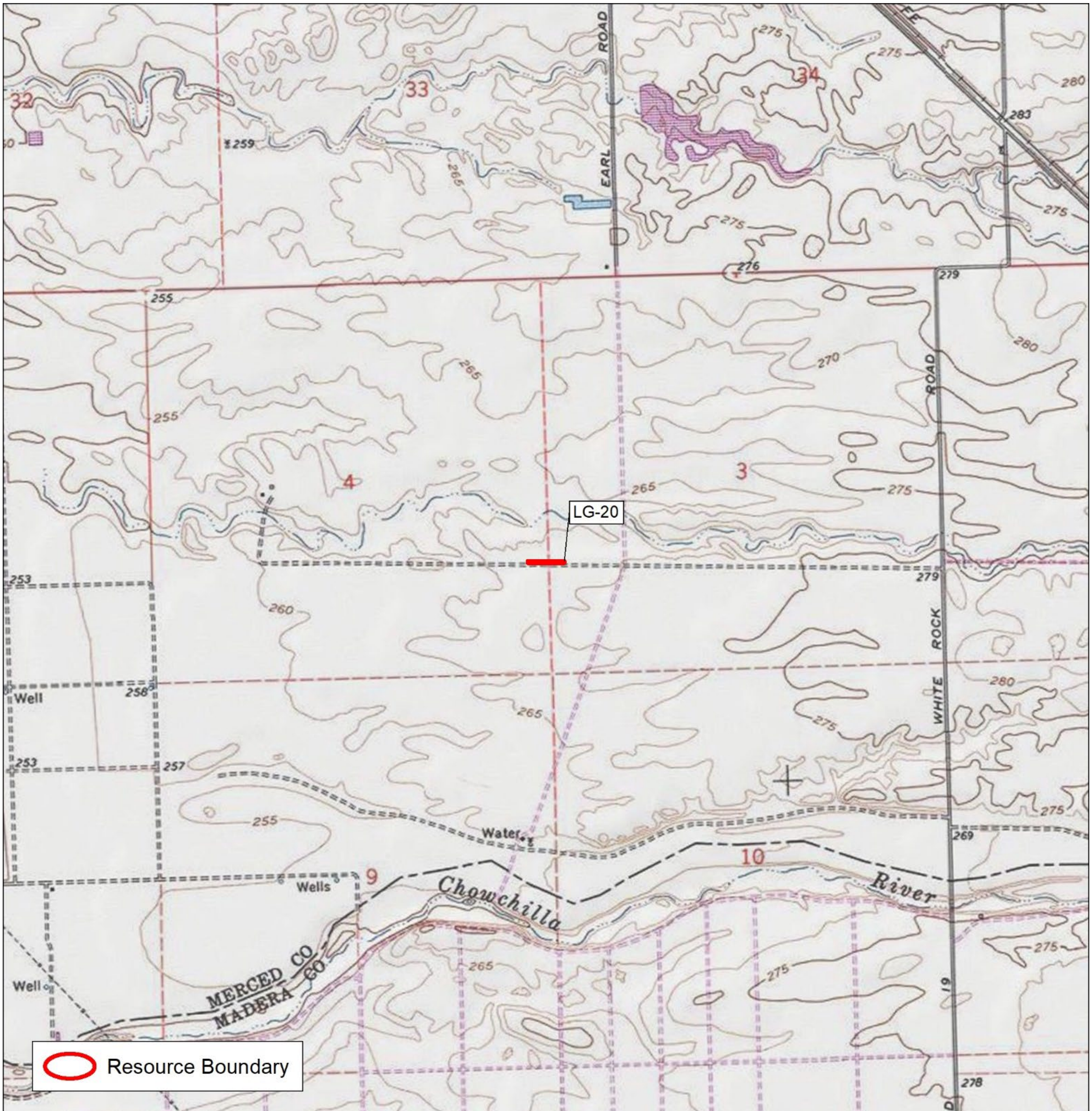
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-20

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T09S, R16E, SEC 4
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-20
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

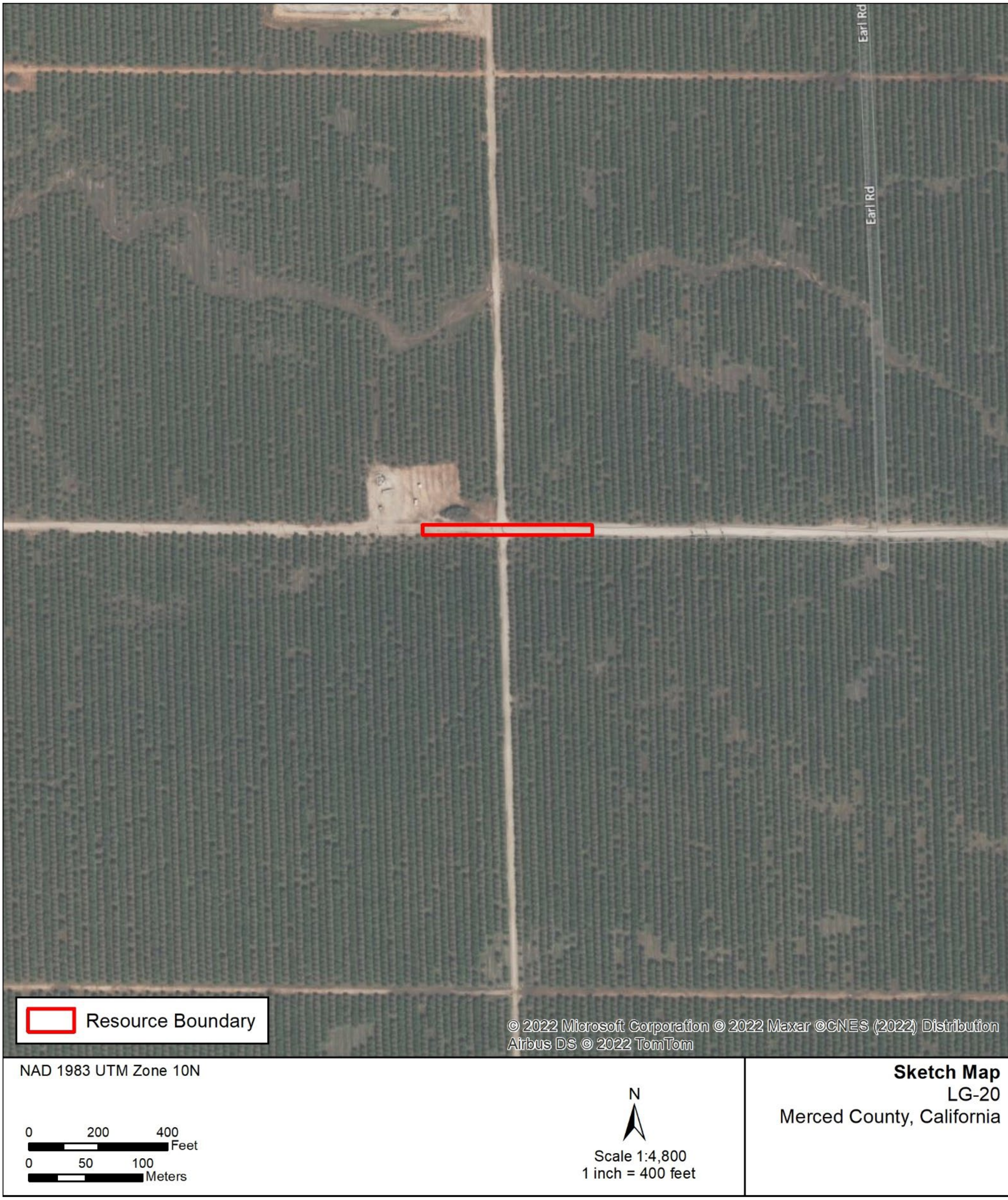
Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-20

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** Jordan Road (LG-22)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 8S; **R** 16E; NW **of** NW **of Sec** 16; M.D. **B.M.**
c. Address: N/A City: Le Grand Zip: 95333
d. UTM: Zone: 10N, 745611 mE, 4125028 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel northwest on S. Santa Fe Ave. and turn right onto Cunningham Rd. Travel north for approximately 2,000 feet and turn right onto Jordan Rd. The recorded segment of road will cross the Le Grand Canal in approximately 1.2 miles to the east.

***P3a. Description:** LG-22 consists of two features. Feature 1 is a concrete bridge spanning the Le Grand Canal constructed ca. 1922-1927 and Feature 2 is a recorded portion of Jordan Road constructed prior to 1918 (USGS 1918a). The bridge is single span and is constructed of concrete. It is approximately 23 feet wide and 20 feet long. The recoded section of Jordan Road is comprised of an asphalt roadway with an east-west orientation measuring approximately 15 feet wide and 490 feet long. The roadway is depicted in the 1918 USGS map as a light duty roadway (USGS 1918a). The bridge was constructed concurrent with the Le Grand Canal ca. 1922-1927. Both the road and the bridge appear in historic aerial images from 1946 and appear essentially similar to the way they appear today (NETR 2021).

***P3b. Resource Attributes:** (List attributes and codes) AH7 (road) and HP19 (bridge)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of Features 1 and 2. View north. September 22, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca 1918 (USGS 1918a)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 22, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

Attachments: ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # (Assigned by recorder) Jordan Road (LG-22)
*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Jordan Road
B2. Common Name: Jordan road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1918 bridge constructed ca. 1922-1927
***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

(Sketch Map with north arrow required.)

Please see attached

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

L1. Historic and/or Common Name:

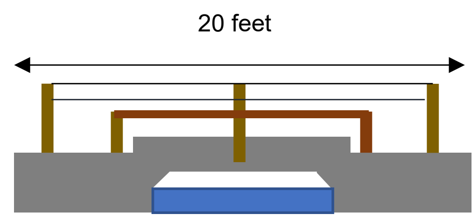
L2 a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point segment: Middle of bridge: 745611 mE, 4125029 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
Feature 1 is a bridge spanning the Le Grand Canal. The bridge is composed entirely of concrete. A wooden guardrail with wire fencing lines the northern side of the bridge. Iron screws were observed on the southern side, suggesting the guardrail was installed there as well.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)
- **a. Top Width:** 23 feet
- **b. Bottom Width:** 23 feet
- **c. Height or Depth:** 6 feet tall
- **d. Length of Segment:** 20 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** S



L5. Associated Resources: LG-22 Feature 2: Jordan Rd., and P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of non-native grasses, swamp brush, and star thistle. The slope was under 1% with an open aspect. Soil deposition is alluvial. Soils consist of tan sandy loam. Inclusions consisted of 0-5% pebble-sized shale rocks.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Detail of the north side of Feature 1 with wood guard rail visible. View east. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

LINEAR FEATURE RECORD

*Resource Name or # **(Assigned by recorder)** Jordan Road (LG-22) [Feature 2]

L1. Historic and/or Common Name: Jordan Road

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Western end of recorded segment: 745559 mE, 4125028 mN
Eastern end of recorded segment: 745711 mE, 4125029 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
Feature 2 consists of a segment of Jordan Road. The road is partially paved with asphalt but badly degraded. Jordan Rd. continues both west and north to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 15 feet
- **b. Bottom Width:** 15 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 490 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W

L5. Associated Resources: LG-22, Feature 1: bridge, and P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of non-native grasses, swamp brush, and star thistle. The slope was under 1% with an open aspect. Soil deposition is alluvial. Soils consist of tan sandy loam. Inclusions consisted of 0-5% pebble-sized shale rocks.

L7. Integrity Considerations: The resource is in poor condition with major impacts from use and erosion. Much of the asphalt has eroded away.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of Feature 2 from the eastern end of the recorded segment. Jordan Rd. turns north here. View west. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1918 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the early-twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-22 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

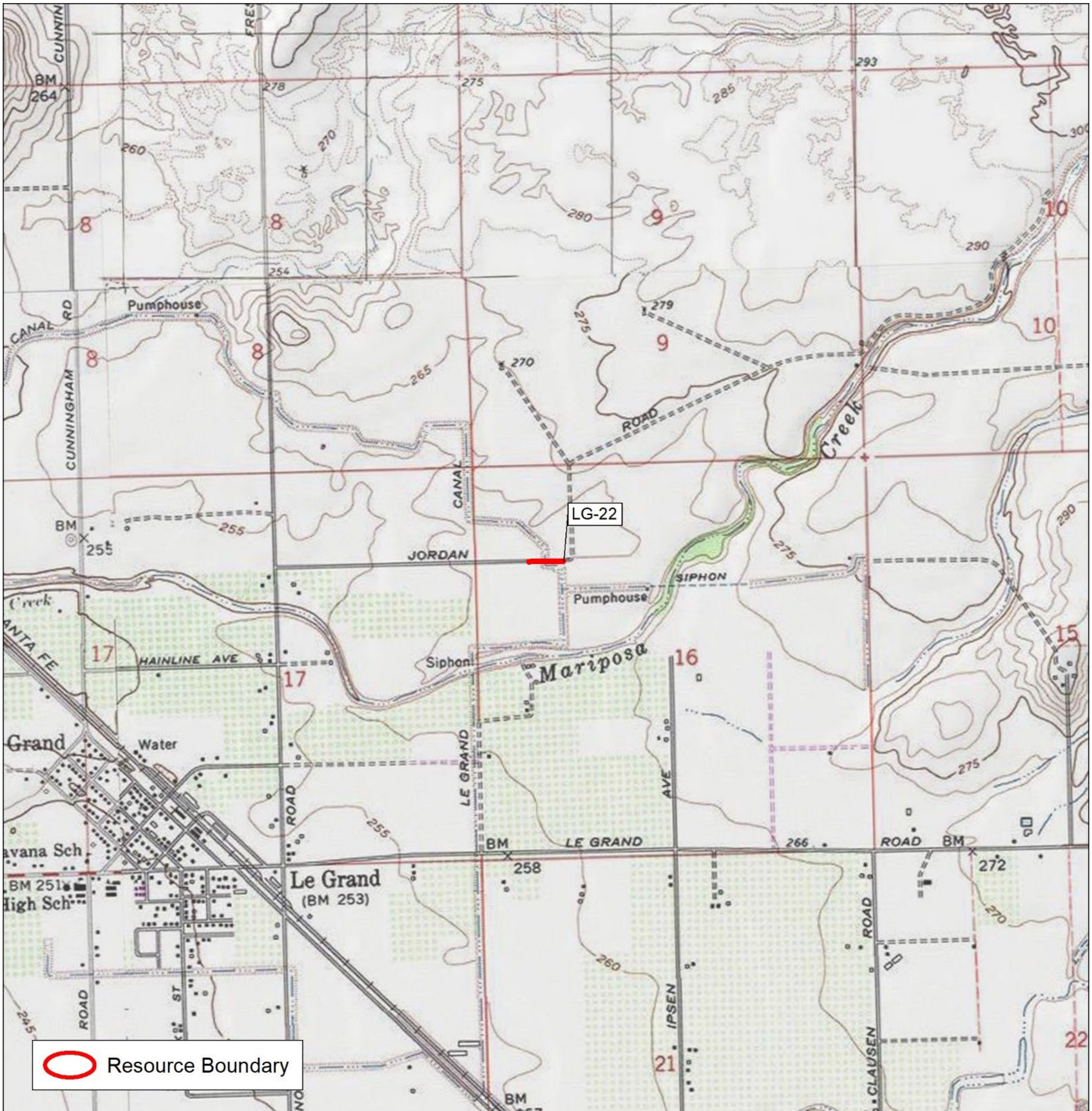
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1918a Le Grand, California. 1:125,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

Page **9** **of** **10**
*Resource Name or # **(Assigned by recorder)** Jordan Road (LG-22)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 16
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-22
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Jordan Road (LG-22)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-22
Merced County, California

State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION** **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **CRHR Status Code**
Other Listings **Review Code** **Reviewer**	**Date**

 ***Resource Name or #:** LG-23

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 T 7S; R 15E; Mul Sec 25; M.D. **B.M**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Northern end of recorded segment: 10N, 741103 mE, 4131490 mN
Southern end (intersection with E. Child's Ave.): 741353 mE, 4130241 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel east on E. Child's Ave. for approximately 2.1 miles and cross over the Le Grand Canal. The dirt road is on the east side of the Le Grand Canal.

***P3a. Description:** LG-23 consists of a recorded segment of an unnamed graded dirt road constructed prior to 1946 (NETR 2021). The recorded segment is approximately 15 feet wide and 5,280 feet long. The road generally has a north-south alignment which follows the contours of the Le Grand Canal located adjacent to the road to the east. The road crosses the canal to the west at the northern end of the recorded segment. No bridge was observed crossing the canal in this location but the road appears to continue west to an undetermined distance. The road first appears on USGS maps in 1961 and is depicted as an unimproved road (USGS 1961).

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the road near the southern end of the recorded segment. View north. September 21, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1961 (USGS 1961)

***P7. Owner and Address:**
Private

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 21, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1961
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

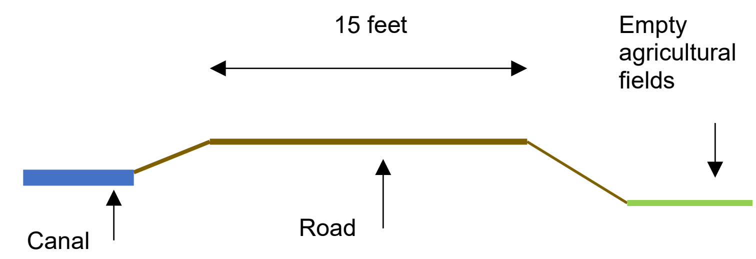
b. Location of point segment: Northern end of recorded segment: 10N 741103 mE, 4131490 mN
Southern end (intersection with E. Child's Ave.): 10N 741353 mE, 4130241 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a dirt road that predominantly runs along the eastern side of the Le Grand Canal.

L4. Dimensions:
- **a. Top Width:** 15 feet
- **b. Bottom Width:** 15 feet
- **c. Height or Depth:** 0-8 feet tall (varies by location)
- **d. Length of Segment:** 5,280 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

L4e. Sketch of Cross-Section (Include scale) **Facing:** N



L6. Setting: Vegetation near the site consists of swamp brush and non-native grasses. Currently empty but plowed agricultural fields lie on either side of the canal. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. Inclusions consist of 0-5% pebble-sized shale rocks.

L7. Integrity Considerations: The resource is in good condition with minor impacts from use and erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the historic road with the Le Grand Canal on the left. View north. September 21, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

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***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

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NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. The road was constructed prior to 1946 as a rural access road. It is one of thousands of roads constructed throughout the region, California, and the United States during the mid-twentieth century. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-23 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

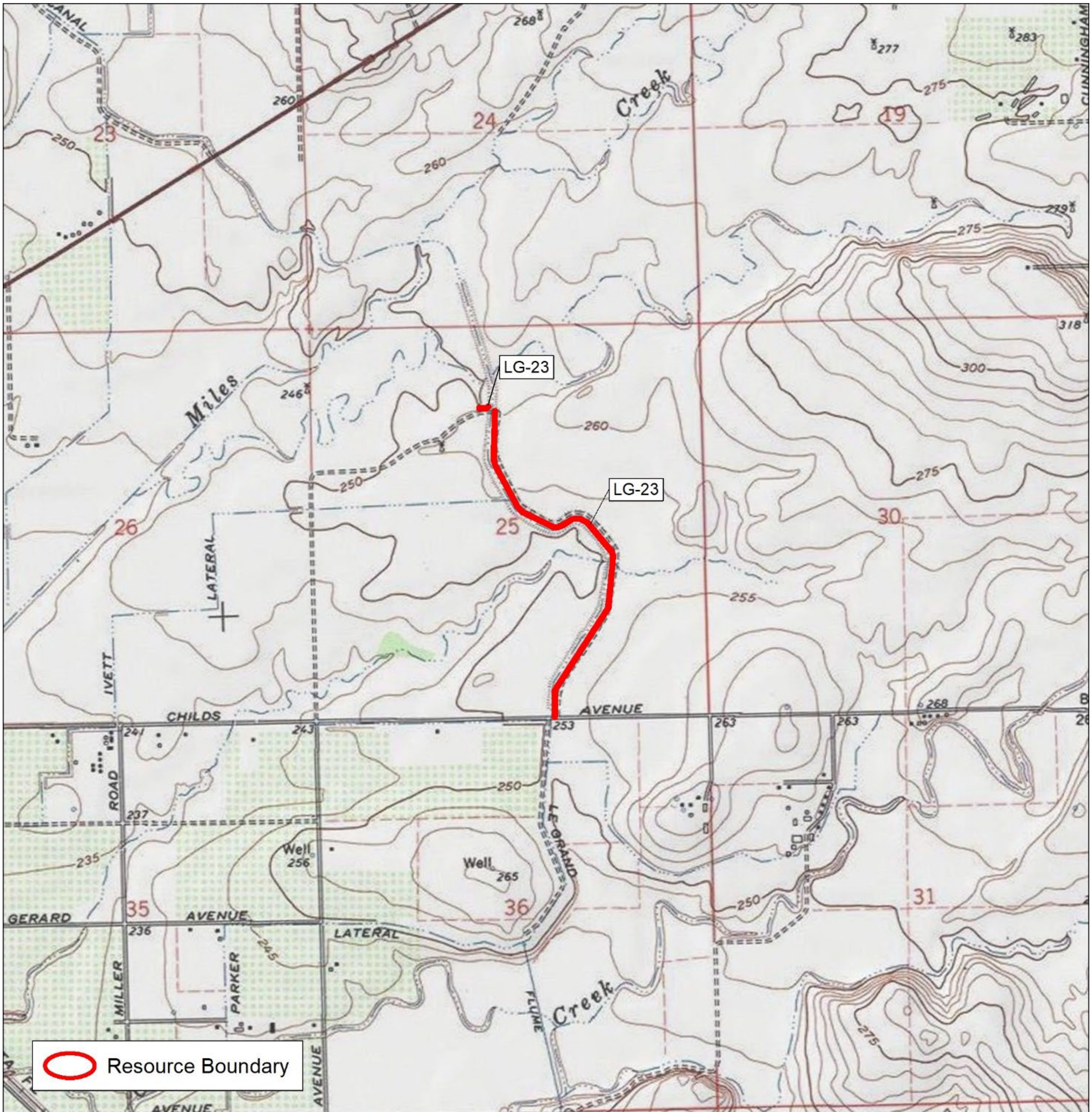
Primary #
HRI#

LOCATION MAP

Trinomial

*Resource Name or # (Assigned by recorder) LG-23

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 25, 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Project Location

Resource Location
LG-23
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-23

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 500 1,000 Feet
0 150 300 Meters

N

Scale 1:12,000
1 inch = 1,000 feet

Sketch Map
LG-23
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #:** S. Cunningham Road (LG-24)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Plainsburg **Date** 2012 **T** 8S; **R** 16E; NE **of** SE **of Sec** 7; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northern end of recorded segment: 4125995 mN, 743684 mE
Southern end of recorded segment: 4125914 mN, 743685 mE

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel north on S. Cunningham Rd. for approximately 0.95 miles and park on the side of the road. The recorded segment spans the Le Grand Canal in this location.

***P3a. Description:** LG-24 consists of the recorded segment of South Cunningham Road constructed prior to 1946 (NETR 2021). The recorded segment of South Cunningham Road consists of a two-lane asphalt road with a north-south alignment. The recorded segment is approximately 24 feet wide and 270 feet long. The road is depicted on the 1947 USGS map as a secondary highway (USGS 1947). While the alignment of the road appears unchanged, it appears to have been subject to regular road maintenance including repaving resulting in the loss of historical materials.

***P3b. Resource Attributes:** AH7 (road)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of S. Cunningham Rd. View north. September 23, 2021.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca 1946 (USGS 1946)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** S. Cunningham Road (LG-24)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: South Cunningham Road
B2. Common Name: South Cunningham Road
B3. Original Use: road **B4. Present Use:** road
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946; repaving and regular maintenance (dates unknown, based on field observations)
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Road **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

*Resource Name or # **(Assigned by recorder)** S. Cunningham Road (LG-24)

L1. Historic and/or Common Name: S. Cunningham Rd.

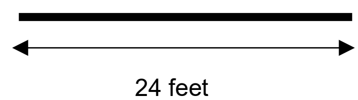
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Northern end of recorded segment: 4125995 mN, 743684 mE
Southern end of recorded segment: 4125914 mN, 743685 mE

L3. Description: The resource consists of a two-lane, asphalt highway that runs north to south. S. Cunningham continues both north and south to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 24 feet
- **b. Bottom Width:** 24 feet
- **c. Height or Depth**: N/A
- **d. Length of Segment:** 270 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** N



L5. Associated Resources: P-24-000608 (the Le Grand Canal, CF-35 (cement sluice), and CF-36 (cement-lined culvert)

L6. Setting: Vegetation at the site consists of almond trees and non-native grasses. Slope is under 2% with an open aspect. Soils consist of tan sandy loam. Deposition is alluvial.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and automobile use.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of S. Cunningham Rd. and associated sluice, culvert, and Le Grand Canal. View southeast.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. South Cunningham Road was constructed prior to 1946 to provide access from rural communities to Le Grand and east-west transportation corridors in the region. It is one of thousands of roads constructed throughout the region, California, and the United States during the early twentieth century. While it would have been heavily used and was undoubtably important to the community of Le Grand and the surrounding rural areas, it does not have sufficient historical significance, even at a local level, to be considered eligible under this criterion. The road is one of several secondary access roads to a more significant commercial and transportation route. It is a common property type found throughout California and the United States and not significantly linked to any important historical themes. Research has yielded no information to suggest that the road was a major transportation or commercial route. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this road is specifically associated with persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this road represents any significant departure from standard road building and design from its period of construction. It is essentially similar to other roads constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-24 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1947 Plainsburg, California. 1:24,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # (Assigned by recorder) S. Cunningham Road (LG-24)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**

USGS 7.5' Quad: PLAINSBURG (1976)
Legal Description: T08S, R16E, SEC 7
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

Project Location

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-24
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** S. Cunningham Road (LG-24)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 25 50 Feet
0 7.5 15 Meters

N
Scale 1:600
1 inch = 50 feet

Sketch Map
LG-24
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

 ***Resource Name or #:** LG-26

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒**Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SE of SW of Sec 21; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northwestern end (intersection with Santa Fe Railroad): 10N, 745862 mE, 4122372 mN
Southeastern end of recorded segment: 10N, 745983 mE, 4122339 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel southeast on Santa Fe Ave. for approximately 1.3 miles and park on the side of the road. The recorded segment of ditch is underneath the Santa Fe Railroad overpass approximately 90 feet northeast of South Santa Fe Ave.

***P3a. Description:** LG-26 consists of the recorded segment of an unnamed ditch constructed ca.1959 (NETR 2021). The ditch is approximately 15 feet wide and 435 feet long. It has a northwest-southeast orientation before gradually curving to a northeast-southwest orientation. Based on its proximity to neighboring orchards, the ditch was likely constructed to support agriculture.

***P3b. Resource Attributes:** AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of ditch facing south. September 28, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1959 (NETR 2021)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation ditch **B4. Present Use:** irrigation ditch
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1959
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation ditch **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point segment: Northwestern end (intersection with Santa Fe Railroad): 745862 mE, 4122372 mN
Southeastern end of recorded segment: 745983 mE, 4122339 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)

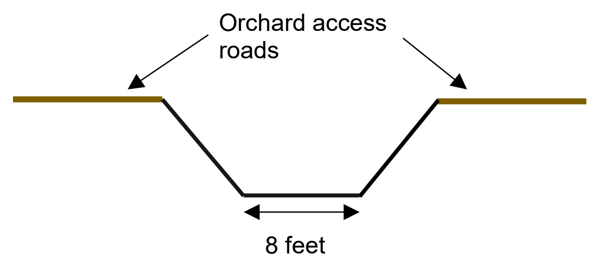
The resource consists of an earthen ditch. The ditch is likely a channelized portion of the unnamed natural stream. Due to time and budget constraints only a segment of the ditch was recorded. The ditch continues both southeast and north to an undetermined distance.

L4. Dimensions:

- **a. Top Width:** 15 feet
- **b. Bottom Width:** 8 feet
- **c. Height or Depth:** 8 feet
- **d. Length of Segment:** 435 feet

L5. Associated Resources: P-24-001881: The Santa Fe Railroad.

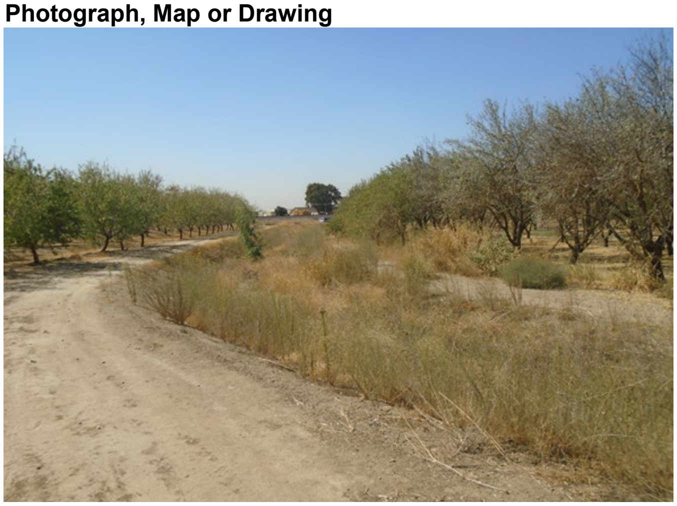
L4e. Sketch of Cross-Section (Include scale) **Facing:** South



L6. Setting: Vegetation near the site consists of almond trees (orchards), non-native grasses, datura, and sage brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam with 2% shale inclusions ranging in size from pebble to cobble.

L7. Integrity Considerations: The resource is in fair condition with moderate impacts from erosion and vegetation growth. The ditch no longer appears to be in use.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the eastern end of the recorded segment. View west. September 28, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation ditch. Research has yielded no information to suggest that this ditch is specifically associated with important historical events. It is one of thousands of irrigation ditches constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation ditch is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation ditch represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation ditches constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-26 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

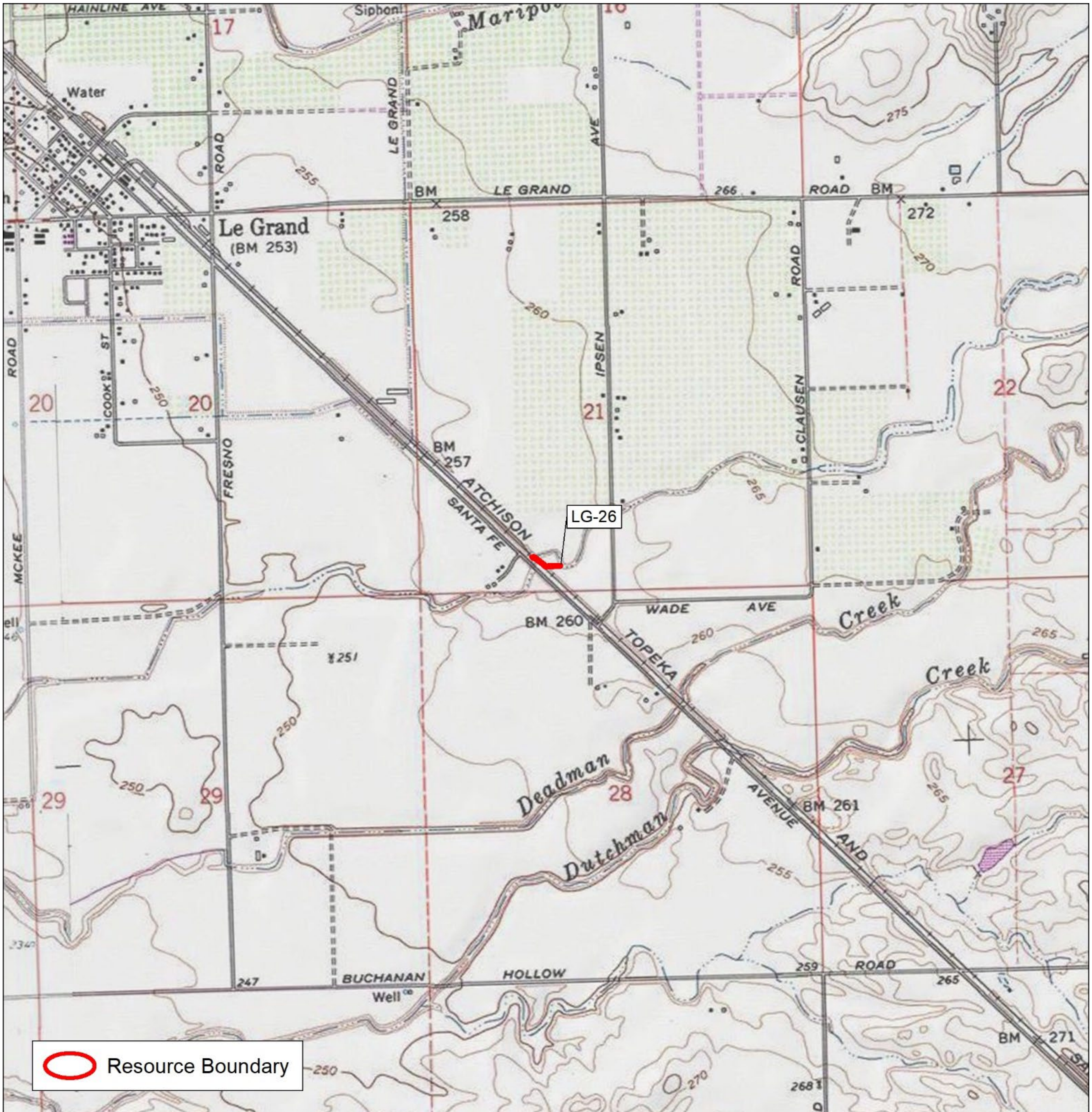
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-26

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-26
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-26

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code

Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** LG-27

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; NE **of** NW **of** Sec 23; M.D. **B.M.**

c. **Address**: N/A City: Le Grand Zip: 95333

d. **UTM: Zone:** Intersection with the Le Grand Canal: 10N, 739293 mE, 4133104 mN
Southern end of recorded segment: 10N, 739294 mE, 4133064 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel northeast on Highway 140 for approximately 1.8 miles. Before crossing the Le Grand Canal turn left onto the dirt access road on the west side of the canal. Travel north for approximately 0.6 miles. The segment of canal will be on the left.

***P3a. Description:** LG-27 consists of the recoded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 14-feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate. The canal has a north-south alignment before transitioning to a northeast-southwest alignment. This segment was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of sluice from the Le Grand Canal leading to canal segment, observed on the left. View south. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St, Merced, CA 95340

***P8. Recorded by:** (Name, affiliation, and address)
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. **Historic and/or Common Name:** N/A

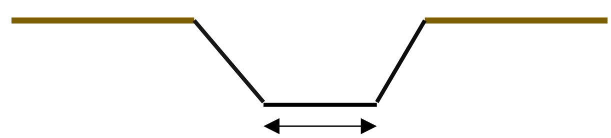
L2 a. **Portion Described:** ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. **Location of point segment:** Intersection with the Le Grand Canal: 739293 mE, 4133104 mN
Southern end of recorded segment: 739294 mE, 4133064 mN

L3. **Description:** (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen canal segment.

L4. **Dimensions:** (In feet for historic features and meters for prehistoric features)
- **a.** **Top Width:** 14 feet
- **b.** **Bottom Width:** 6 feet
- **c.** **Height or Depth:** 7 feet deep
- **d.** **Length of Segment:** 134 feet

L4e. **Sketch of Cross-Section** (Include scale) **Facing:** South



L5. **Associated Resources:**
P-24-000608: the Le Grand Canal

L6. **Setting:** Vegetation near the site consists of almond trees (orchards), non-native grasses, cattails, and water reeds. Slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. **Integrity Considerations:** The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Aerial photograph of recorded canal segment. From Google Earth 2022.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-27 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

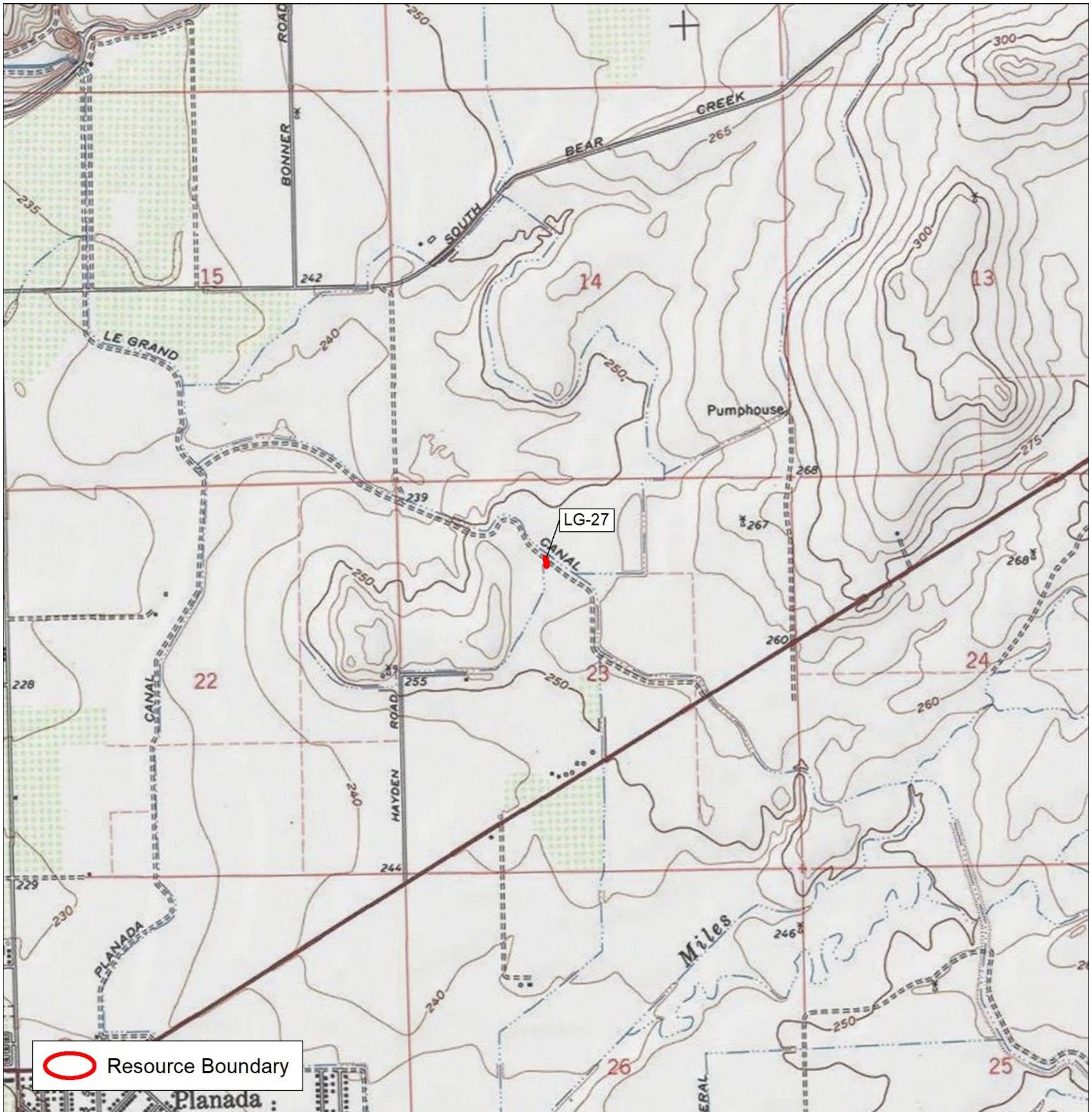
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # HRI# Trinomial

Page **8** **of** **9** *Resource Name or # **(Assigned by recorder)** LG-27

*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-27
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

*Resource Name or # **(Assigned by recorder)** LG-27

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-27
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

 ***Resource Name or #:** LG-28

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; NE **of** NW **of Sec** 23; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 739407 mE, 4133033 mN
Eastern end of recorded segment: 10N, 739461 mE, 4133034 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel northeast on State Route 140 for approximately 1.8 miles and cross the Le Grand Canal. Turn left onto the canal access road on the east side of the canal. Travel north approximately 0.53 miles. The canal segment is the east-west oriented canal heading east from the Le Grand Canal.

***P3a. Description:** LG-28 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 20 feet wide. The canal segment connects directly to the Le Grand Canal. The canal has an east-west alignment before transitioning into a north-south alignment where it transitions into an irregular alignment and feeds into additional irrigation canals. The canal segment is observed on a historic topographic map from 1948 (USGS 1948).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the Le Grand Canal and LG-28 segment on right. View north. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St,
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

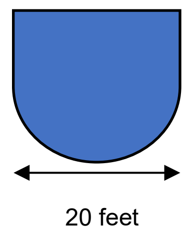
b. Location of point segment: Intersection with the Le Grand Canal: 10N 739407 mE, 4133033 mN
Eastern end of recorded segment: 10N 739461 mE, 4133034 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal connecting to the Le Grand Canal. The canal segment is observed on a historic topographic map. Due to time and budget constraints only a segment of the canal was recorded. The canal continues east to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 15 feet
- **c. Height or Depth:** 7 feet deep
- **d. Length of Segment:** 195 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

L4e. Sketch of Cross-Section (Include scale) **Facing:** East



L6. Setting: Slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the Le Grand Canal and east-running canal pictured on left. View south. September 20, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

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(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

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In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

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With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-28 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1948 Planada, California. 1:24,000 scale.

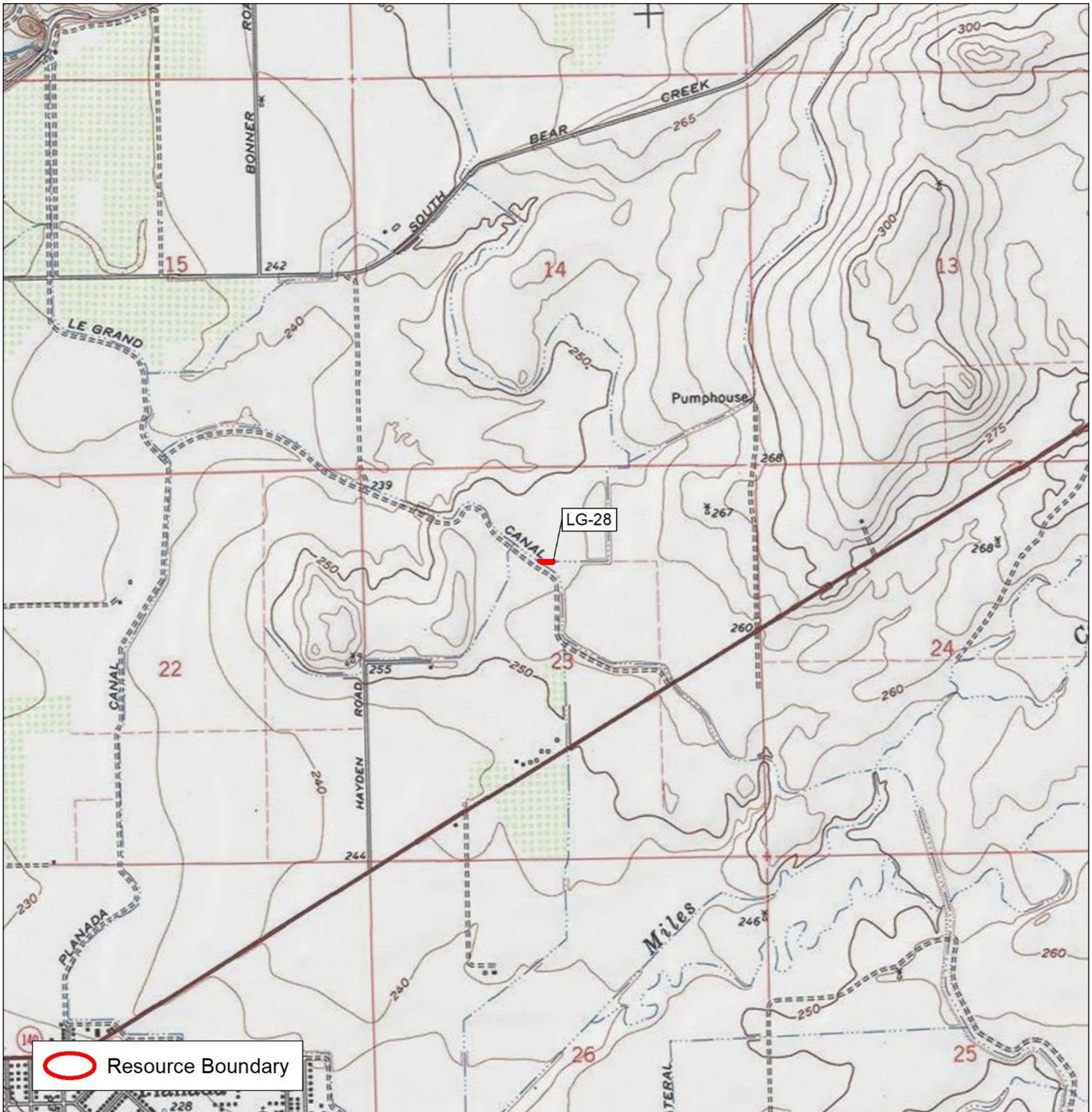
LOCATION MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** LG-28

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-28
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9**
*Resource Name or # **(Assigned by recorder)** LG-28
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-28
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code   Reviewer   Date

***Resource Name or #:** LG-29

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 7S; R 15E; SW of NE of Sec 23; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Sluice at the intersection with the Le Grand Canal: 10N, 739510 mE, 4132708 mN
Southern end of recorded segment: 10N, 739511 mE, 4132689 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Le Grand travel northeast on State Route 140 for approximately 1.8 miles and turn left onto the dirt access road on the west side of the Le Grand Canal. Travel northwest for approximately 0.3 miles. The canal segment runs south from this intersection with the Le Grand Canal.

***P3a. Description:** LG-29 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 12 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate and has a north-south alignment. The canal was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of south-facing channel and cement sluice and inlet. View south. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

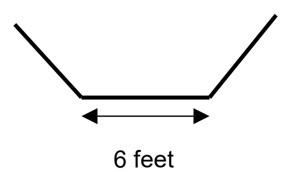
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Sluice at the intersection with the Le Grand Canal: 739510 mE, 4132708 mN
Southern end of recorded segment: 739511 mE, 4132689 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen canal channel observed on a historic topographic map. The south-facing channel is connected to the Le Grand Canal with a cement-lined inlet. The canal extends beyond the recorded portion to the south to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 12 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 60 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** South



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: The slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Southern side of inlet to south-facing canal channel. The Le Grand Canal is visible in the mid-ground. View north. September 20, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-29 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

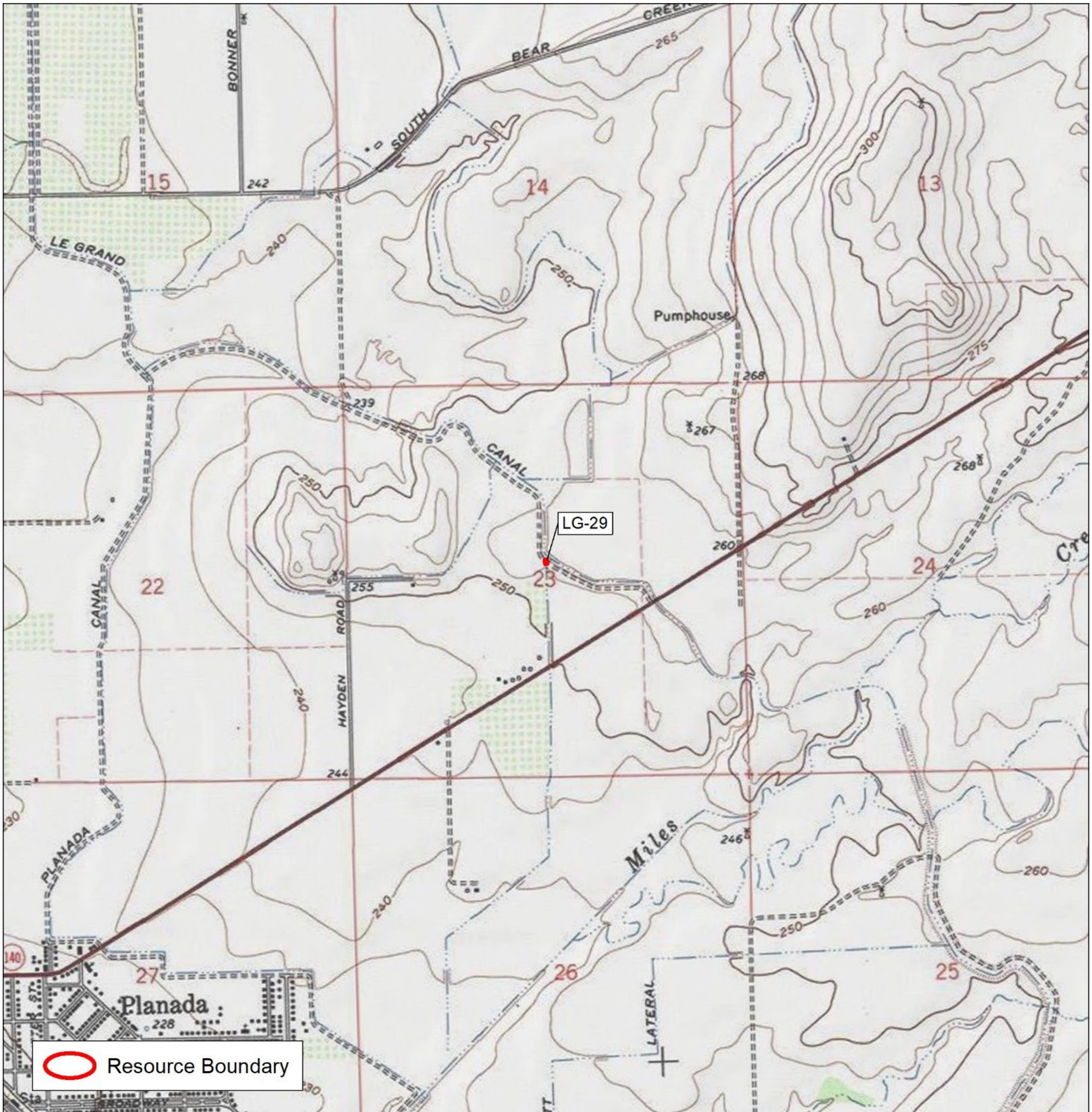
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI#
LOCATION MAP	Trinomial

Page **8** of **9** *Resource Name or # **(Assigned by recorder)** LG-29

*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Project Location

Resource Location
LG-29
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION SKETCH MAP	Primary # HRI# Trinomial

*Resource Name or # (Assigned by recorder) LG-29

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code   Reviewer   Date

    ***Resource Name or #:** LG-30

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted**   ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; SE **of** SW **of Sec** 24; M.D. **B.M.**

c. Address: N/A   City: Le Grand   Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 740792 mE, 4132181 mN
Southwestern end of recorded segment: 10N, 740759 mE, 4132137 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel east on E. Child's Ave. for approximately 2.15 miles. Turn left onto the dirt access road on the west side of the Le Grand Canal. Travel north and west for approximately 1.5 miles and park near the cement dam. The recorded segment of channelized stream will be located flowing southwest of the dam.

***P3a. Description:** LG-30 consists of the recorded segment of a channelized section of Miles Creek constructed ca. 1946 (NETR 2021). The channel runs northeast to southwest and bisects the Le Grand Canal. It features a concrete weir flanked by rip rap where the channel meets the canal on the northeast bank.

***P3b. Resource Attributes:** HP20 (canal), HP21 (dam), and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of cement dam and channelized portion of Miles Creek in mid-ground. View west. September 21, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: channelized creek **B4. Present Use:** channelized creek
***B5. Architectural Style:** utlitiarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** channelized canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

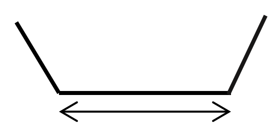
b. Location of point segment: Intersection with the Le Grand Canal: 740792 mE, 4132181 mN
Southwestern end of recorded segment: 740759 mE, 4132137 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of channelized section of Miles Creek. The canal runs northwest to southeast and bisects the Le Grand Canal. At the juncture a cement weir allows water to flow into the Le Grand Canal. The channel continues both northeast and southwest beyond the recorded section to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** 10 feet deep
- **d. Length of Segment:** 330 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

L4e. Sketch of Cross-Section (Include scale) **Facing:** W



L6. Setting: Vegetation near the site consists of willow, non-native grasses, starthistle, cattail, and other swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. Inclusions were composed of 0-5% shale pebbles.

L7. Integrity Considerations: The resource is in fair condition with moderate impacts from vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the Le Grand Canal and channel that runs northeast in the background on the left. September 21, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 16, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from “Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures” (Caltrans et al 20000) and **“**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California” (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California’s history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of a channelized segment of Mills Creek. Research has yielded no information to suggest that this channelized creek is specifically associated with important historical events. It is one of thousands of channelized creek constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this channelized creek is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this channelized creek represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-30 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

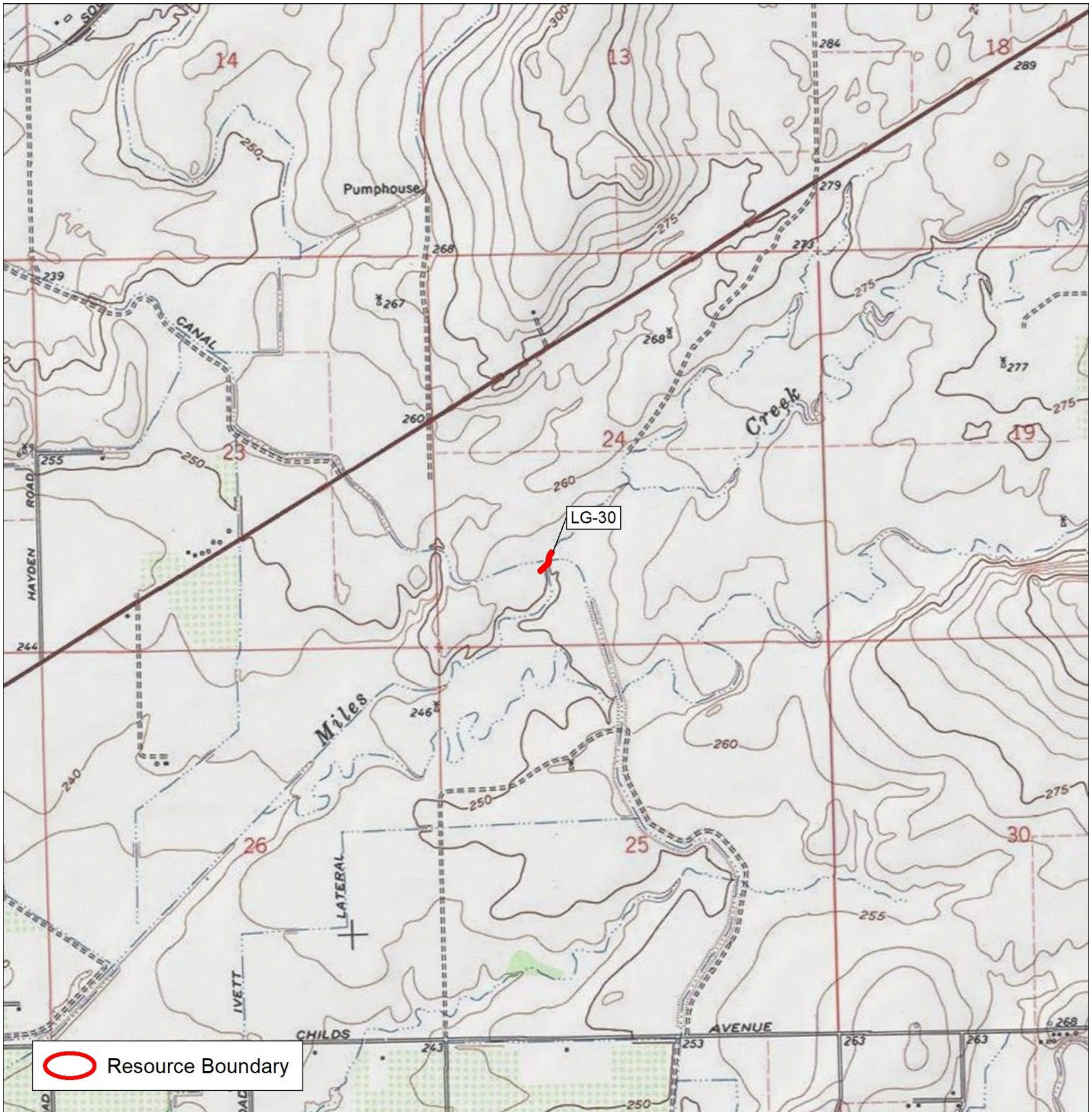
Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

Page **8** **of** **9**
*Resource Name or # **(Assigned by recorder)** LG-30
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 24
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-30
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-30

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-30
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

***Resource Name or #:** Ivett Lateral (LG-31)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; SE **of** NW **of Sec** 25; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 741162 mE, 4131137 mN
Western end of recorded segment: 10N, 741133 mE, 4131135 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel east on E. Child's Ave. for approximately 1.67 miles and turn left onto Cunningham. Travel north approximately 0.55 miles, cross the Le Grand Canal, and turn right onto the dirt access road. Proceed east for approximately 0.5 miles. The recorded segment of canal will be on the right.

***P3a. Description:** LG-31 consists of the recorded segment of the Ivett Lateral, an earthen irrigation lateral canal constructed prior to 1946 (NETR 2021). The recorded segment is approximately 35-feet wide and 95-feet long. It has an east-west alignment and joins the Le Grand Canal at a cement-lined sluice culvert inlet. A tag reading "089596 R 24 L 07 00 U" was observed on the sluice gate. The canal is flanked by dirt access roads. The lateral was observed on a historic topographic map from 1961 (USGS1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Cement-lined sluice and west facing canal segment. View northwest. September 21, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca 1961

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Ivett Lateral
B2. Common Name: Ivett Lateral
B3. Original Use: irrigation lateral **B4. Present Use:** irrigation lateral
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation lateral **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name:

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

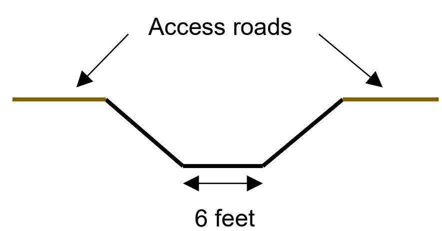
b. Location of point segment: Intersection with the Le Grand Canal: 741162 mE, 4131137 mN
Western end of recorded segment: 741133 mE, 4131135 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen irrigation branch canal and cement-lined sluice culvert inlet.

L4. Dimensions:
- **a. Top Width:** 35 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 10 feet deep
- **d. Length of Segment:** 95 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

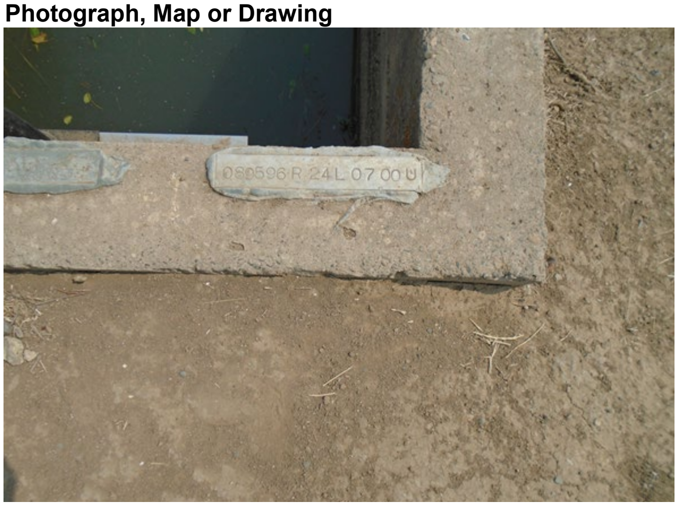
L4e. Sketch of Cross-Section (Include scale) **Facing:** West



L6. Setting: Vegetation near the site consists of non-native grasses and swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. Inclusions of 0-5% pebble-sized shale were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Detail of tag located on the cement sluice. September 21, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of Ivett Lateral. Research has yielded no information to suggest that this irrigation lateral is specifically associated with important historical events. It is one of hundreds of irrigation laterals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation lateral is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation lateral represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation laterals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-31 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

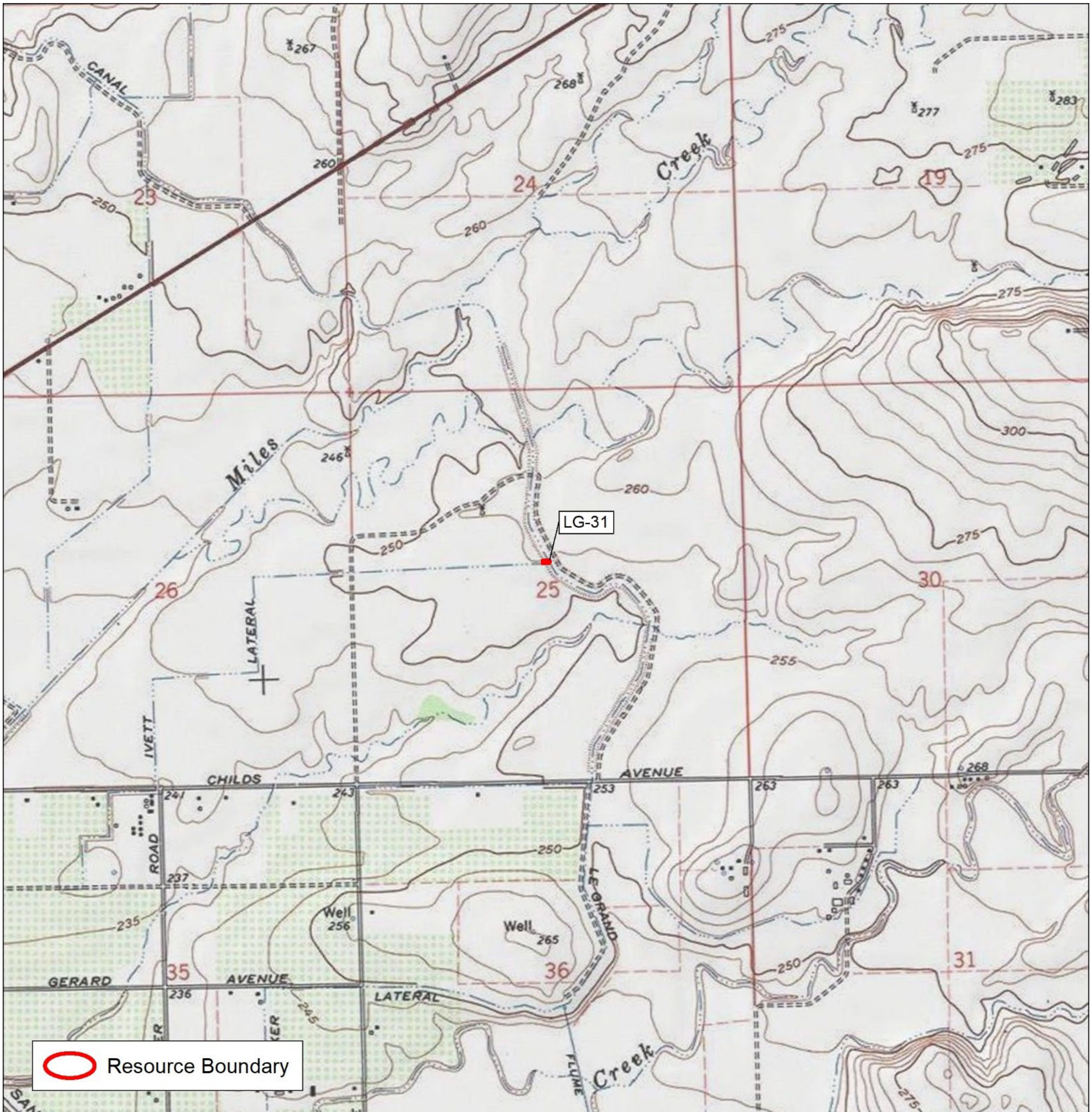
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 25
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-31
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-31
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

 ***Resource Name or #:** LG-32

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada Date 1961 T 7S; R 15E; NW of NE of Sec 36; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Intersection with the Le Grand Canal: 10N, 741323 mE, 4130040 mN
Eastern end of the recorded segment: 10N, 741353 mE, 4130040 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel east on E. Childs Ave. for approximately 2.12 miles and cross the Le Grand Canal. Turn right onto the dirt access road and travel south for approximately 630 feet. The recorded segment of canal is on the left at this point.

***P3a. Description:** LG-32 consists of a segment of earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The recorded section has an east-west alignment approximately 24 feet wide. The canal intersects with the La Grand canal by a wood sluice gate and culvert. The canal was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

Overview of canal and wooden sluice inlet from the Le Grand Canal. View east. September 22, 2021.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name:

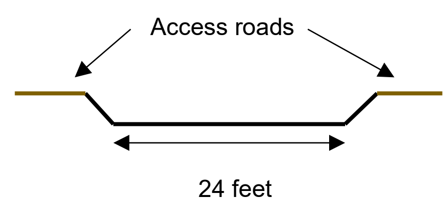
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 741323 mE, 4130040 mN
Eastern end of the recorded segment: 741353 mE, 4130040 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal constructed prior to 1946.

L4. Dimensions:
- **a. Top Width:** 24 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** 6 feet deep
- **d. Length of Segment:** 80 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** East



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation at the site consists of non-native grasses, starthistle, and other swamp shrubs. The slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of east facing canal channel (on left) and the Le Grand Canal (on right). View south. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**
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(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-32 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

Primary #
HRI#

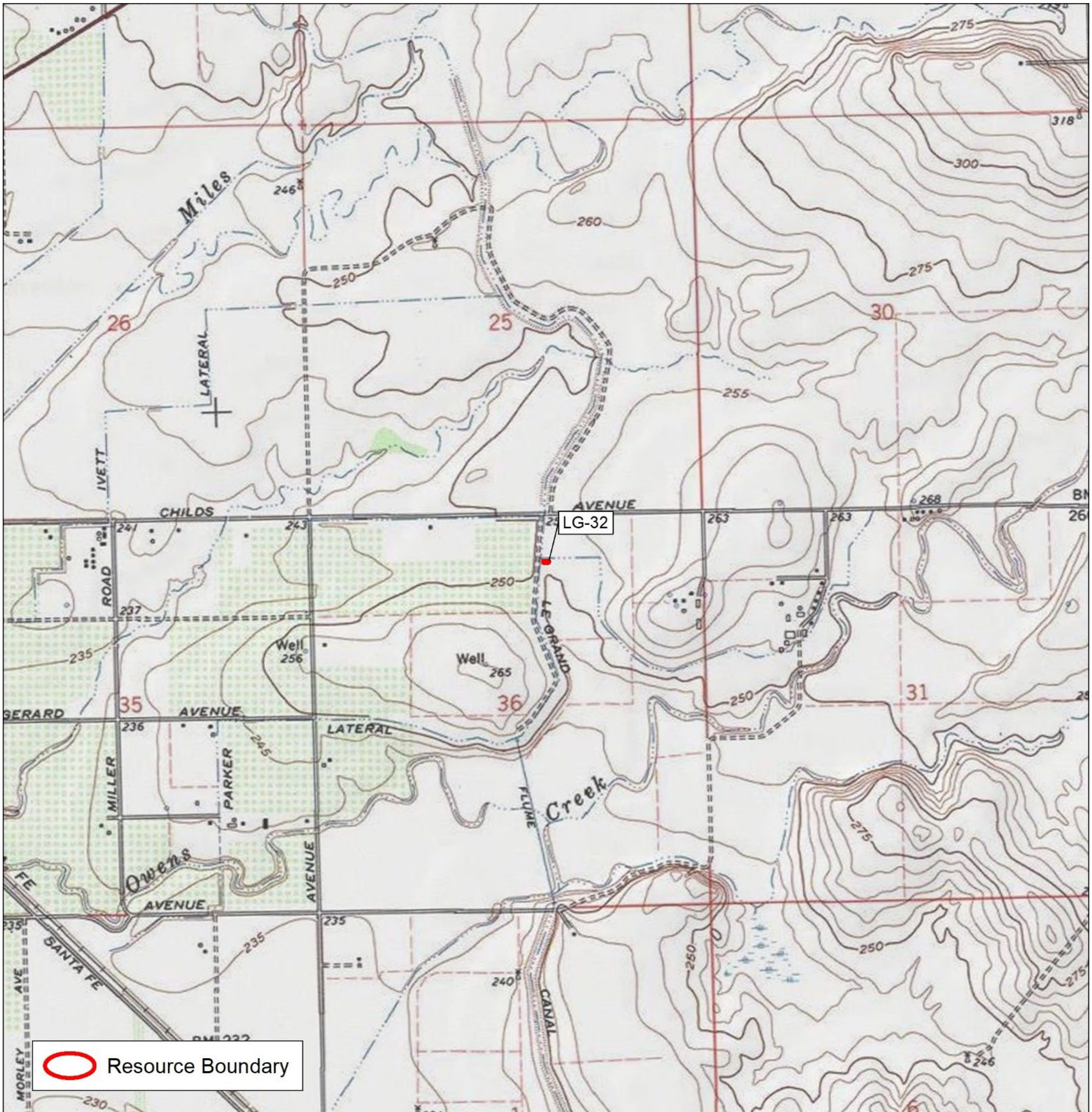
LOCATION MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** LG-32

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-32
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION SKETCH MAP	Primary # HRI# Trinomial

*Resource Name or # **(Assigned by recorder)** LG-32

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** Parker Lateral (LG-33)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Planada Date 1961 T 7S; R 15E; NW of SE of Sec 36; M.D. B.M
c. Address: N/A City: Le Grand Zip: 95333
d. UTM: Zone: Intersection with the Le Grand Canal: Zone: 10N, 741245 mE, 4129335 mN
Western end of recorded segment: Zone: 10N, 741185 mE, 4129308 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel east on E. Child's Ave. for approximately 1.7 miles and turn right onto S. Burchell Ave. Proceed south for approximately 0.52 miles and turn left onto the dirt access road along the south side of the canal. Proceed east 0.52 miles. The recorded segment of canal will be on the left.

***P3a. Description:** LG-33 consists of a recorded portion of the Parker Lateral constructed prior to 1946 (NETR 2021). The recorded portion of the Parker Lateral is an earthen branch irrigation canal with an east-west orientation. The canal intersects with the Le Grand Canal via a metal sluice gate and concrete culvert on the west bank of the Le Grand Canal. The recorded section of the parker lateral is approximately 16 feet wide.

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of cement sluice and westward flowing canal channel from the Le Grand Canal. View southwest. September 22, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Parker Lateral
B2. Common Name: Parker Lateral
B3. Original Use: irrigation lateral **B4. Present Use:** irrigation lateral
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation lateral **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

State of California—The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

*Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)

L1. Historic and/or Common Name: Parker Lateral

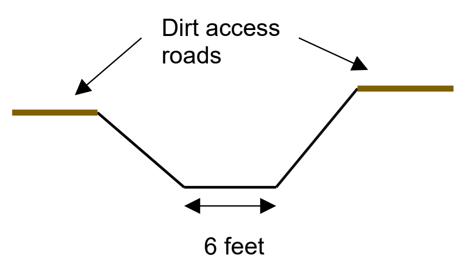
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: Zone: 10N, 741245 mE, 4129335 mN
Western end of recorded segment: Zone 10N, 741185 mE, 4129308 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of the Parker Lateral. The canal flows west and receives water from a sluice on the west bank of the Le Grand Canal. The canal continues west beyond the recorded segment to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 16 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 235 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** West

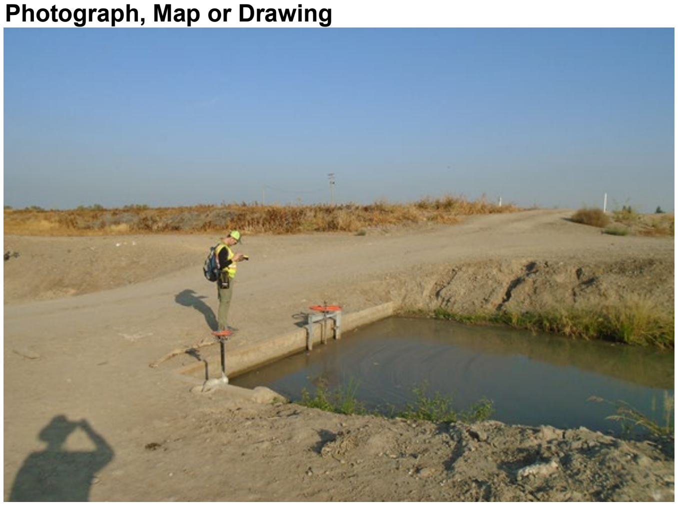


L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation at the site consists of non-native grasses, cattail, and swamp brush. The slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Cement-lined sluice leading to the recorded segment of canal to the left. View west. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of Parker Lateral. Research has yielded no information to suggest that this irrigation lateral is specifically associated with important historical events. It is one of hundreds of irrigation laterals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation lateral is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation lateral represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation laterals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-33 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

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2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

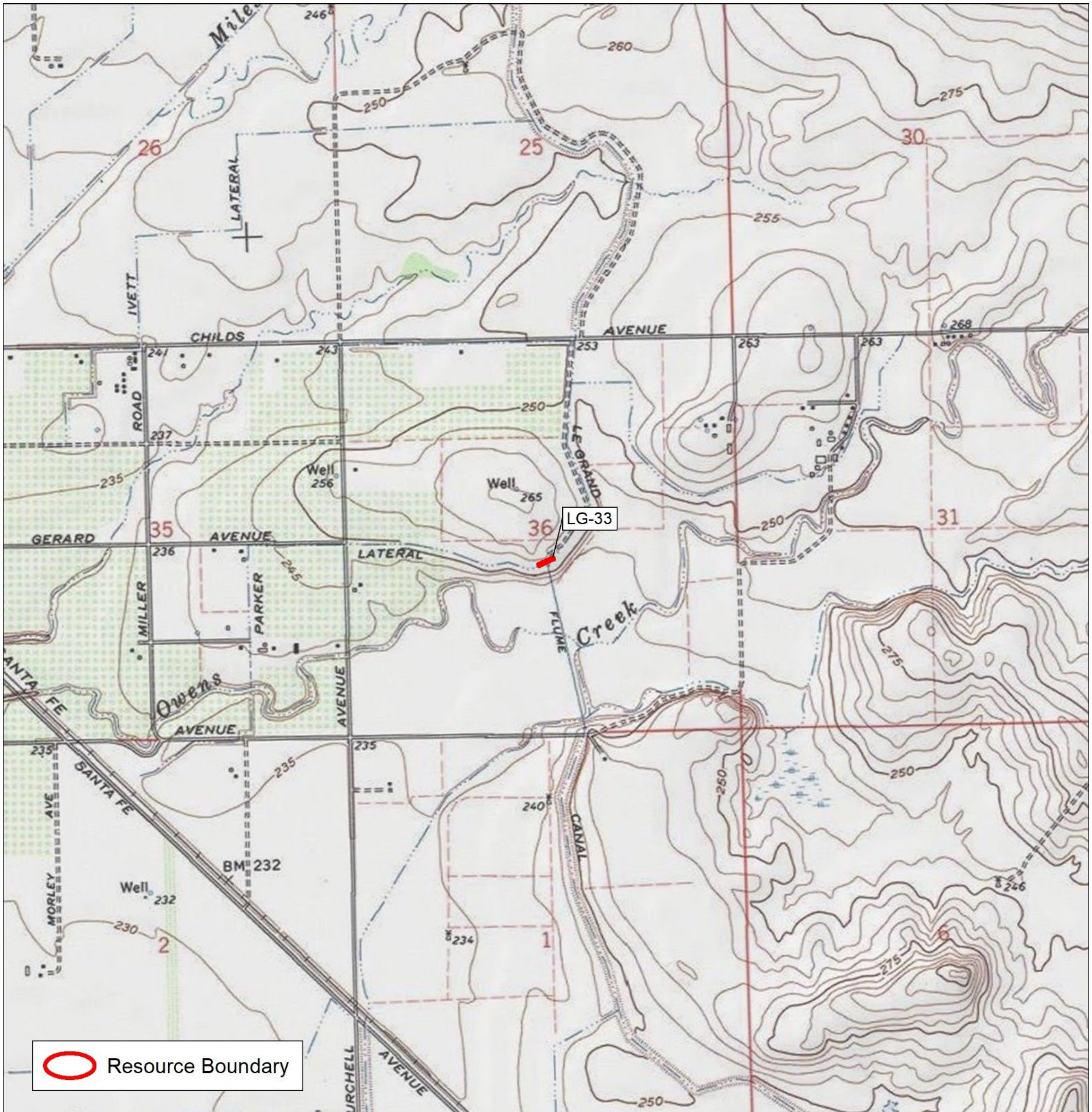
Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

LOCATION MAP

*Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-33
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # (Assigned by recorder) Parker Lateral (LG-33)

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** LG-34

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada Date 1961 T 8S; R 15E; NW of SE of Sec 1; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 741518 mE, 4127484 mN
Southwestern end of the recorded segment: 10N, 741478 mE, 4127461 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal.

***P3a. Description:** LG-34 consists of a recorded segment of an earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. It is observed in the historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Cement-lined sluice and canal segment. View west.
September 23, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced and Madera Counties, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca, 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

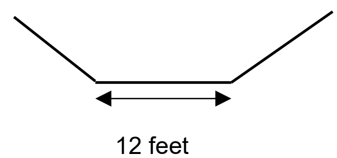
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 741518 mE, 4127484 mN
Southwestern end of the recorded segment: 741478 mE, 4127461 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen segment of canal. The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. The canal continues towards the southwest to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 12 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 155 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** Southwest

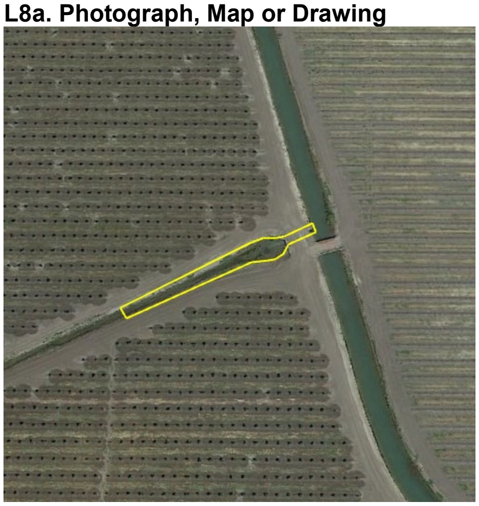


L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation at the site consists of almond trees (orchards), non-native grasses, and other swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Aerial imagery of the recorded canal segment. From Google Earth 2022.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-34 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

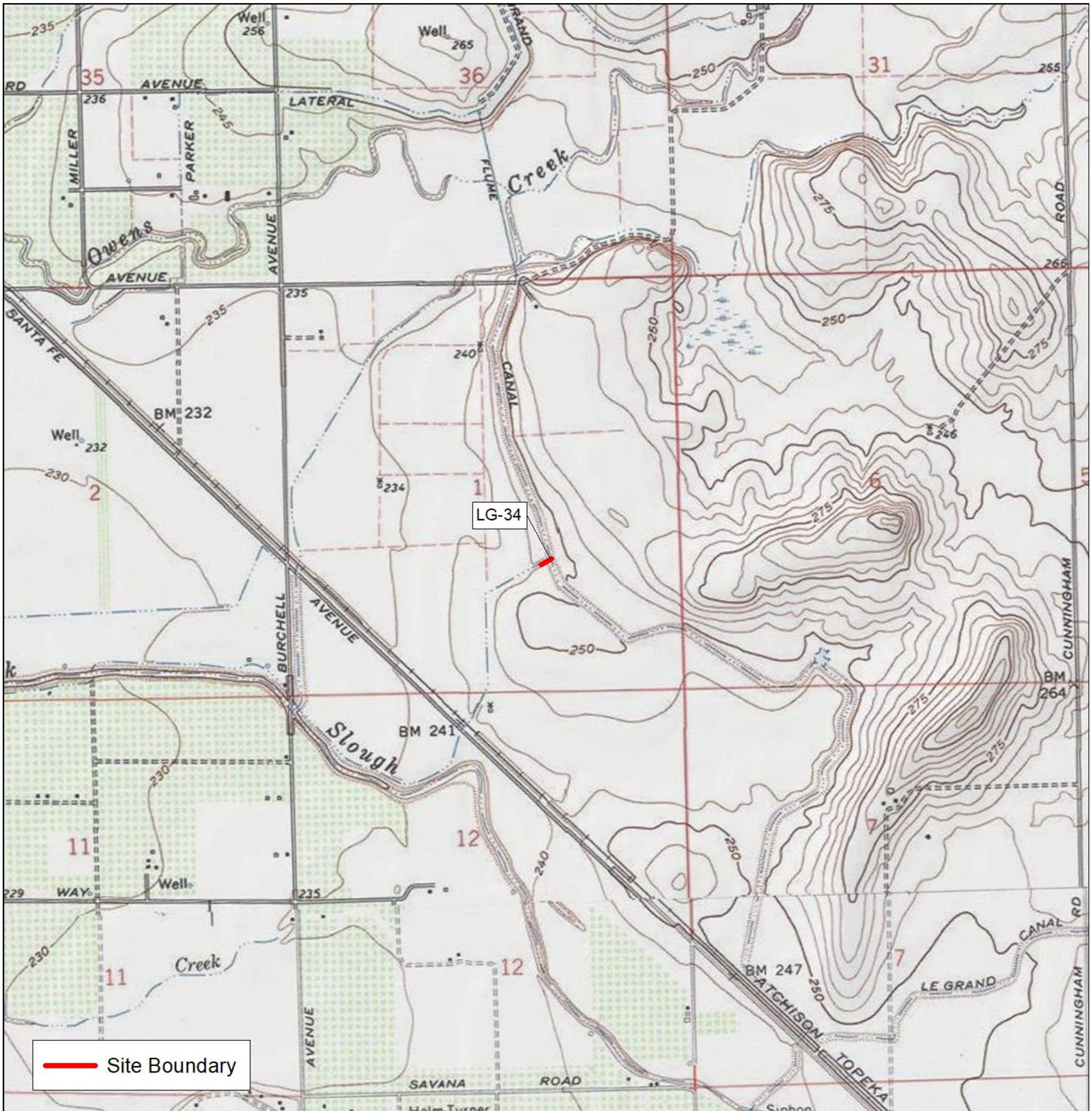
Primary #
HRI#
Trinomial

LOCATION MAP

*Resource Name or # **(Assigned by recorder)** LG-34

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T08S, R15E, SEC 1
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-34
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-34

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-34
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

 ***Resource Name or #:** LG-35

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SW of NW of Sec 16; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 745687 mE, 4124921 mN
Eastern end of recorded segment: 10N, 745748 mE, 4124920 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of La Grand travel east on La Grand Rd. Turn left onto S. Fresno Rd. Travel north for approximately 0.75 miles and turn right onto Jordan Rd. Travel east for approximately 0.73 miles and turn right onto the dirt canal access road. Travel south for approximately 330 feet. The recorded segment of canal will be on the left.

***P3a. Description:** LG-35 consists of a segment of earthen canal constructed ca. 1945. The recorded segment of the canal is approximately 20 feet wide and 200 feet long. It has a east-west orientation and connects with the Le Grand Canal via wooden sluice on the west terminus. The canal first appears of the USGS map from 1946 (USGS 1946) and is visible on historic aerials from 1945 (NETR 2021).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

Overview of east-flowing canal channel with the Le Grand Canal visible at bottom. View east. September 29, 2021

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1945 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 18, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

(Sketch Map with north arrow required.)

Please see attached

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

L1. Historic and/or Common Name:

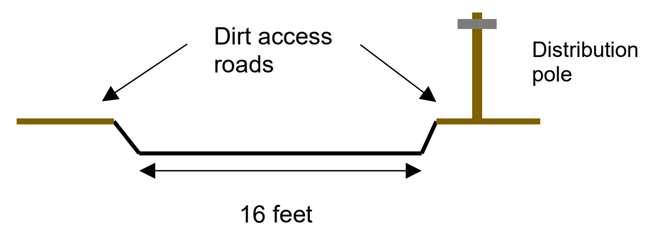
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 745687 mE, 4124921 mN
Eastern end of recorded segment: 745748 mE, 4124920 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal. Water flows east from the Le Grand Canal through a badly eroded wooden sluice. A distribution line runs along the access road 13 feet south of the canal. The canal continues east to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 16 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 200 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** E



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of non-native grasses. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Badly eroded wooden sluice on the east side of the Le Grand Canal. View southwest. September 29, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 18, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-35 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1946 Le Grand, California. 1:62,500 scale.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

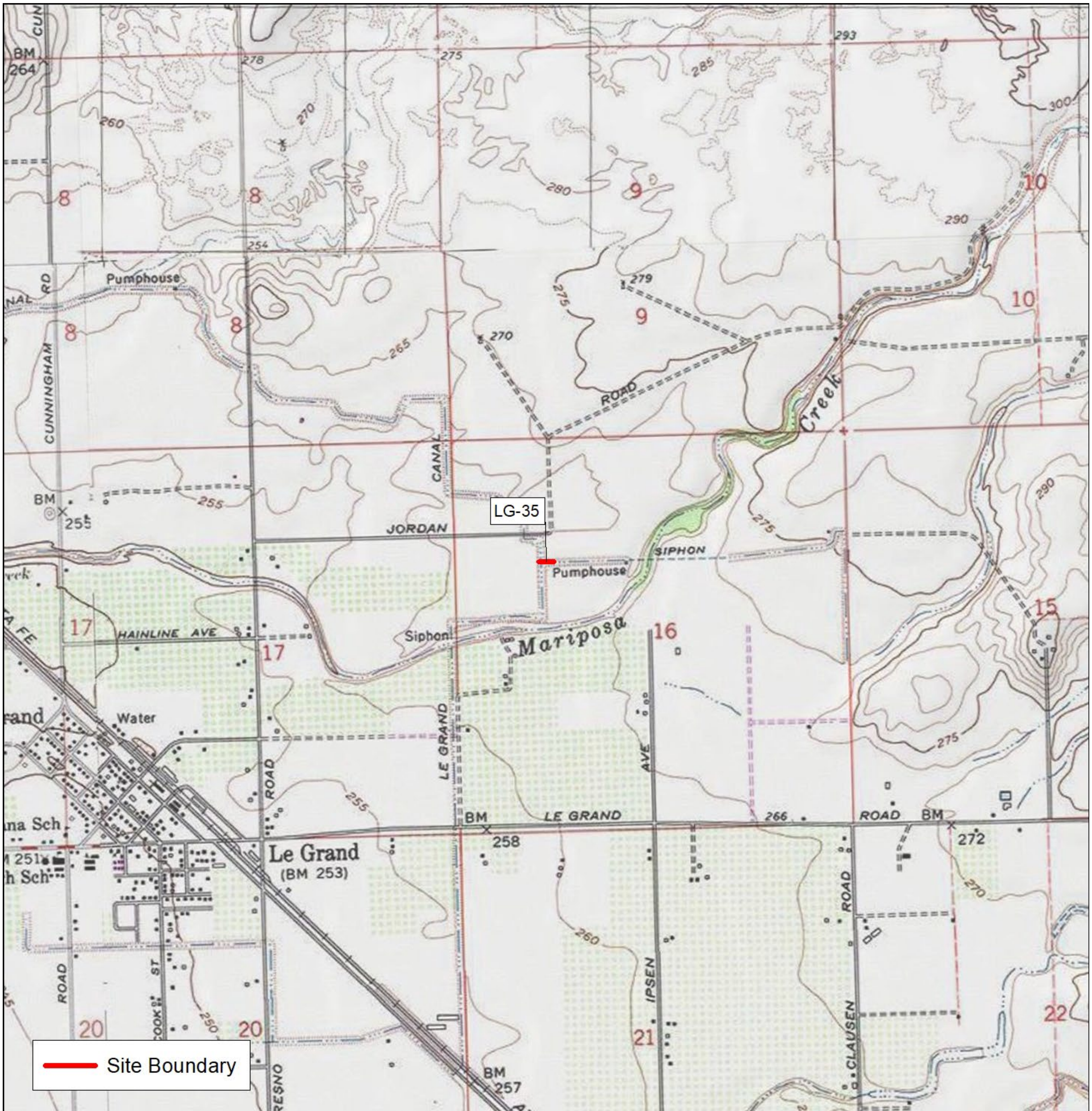
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-35

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 16
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet
0 300 600 Meters

N
Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-35
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-35

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-35
Merced County, California

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
Merced Irrigation District (P-24-001909)

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

The Le Grand Canal (P-24-000608/CA-MER-000365H) was originally recorded on April 18, 1999 by Wendy Pierce, R. Bethard, T. Overly, and N. Stevens of the Archaeological Research Center near a segment of the Le Grand Canal in the vicinity of UTM 10N 740040 mE/ 4132340 mN. No recommendation of eligibility was made (Pierce et al 1999).

In July of 2000 Bryan Larson and Chris Cannon of JRP Historical Consulting Services recorded segments of the Le Grand Canal as P-24-001887 (later corrected to be P-24-000608/CA-MER-000365H by the IC). The recorded segments were located at UTM 10N 727992 mE/ 4138843 mN, UTM 10N 728510 mE/ 4138589 mN, and UTM 10N 729046 mE/ 4138244 mN. Larson and Cannon recommended that the Le Grand Canal was not eligible for the NRHP or the CRHR under any criteria (Larson and Cannon 2000).

Between September 20, 2021 and September 29, 2021 Kleinfelder, Inc. recorded an approximately 9.8-mile segment of the Le Grand Canal between UTM 10N 4133265 mN, 738887 mE and UTM 10 N4124688 mN, 745689 mE. The recorded segment of canal is primarily unlined with the exception of intermittent concrete lining and riprap. The recorded segment is generally approximately 50-feet in width. It features several related structures including pumping stations, weirs, sluice gates, culverts, pipes. Images of the canal and related features are located below. The canal and its associated features appear in good condition. Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Le Grand Canal is not eligible for the NRHP or the CRHR under any criteria.

Kleinfelder does, however, recommended that the Le Grand Canal is a contributor to the NRHP-eligible Merced Irrigation District (P-24-001909).

References

Larson, Bryan and Chis Cannon
2000 “DPR 523 Series Form for the Le Grand Canal (P-24-001887). On file at the CCIC.

Pierce, Wendy, R. Bethard, T. Overlay, N. Stevens
1999 “DPR 523 Series Form for the Le Grand Canal (P-24-000608/CA-MER-000365H). On file at the CCIC.

Recorded by:
Zack Starke and Nick Lucatorto
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of the Le Grand Canal. View south. September 23, 2021.

Description of Photo: Overview of the Le Grand Canal near the intersection with State Route 140. View northwest. September 20, 2021 (UTM 10N .739920 mE/ 4132612)

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Transition from earthen to cement-lined canal segment This segment is approximately 915 feet long and runs roughly northwest-southeast. View northwest. September 20, 2021 (10N 739164 mE/ 4133268 mN).

Description of Photo: Transition from earthen to cement-lined. Small segment of cement-lined canal that runs roughly southeast-northwest. This segment is approximately 285 feet long and lies between two widened earthen segments View north. September 21, 2021 (UTM 10N 741090 mE/ 4131618 mN)

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Transition from deteriorated cement-lined to earthen segment of the canal. The canal widens at this point and is approximately 1,880 feet long and runs roughly southeast-north View west. September 21, 2021 (UTM 741239 mE/ 4131067 mN 10N).

Description of Photo: Overview of the Le Grand Canal. View east. September 24, 2021 (UTM 10N . 743700 mE, 4125977 mN)

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of heavily deteriorated segment of cement-lined canal. This segment runs roughly north-south and is approximately 685 feet long View northwest. September 20, 2021 (UTM 10N .745695 mE/ 4124712 mN).

Description of Photo: Overview of F-01, cement-lined sluice leading to south-flowing channel. View south. September 20, 2021 (10N 739510 mE/ 4132707).

Description of Photo: F-02, concrete drop, rip-rap lining the canal. View northwest. September 20, 2021 (UTM 10N 739420 mE/ 4133019 mN).

Description of Photo: F-03, ferrous pipe crossing the Le Grand Canal. View northwest. September 20, 2021 (UTM 10N 739391 mE/ 4133039 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: F-04, concrete-lined sluice leading to south-flowing canal channel. View south. September 20, 2021 (UTM 10N 739293 mE, 4133103 mN).

Description of Photo: F-05, cement-lined inlet and associated ferrous pipes. The top of F-06 pump house is also pictured. View north. September 20, 2021 (UTM 10N .738911 mE/ 4133255 mN)

Description of Photo: North elevation of F-05 with ferrous pipes connected to the pump house (F-06). View west. September 20, 2021 (UTM 10N 738895 mE/ 4133262 mN).

Description of Photo: East elevation of pumphouse (F-06), a pump. Ferrous pipes connect the pump house to F-05, a cement-lined inlet. View west. September 20, 2021 (UTM 10N 738895 mE/ 4133262 mN).

 ***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: North and east elevation of pump house (F-06). View southeast.

Description of Photo: South and west elevations of F-06. View northeast. September 20, 2021.

Description of Photo: Concrete and ferrous pipe debris on the western berm of the Le Grand Canal, 20 feet south of feature F-05. View north. September 20, 2021.

Description of Photo: F-07, cement-lined sluice, leading to a modern eastern-flowing canal channel. View east. September 21, 2021 (UTM 10N 741578 mE/ 4130875 mN).

Description of Photo: F-08, cement-line sluice, leading to a historic west-flowing canal channel. A tag on the sluice reads “089596 R 24L 07 00 U.” (UTM 10S 741152mE/ 4131135mN).

Description of Photo: F-09, cement-lined sluice with pump, leading to west modern canal channel. View west. September 21, 2021 (UTM 10N 741088 mE/ 4131515 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of F-09 pipe and cement cistern. View east. September 21, 2021.

Description of Photo: F-10, cement culvert pipes, on the eastern side of the Le Grand Canal. View east. September 21, 2021 (UTM 10N 741096 mE/ 4131632 mN).

Description of Photo: Detail of F-11, a cement dam/inlet and drop. View south. September 21, 2021 (UTM 10N 740794 mE, 4132186 mN).

Description of Photo: West elevation of F-11. View northeast. September 21, 2021.

Description of Photo: F-12, cement culvert with cement cistern on the east side of the Le Grand Canal. View east. September 21, 2021 (Cistern: UTM 10 N 741109 mE/ 4131492 mN, . UTM 10 N 741098 mE/ 4131493 mN).

Description of Photo: F-13, cement inlet at Mission Avenue. View north. September 22, 2021 (UTM 10N . 741382 mE/ 4128635 mN).

Description of Photo: North elevation of F-13. View south. September 22, 2021.

Description of Photo: Overview of F-14, a cement flume that allows water from the Le Grand Canal to dive underground. F-13 runs northwest to southeast and is approximately 190 feet long and 7 feet wide. The Le Grand Canal flows underground along a dirt access road north of this pipe for approximately 2,000 feet. The southern portion of the pipe, a 95-foot segment that intersects with F-12, is at ground level but covered with dirt. The northern end is exposed View east. September 22, 2021 (UTM 10N 741369 mE, 4128700 mN [north recorded terminus] and UTM 10N 741382 mE, 4128644 mN [south recorded terminus]).

 ***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Southern segment of F-14 at ground level but covered with dirt. View northeast. September 22, 2021.

Description of Photo: Northern end of F-14 (on right) as the Le Grand Canal flume dives under the pictured access road. View northeast. September 22, 2021.

Description of Photo: F-16, sluice on the west side of the Le Grand flume. View west. September 22, 2021 (UTM 10N .Eastern sluice: 741301 mE/ 4129040 mN [eastern sluice] and UTM 10N 741284 mE/ 4129038 mN [western sluice]).

Description of Photo: F-17, cement inlet that leads into the underground flume. The inlet spans the Le Grand Canal and is approximately 30 feet wide. A metal barricade rests over the opening. The section of canal between features F-17 and F-18 is lined with cement. View south. September 22, 2021 (UTM 10N 741236 mE/ 4129296 mN).

Description of Photo: F-18, cement drop. The drop spans this portion of the Le Grand Canal and is approximately 25 feet long View north. September 22, 2021 (UTM 10N 741249 mE/ 4129328 mN).

Description of Photo: Overview of F-19. View west. Sluice leads to a historic southwest-flowing canal channel. The cement portion spans the canal at this point and is approximately 22 feet long. September 22, 2021 (UTM 10N 741228 mE/ 4129329 mN).

Description of Photo: Overview of F-20. View south. Metal cistern pipe on west side of access road. Cement rubble, likely an old sluice, is on the west side of the Le Grand Cana September 22, 2021 UTM 10N .741292 m/, 4129824 mN).

Description of Photo: Overview F-21. View east. Wooden sluice to allow water into a historic canal channel September 22, 2021 (UTM 10N 741323 mE/ 4130041 mN).

Description of Photo: F-22 overview. View west. September 23, 2021 (UTM10N 741283 mE/ 4128346 mN).

Description of Photo: F-23 overview. View west. Cement and metal sluice September 23, 2021 (UTM 10N 741299 mE/ 4128234 mN).

 ***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: F-24 overview. View west. Cement and metal sluice. A tag on the cement reads “101544 R 241 0500U.” September 23, 2021 (UTM 10N 741334 mE/ 4128000 mN).

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Description of Photo: F-25 overview. View east. Cement and metal sluice and associated machinery September 23, 2021 (Sluice: UTM 10N 741480 mE/ 4127647 and Machinery: UTM 10N 741494 mE/ 4127656 mN).

Description of Photo: F-26 overview. View west. Cement and metal sluice leading to a west-flowing canal channel. September 23, 2021 (UTM 10N 741519 mE/ 4127484 mN**).**

Description of Photo: F-27 overview. View east. Wooden bridge with cement footing and metal pipe on the south side. The bridge spans the Le Grand Canal and connects to access roads on either side. A tag on the northwest footing reads “103377 Y 2 16.” September 23, 2021 (UTM 10N 741526 mE/ 4127478 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: F-27, view from the southeast corner. View west. September 23, 2021

Description of Photo: F-28, overview. View northwest. Wooden bridge with cement footings. A metal gate prevents automobile access on the southeast side. A 22-foot length of PVC pipe leads into the Le Grand Canal on the southeastern side. A tag on the northeastern corner of the cement footing reads “110035 Y 2 16.” September 23, 2021 (10N 742576 mE/ 4126524 mN).

Description of Photo: F-28 overview from the northeast corner. View south. September 23, 2021.

Description of Photo: F-29 overview. View south. Broken cement and metal sluice. September 23, 2021 (UTM 10N 742424 mE/ 4126959 mN).

Description of Photo: F-30 overview. View north. Cement rubble on the southeastern side of the Le Grand Canal. September 23, 2021 (UTM 10N 742741 mE/ 4126875 mN).

Description of Photo: Overview of F-31 and associated machinery and distribution poles. View east. September 23, 2021 (UTM 10N Sluice: 742713 mE/ 4126757 mN and Machinery: UTM 10N 742724 mE/ 4126756 mN).

Description of Photo: View of F-32 from the northwestern corner. View southeast. Cement inlet leadings to southwest flowing canal channel underneath the Santa Fe Railroad. A tag on the cement foundation reads "114059 C 1 49." September 23, 2021 (UTM 10N 742545 mE/ 4125534 mN).

Description of Photo: F-33 overview. View north. Cement and metal sluice. Possibly leads to a holding pond approximately 63 feet to the northeast. September 23, 2021 (UTM 10N 742768 mE/ 4125527 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of F-34. View north. Metal pipe spanning the width of the Le Grand Canal. The exposed pipe is approximately 32 feet long but continues underground both north and south September 23, 2021 (UTM 10N 743083 mE/ 4125702 mN).

Description of Photo: F-35 overview. View south. Cement and metal sluice and associated machinery to the south. September 23, 2021 (UTM 10N Sluice:743661 mE, 4125950 mN and Machinery: UTM 10N 743667 mE, 4125941 mN.

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of F-36, west side of S. Cunningham Rd. Concrete culvert underneath S. Cunningham Rd. View southeast. September 23, 2021 (West of S. Cunningham Rd.: 7UTM 10N 43675 mE/ 4125956 mN and East of S. Cunningham Rd.: UTM 10N 743690 mE/ 4125956 mN.

Description of Photo: Overview of F-35 and F-36. View east. September 23, 2021.

Description: Overview of F-36 on the east side of S. Cunningham Rd. September 24, 2021.

Description of Photo: Overview of F-37. View south. Ferrous pipe on the south side of the Le Grand Canal. The pipe likely spanned the canal at one point but is currently just a small segment. September 24, 2021(UTM 10N 743793 mE/ 4125987 mN).

Description of Photo: Overview of F-38, view from the northwest corner of the pumphouse. View southwest. F-38 consists of a pump house, metal pipes, and a cement inlet. Pump house dimensions: 18 feet wide (east-west), by 20 feet long (north-south), 20 feet tall. Inlet dimensions: 17 feet wide (north-south) by 110 feet long (west-east). September 24, 2021 (Western end (at pump house): 744208 mE, 4126036 mN Eastern end (end of concrete-lined inlet): 744258 mE, 4126029 mN).

Description of Photo: Overview of the inlet at F-38. View west. September 24, 2021

 ***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of the southwest corner of the pumphouse at F-38. View northeast. September 24, 2021. A nearby cattle ranch is pictured in the background.

Description of Photo: F-39 overview. View northeast. Badly dilapidated wooden bridge spanning the Le Grand Canal. The bridge is approximately 23 feet long (southwest-northeast) and 12 feet wide (west-east).September 24, 2021 (UTM 10N 744246 mE/ 4126035 mN).

Description of Photo: F-40 overview with adjacent cattle ranch in the background. View north. Cement and metal sluice on the north side of the Le Grand Canal. A tag on the sluice reads “006620 R 12 7 0600U.” September 24, 2021 (UTM 10N 744252 mE/ 4126037 mN).

Description of Photo: Overview of F-41. View south. F-41 is a ferrous pipe that spans the width of the Le Grand Canal. The pipe leads to a cement cistern and pump on the south side of the canal. September 24, 2021 (UTM 10N 744255 mE/ 4126033 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of F-42. View west. Metal and cement sluice in the west side of the Le Grand Canal. Approximately 20 feet west of the sluice are several cement cisterns, a pump, and a distribution pole September 24, 2021 (UTM 10N 744262 mE/ 4126016 mN).

Description of Photo: F-43 overview. View north. Line of cement pipes with tires on the surface. Inside the pipe appear to be a hatch. The purpose of these is unknown September 24, 2021 (Southern end: 744312 mE, 4125839 mN, Northern end: 744262 mE, 4125998 mN).

Description of Photo: Detail of F-43.

Description of Photo: Overview of F-44. View west. A tag on the sluice reads “015054 R 24 5 0 401U.” September 29, 2021 (UTM 10N 745687 mE, 4124698 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of F-45. View north. Ferrous pipe on the north side of the Le Grand Canal. The pipe no longer spans the canal . September 24, 2021 (UTM 10N 743714 mE, 4125968 mN).

Description of Photo: Overview of F-44, F-46, and F-47. View east. F 46: Metal bridge spanning the Le Grand Canal. A tag on the bridge reads “015062C1 60.” F-47: Small shack (likely housing a pump). A tag on the shack reads “000000 S 1 16.” September 29, 2021 (F-46: 745690 mE, 4124695 mN F-47: 745692 mE, 4124696 mN).

***Resource Name or #:** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

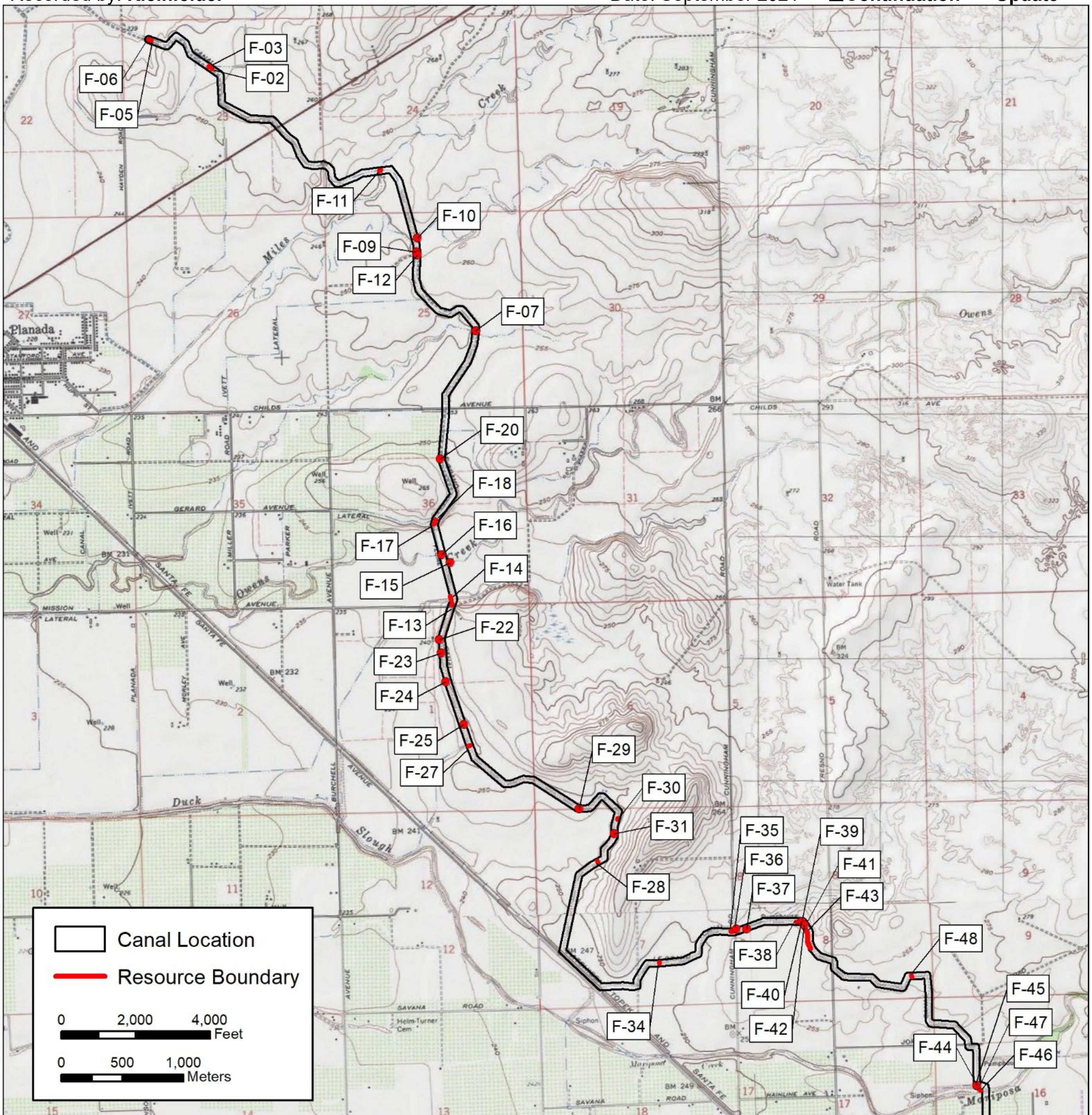
Description of Photo: Overview of F-44, F-46, and F-47. View northwest. September 29, 2021.

Description of Photo: F-48 overview. View northwest. Dilapidated wooden bridge spanning the Le Grand Canal. September 29, 2021(UTM 10N 745150 mE/ 4125592 mN).

LOCATION MAP

Primary # P-24-000608 (Update)
HRI#
Trinomial CA-MER-000365H (Update)

Page 37 of 38 *Resource Name or # **(Assigned by recorder)** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE
*Recorded by: **Kleinfelder** *Date: September 2021 □Continuation ■ Update



USGS 7.5' Quad: LE GRAND (1981), PLAINSBURG (1976), PLANADA (1973)
Legal Description: T07S, R15E, SEC 23, 24, 25, 36; T08S, R15E, SEC 1; T08S, R16E, SEC 7, 8, 16
NAD 1983 UTM Zone 10N

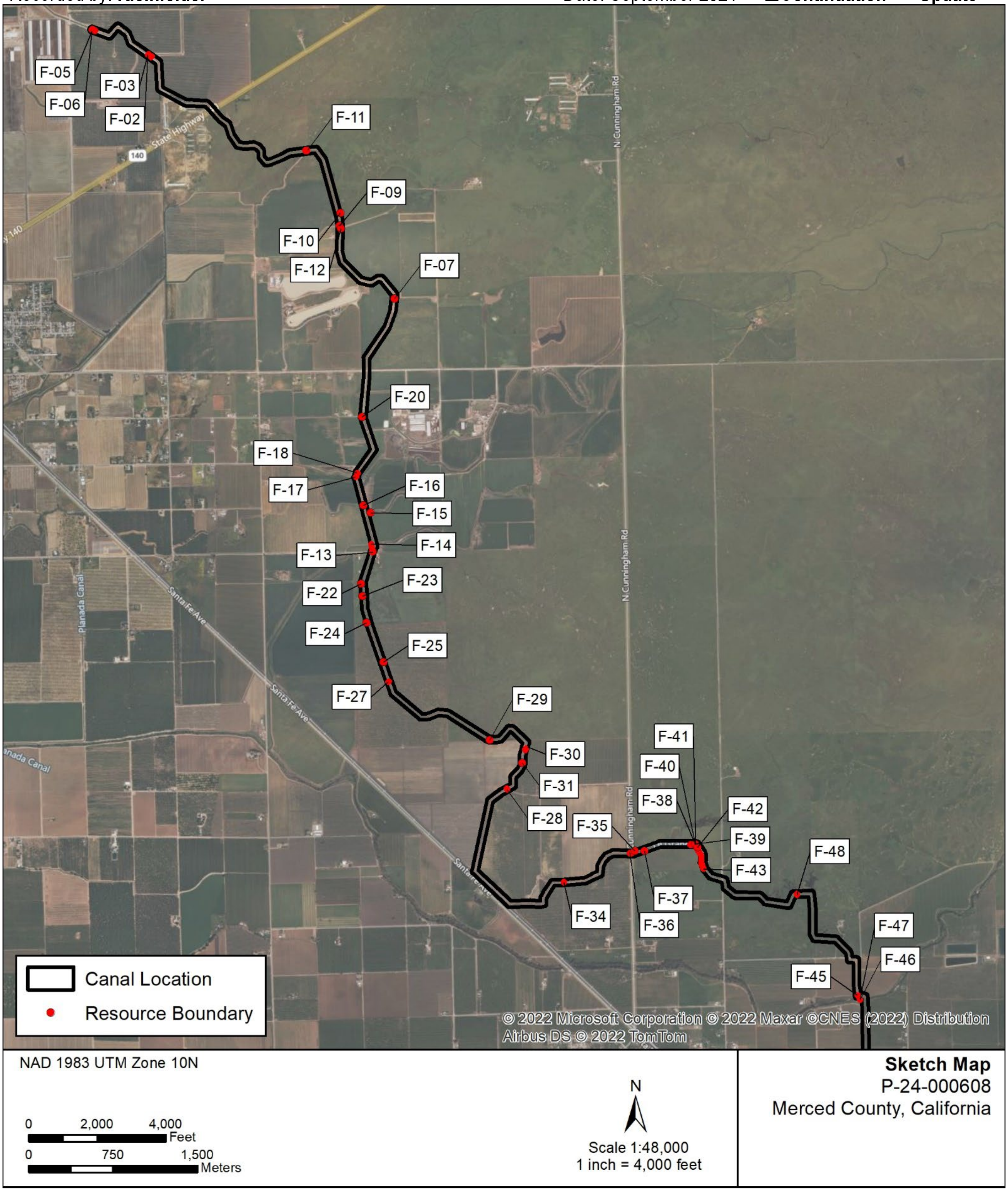
Scale 1:48,000
1 Inch = 4000 Feet

Resource Location
P-24-000608
Merced County, California

SKETCH MAP

 *Resource Name or # **(Assigned by recorder)** Le Grand Canal (P-24-000608/CA-MER-000365H) UPDATE

*Recorded by: **Kleinfelder** *Date: September 2021 ☐**Continuation** ■ **Update**



Sketch Map
P-24-000608
Merced County, California

***Resource Name or #:** Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad (P-24-001881) UPDATE

***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

This resource consists of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad. Frank Lortie with Caltrans recorded the site in 2002 as a standard, 16-foot-wide railroad track resting on a 3.5-foot tall, crushed rock ballast. Lortie recommended that the resource was not eligible for the NRHP or the CRHR under any criteria (Lortie 2002). In 2009, Josh Smallwood of CRM Tech visited the resource and found it as described in 2002 (Smallwood 2009). The resources was again recorded in 2018 by J. Wisely of Far Western Anthropological Research Group, Inc (Wisely 2018).

Kleinfelder surveyed two unrecorded segments of the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad between 10N 4125776 mN, 742271 mE and10N 4125479 mN, 742577 mE. The recorded segment is comprised of a standard gauge single track line with wooden ties and crushed rock ballast. The alignment is approximately 20-feet wide. Associated features include a concrete single-span bridge located over a ditch. The historical material of the recorded segment has been largely replaced due to regular maintenance and repairs; however, the alignment appears to be unchanged. Based on field observations and review of the historic context, Kleinfelder concurs with the previous recommendations that the Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad l is not eligible for the NRHP or the CRHR under any criteria.

References

Smallwood, Josh.
2009 “Update DPR 523 Series Form for the Burlington Norther/Santa Fe Railroad (P-24-001881). On file at the CCIC.

Lortie, Frank
2002 “DPR 523 Series Form for the Burlington Norther/Santa Fe Railroad (P-24-001881). On file at the CCIC.
.
Wisely, J.
2018 “Update DPR 523 Series Form for the Burlington Norther/Santa Fe Railroad (P-24-001881). On file at the CCIC

Recorded by:

Zack Starke and Nick Lucatorto
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

***Resource Name or #:** Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad (P-24-001881) UPDATE

***Recorded by:** Zack Starke ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Overview of newly recorded segment of P-24-001881. View northwest. September 28, 2021. November 30, 2021 (10.N 746118 mE, 4122109)

Description of Photo: P-24-001881 intersection with S. Ipsen Ave. View northeast. September 28, 2021. September 28, 2021 (UTM 10N 746119 mE, 4122111 mN)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary#: P-24-001881 (Update)
HRI#
Trinomial:

 ***Resource Name or #:** Burlington Northern Santa Fe Railroad/Atchison, Topeka & Santa Fe Railroad (P-24-001881) UPDATE

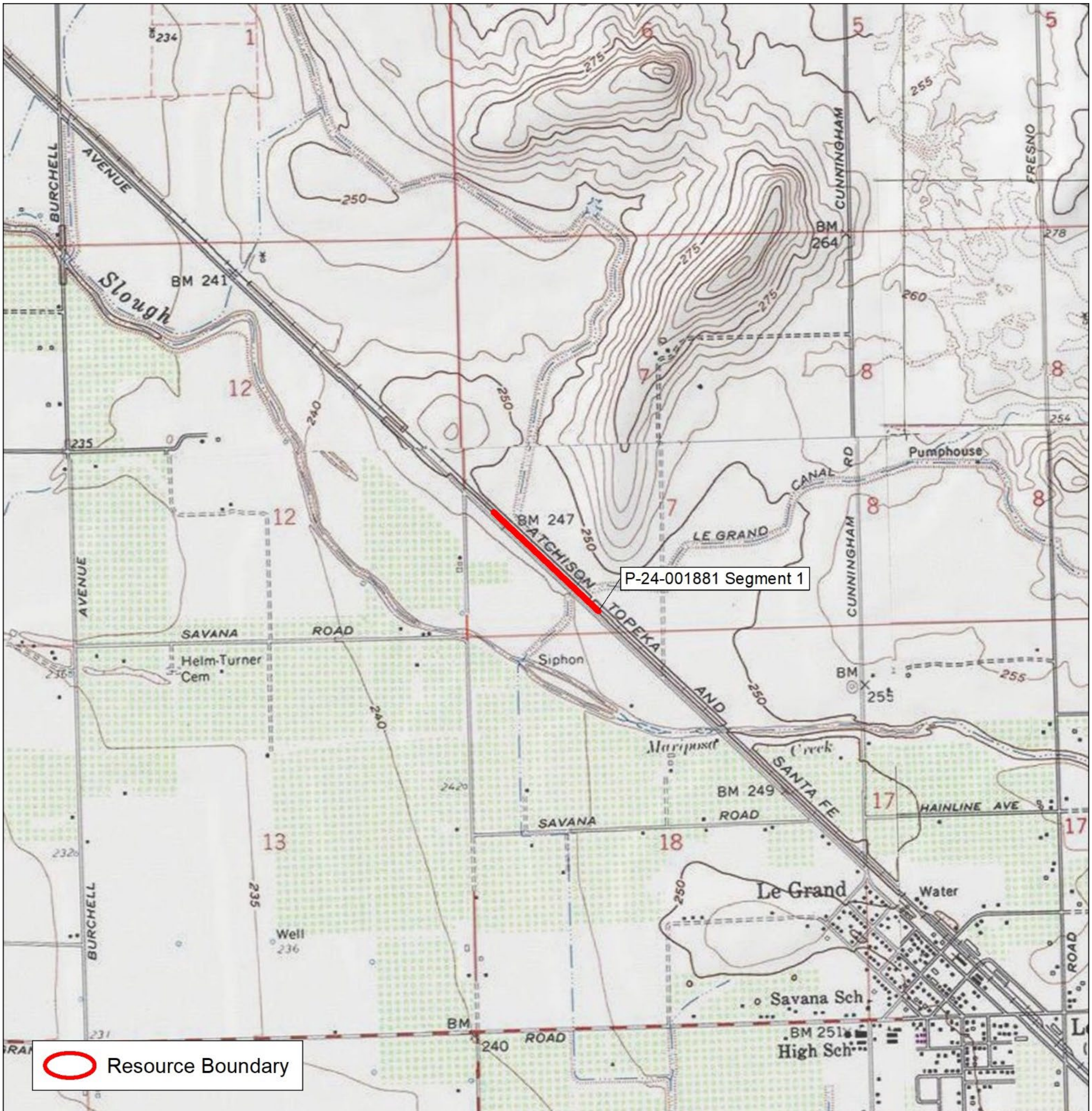
***Recorded by:** Zack Starke ***Date:** November 2021 ☐ Continuation ☒ Update

Description of Photo: Railroad overpass spanning ditch. 10N 746482 mE, 4121789 mN. View southeast. September 28, 2021

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	**Primary # P-24-001881 (Update)** **HRI#** **Trinomial**

Page **4** of **6** *Resource Name or # P-24-001881

*Recorded by: **Kleinfelder** *Date: September 2021 ☐ **Continuation** ☒ **Update**



USGS 7.5' Quad: PLAINSBURG (1976)
Legal Description: T08S, R16E, SEC 7
NAD 1983 UTM Zone 10N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
P-24-001881 Segment 1
Merced County, California

LOCATION MAP

Primary # P-24-001881 (Update)
HRI#
Trinomial

*Resource Name or # P-24-001881

*Recorded by: **Kleinfelder**

*Date: September 2021 ☐**Continuation** ☒ **Update**

USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 21, 27, 28
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

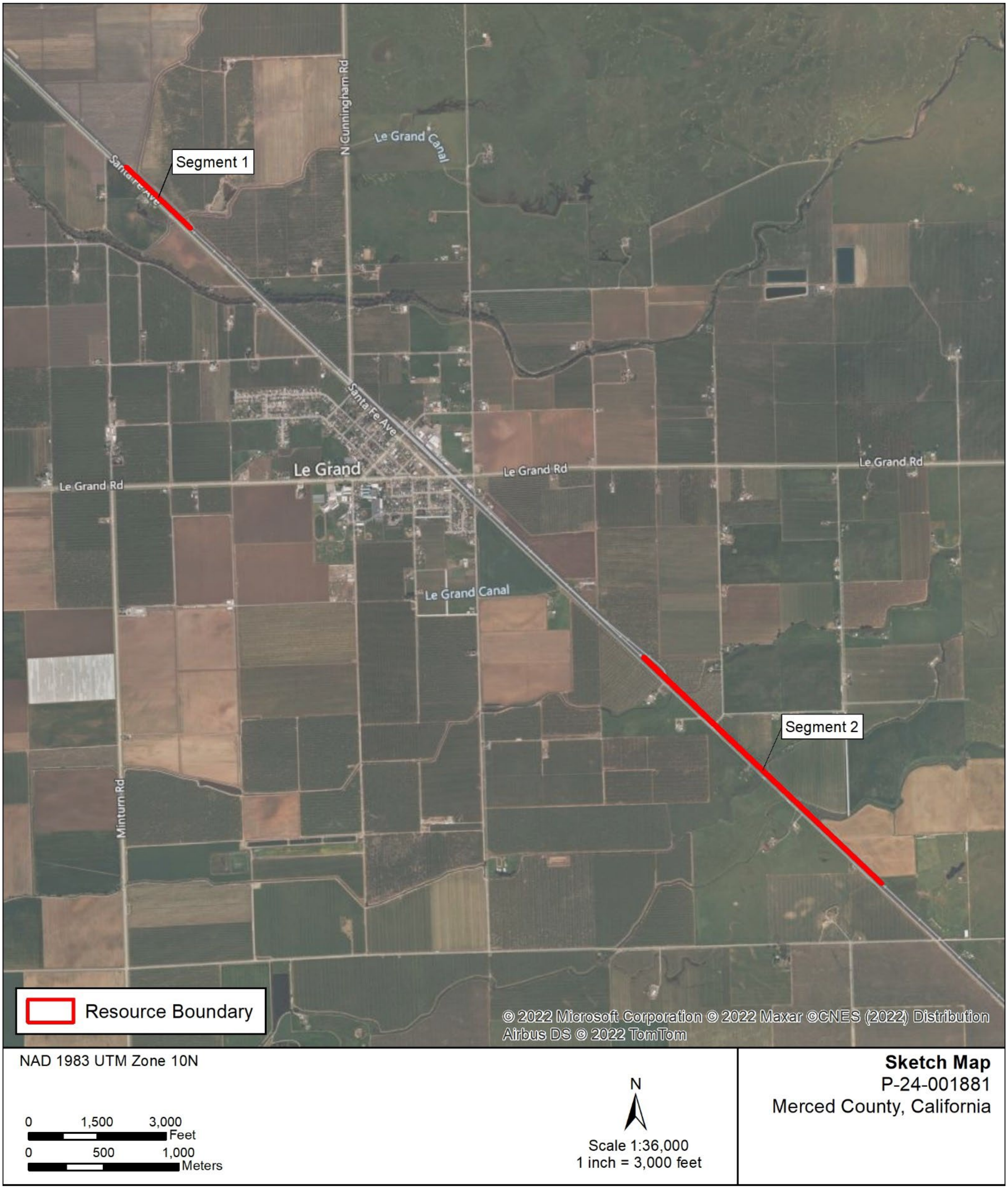
Resource Location
P-24-001881 Segment 2
Merced County, California

State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION** **SKETCH MAP**	**Primary # P-24-001881 (Update)** **HRI#** **Trinomial**

*Resource Name or # P-24-001881

*Recorded by: **Kleinfelder**

*Date: September 2021 ☐**Continuation** ☒ **Update**



***Recorded by:** Kleinfelder ***Date:** November 2021 ☐ Continuation ☒ Update

This historic-era resource consists of the Merced Irrigation District. Elements of this district including Melvin Canal Creek, Main Ashe Lateral, East Ashe Lateral, Canal Creek Lateral Headgate, Bear Creek, Meadowbrook Lateral, Black Rascal Creek, Hess Lateral, Buhach Lateral, Drainage Ditch, Henderson Lateral, Mason/Curtis Lateral, Livingston Canal, Livingston Canal Headgate were recorded by Meta Bunse and Steven J. Melvin in December 2006 and January 2007 (Bunse and Melvin 2007). In 2010, Michael H. Dice of Michal Bradman Associates recorded the Merced Irrigation District, as a whole, and recommended that the district was eligible for the NRHP under criteria A, C, and D but did not fully specify the contributing and non-contributing elements to the district (Dice 2010). Neither DPR addressed the Le Grand Canal as a contributing resource to the district. The Le Grand Canal was originally recorded in 1999, but no recommendation of eligibility was made (Pierce et al 1999). In July of 2000 the Le Grand Canal was recommended not eligible for the NRHP or the CRHR under any criteria (Larson and Cannon 2000). Neither DPR addressed the Le Grand Canal as a contributor to the Merced Irrigation District.

Kleinfelder recorded several potential contributing resources to the Merced irrigation District: the Le Grand Canal, LG-26, LG-27, LG-28, LG-29, LG-30, LG-31, LG-32, LG-33, LG-34, and LG-35. Of these resources, Kleinfelder recommends that the Le Grand Canal, while not individually eligible for the NRHP or the CRHR, it is a contributor to the Merced Irrigation District.

References

Bunse, Meta and Steven J. Melvin
2007 DPR 523 Series form for Portions of the Merced irrigation District (P-24-001909). On file at the CCIC.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the CCIC.

Larson, Bryan and Chis Cannon
2000 “DPR 523 Series Form for the Le Grand Canal (P-24-001887). On file at the CCIC.

Pierce, Wendy, R. Bethard, T. Overlay, N. Stevens
1999 “DPR 523 Series Form for the Le Grand Canal (P-24-000608/CA-MER-000365H8). On file at the CCIC.

Recorded by:

Zack Starke and Nick Lucatorto
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** LG-26

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒**Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SE of SW of Sec 21; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Northwestern end (intersection with Santa Fe Railroad): 10N, 745862 mE, 4122372 mN
Southeastern end of recorded segment: 10N, 745983 mE, 4122339 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Le Grand travel southeast on Santa Fe Ave. for approximately 1.3 miles and park on the side of the road. The recorded segment of ditch is underneath the Santa Fe Railroad overpass approximately 90 feet northeast of South Santa Fe Ave.

***P3a. Description:** LG-26 consists of the recorded segment of an unnamed ditch constructed ca.1959 (NETR 2021). The ditch is approximately 15 feet wide and 435 feet long. It has a northwest-southeast orientation before gradually curving to a northeast-southwest orientation. Based on its proximity to neighboring orchards, the ditch was likely constructed to support agriculture.

***P3b. Resource Attributes:** AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of ditch facing south. September 28, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1959 (NETR 2021)

***P7. Owner and Address:**
County of Merced
2222 M Street
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation ditch **B4. Present Use:** irrigation ditch
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1959
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation ditch **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

State of California—The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-26

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Northwestern end (intersection with Santa Fe Railroad): 745862 mE, 4122372 mN
Southeastern end of recorded segment: 745983 mE, 4122339 mN

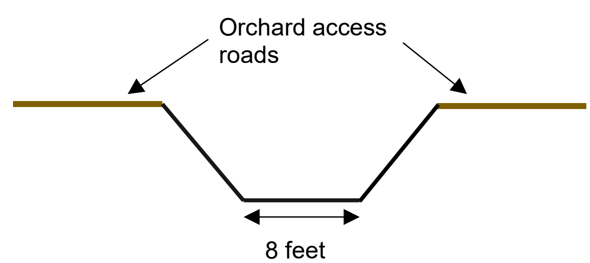
L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)

The resource consists of an earthen ditch. The ditch is likely a channelized portion of the unnamed natural stream. Due to time and budget constraints only a segment of the ditch was recorded. The ditch continues both southeast and north to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 15 feet
- **b. Bottom Width:** 8 feet
- **c. Height or Depth:** 8 feet
- **d. Length of Segment:** 435 feet

L5. Associated Resources: P-24-001881: The Santa Fe Railroad.

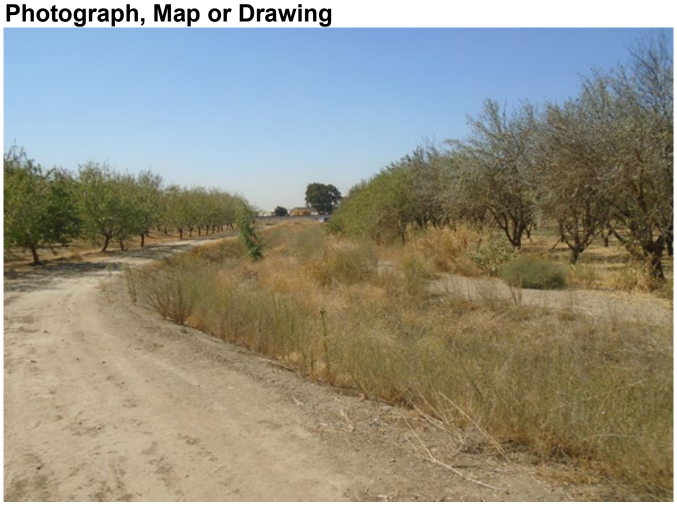
L4e. Sketch of Cross-Section (Include scale) **Facing:** South



L6. Setting: Vegetation near the site consists of almond trees (orchards), non-native grasses, datura, and sage brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam with 2% shale inclusions ranging in size from pebble to cobble.

L7. Integrity Considerations: The resource is in fair condition with moderate impacts from erosion and vegetation growth. The ditch no longer appears to be in use.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the eastern end of the recorded segment. View west. September 28, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from “Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures” (Caltrans et al 20000) and **“**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California” (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California’s history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

<u>NRHP and CRHR Evaluation</u>
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation ditch. Research has yielded no information to suggest that this ditch is specifically associated with important historical events. It is one of thousands of irrigation ditches constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation ditch is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation ditch represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation ditches constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-26 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

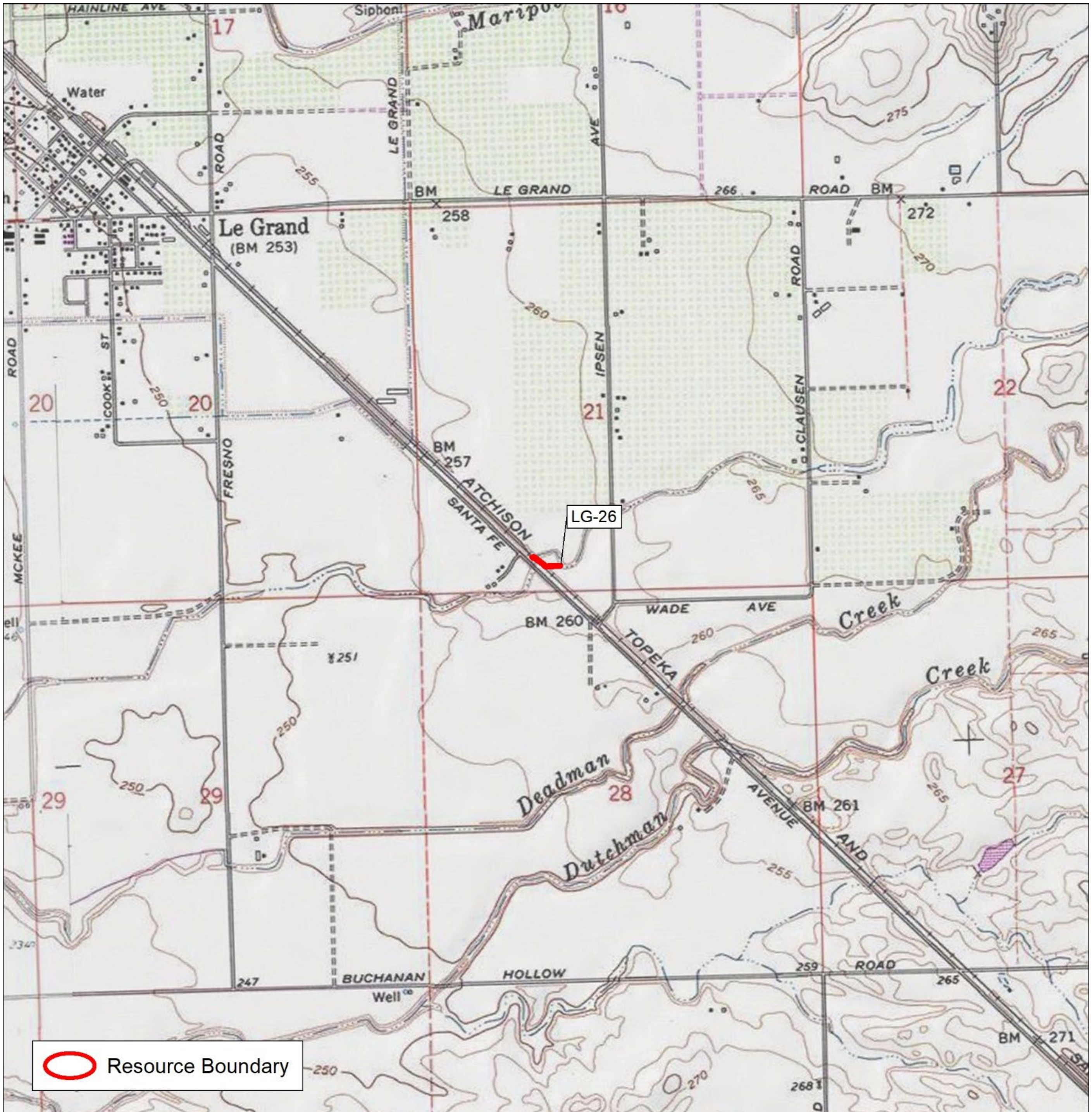
Primary #
HRI#
Trinomial

Page **8** **of** **9**

*Resource Name or # **(Assigned by recorder)** LG-26

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-26
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page **9 of 9** *Resource Name or # **(Assigned by recorder)** LG-26

*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet

0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-26
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

***Resource Name or #:** LG-27

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; NE **of** NW **of** Sec 23; M.D. **B.M.**

c. **Address**: N/A City: Le Grand Zip: 95333

d. **UTM: Zone:** Intersection with the Le Grand Canal: 10N, 739293 mE, 4133104 mN
Southern end of recorded segment: 10N, 739294 mE, 4133064 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel northeast on Highway 140 for approximately 1.8 miles. Before crossing the Le Grand Canal turn left onto the dirt access road on the west side of the canal. Travel north for approximately 0.6 miles. The segment of canal will be on the left.

***P3a. Description:** LG-27 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 14-feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate. The canal has a north-south alignment before transitioning to a northeast-southwest alignment. This segment was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of sluice from the Le Grand Canal leading to canal segment, observed on the left. View south. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St, Merced, CA 95340

***P8. Recorded by:** (Name, affiliation, and address)
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** LG-27

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

*Resource Name or # **(Assigned by recorder)** LG-27

L1. Historic and/or Common Name: N/A

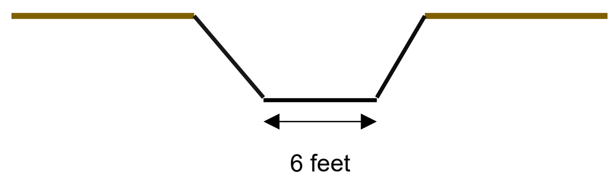
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 739293 mE, 4133104 mN
Southern end of recorded segment: 739294 mE, 4133064 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen canal segment.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)
- **a. Top Width:** 14 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 7 feet deep
- **d. Length of Segment:** 134 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** South



L5. Associated Resources:
P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of almond trees (orchards), non-native grasses, cattails, and water reeds. Slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Aerial photograph of recorded canal segment. From Google Earth 2022.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

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With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-27 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

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2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

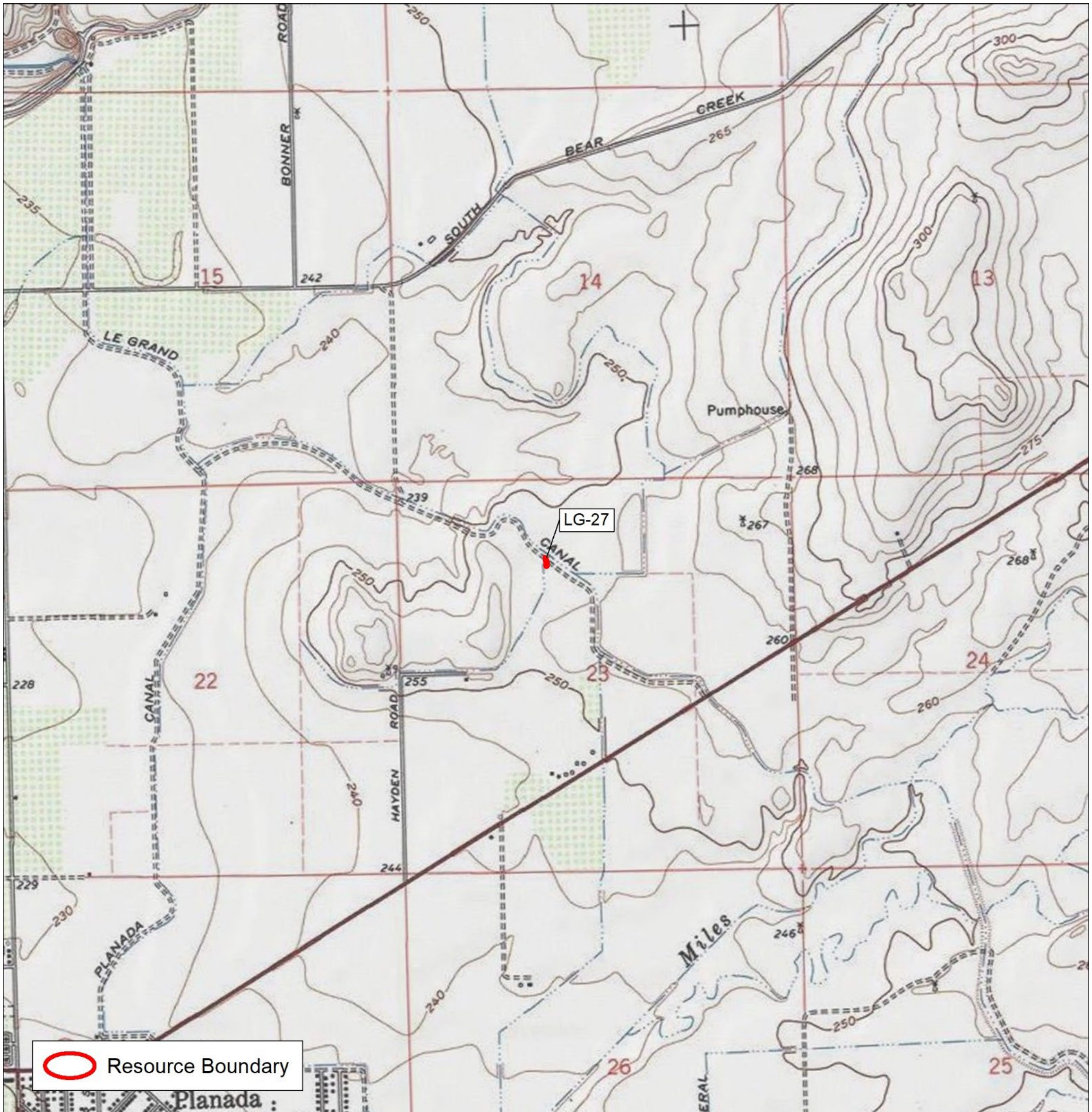
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-27

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-27
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

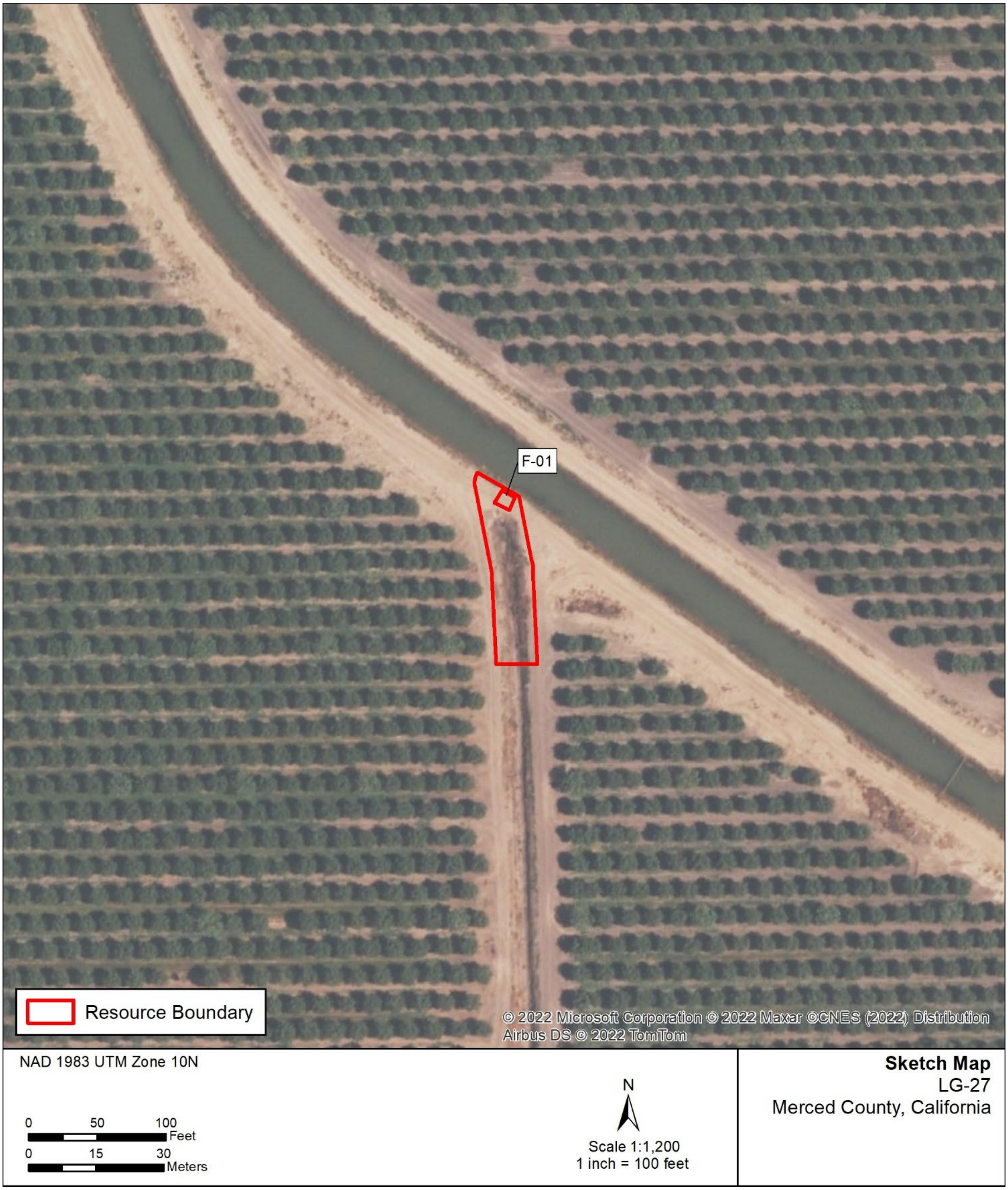
Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-27

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer



Sketch Map
LG-27
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

***Resource Name or #:** LG-28

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; NE **of** NW **of Sec** 23; M.D. **B.M.**

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 739407 mE, 4133033 mN
Eastern end of recorded segment: 10N, 739461 mE, 4133034 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel northeast on State Route 140 for approximately 1.8 miles and cross the Le Grand Canal. Turn left onto the canal access road on the east side of the canal. Travel north approximately 0.53 miles. The canal segment is the east-west oriented canal heading east from the Le Grand Canal.

***P3a. Description:** LG-28 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 20 feet wide. The canal segment connects directly to the Le Grand Canal. The canal has an east-west alignment before transitioning into a north-south alignment where it transitions into an irregular alignment and feeds into additional irrigation canals. The canal segment is observed on a historic topographic map from 1948 (USGS 1948).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of the Le Grand Canal and LG-28 segment on right. View north. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St,
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 15, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

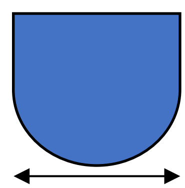
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 10N 739407 mE, 4133033 mN
Eastern end of recorded segment: 10N 739461 mE, 4133034 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal connecting to the Le Grand Canal. The canal segment is observed on a historic topographic map. Due to time and budget constraints only a segment of the canal was recorded. The canal continues east to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 15 feet
- **c. Height or Depth:** 7 feet deep
- **d. Length of Segment:** 195 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** East



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the Le Grand Canal and east-running canal pictured on left. View south. September 20, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**
Irrigation Systems in the San Joaquin Valley
Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-28 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1948 Planada, California. 1:24,000 scale.

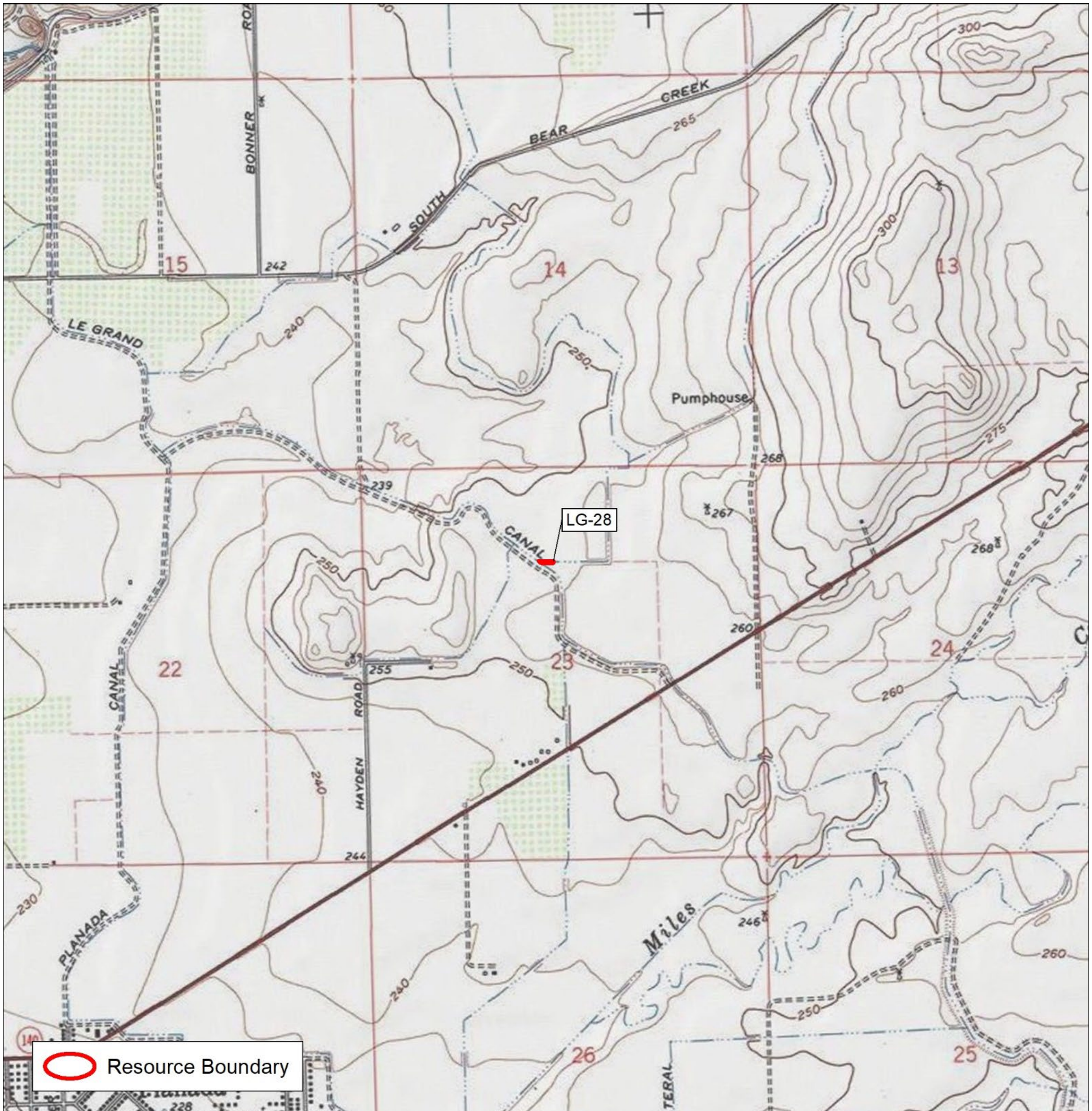
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-28

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-28
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-28

*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-28
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code
Other Listings Review Code Reviewer	Date

Page 1 of 9 ***Resource Name or #:** LG-29

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 7S; R 15E; SW of NE of Sec 23; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Sluice at the intersection with the Le Grand Canal: 10N, 739510 mE, 4132708 mN
Southern end of recorded segment: 10N, 739511 mE, 4132689 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Le Grand travel northeast on State Route 140 for approximately 1.8 miles and turn left onto the dirt access road on the west side of the Le Grand Canal. Travel northwest for approximately 0.3 miles. The canal segment runs south from this intersection with the Le Grand Canal.

***P3a. Description:** LG-29 consists of the recorded segment of an earthen branch irrigation canal segment constructed prior to 1946 (NETR 2021). The canal is approximately 12 feet wide. The canal connects to the Le Grand Canal via a concrete and metal sluice gate and has a north-south alignment. The canal was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of south-facing channel and cement sluice and inlet. View south. September 20, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

 *Resource Name or # **(Assigned by recorder)** LG-29

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

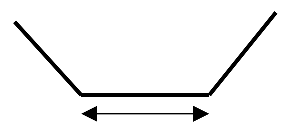
b. Location of point segment: Sluice at the intersection with the Le Grand Canal: 739510 mE, 4132708 mN
Southern end of recorded segment: 739511 mE, 4132689 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen canal channel observed on a historic topographic map. The south-facing channel is connected to the Le Grand Canal with a cement-lined inlet. The canal extends beyond the recorded portion to the south to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 12 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 60 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

L4e. Sketch of Cross-Section (Include scale) **Facing:** South



6 feet

L6. Setting: The slope is under 1% with an open aspect. Soils were composed of tan sandy loam with 0-5% shale and basalt inclusions ranging in size from pebbles to cobbles. Deposition is alluvial. Vegetation consists almond trees, cottonwood, non-native grasses, water reeds, and cattail.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Southern side of inlet to south-facing canal channel. The Le Grand Canal is visible in the mid-ground. View north. September 20, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>

The San Joaquin Valley forms the southernmost part of the California’s Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state’s farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-29 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale

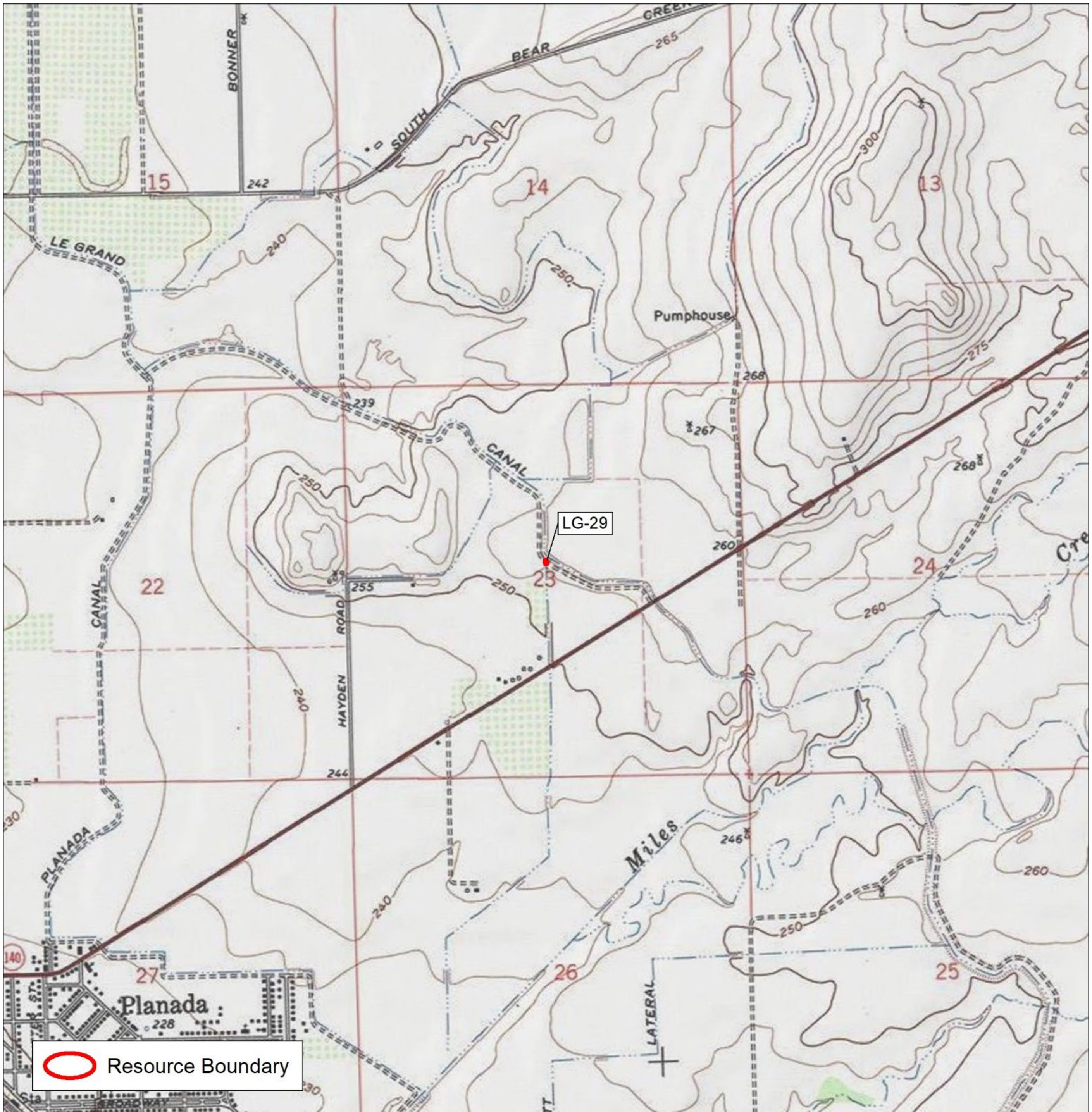
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-29

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 23
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-29
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9**

*Resource Name or # **(Assigned by recorder)** LG-29

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** LG-30

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; SE **of** SW **of Sec** 24; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 740792 mE, 4132181 mN
Southwestern end of recorded segment: 10N, 740759 mE, 4132137 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel east on E. Child's Ave. for approximately 2.15 miles. Turn left onto the dirt access road on the west side of the Le Grand Canal. Travel north and west for approximately 1.5 miles and park near the cement dam. The recorded segment of channelized stream will be located flowing southwest of the dam.

***P3a. Description:** LG-30 consists of the recorded segment of a channelized section of Miles Creek constructed ca. 1946 (NETR 2021). The channel runs northeast to southwest and bisects the Le Grand Canal. It features a concrete weir flanked by rip rap where the channel meets the canal on the northeast bank.

***P3b. Resource Attributes:** HP20 (canal), HP21 (dam), and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of cement dam and channelized portion of Miles Creek in mid-ground. View west. September 21, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: channelized creek **B4. Present Use:** channelized creek
***B5. Architectural Style:** utlitiarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** channelized canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: **(List attributes and codes)** N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

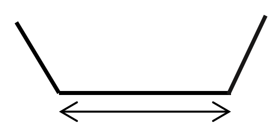
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 740792 mE, 4132181 mN
Southwestern end of recorded segment: 740759 mE, 4132137 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of channelized section of Miles Creek. The canal runs northwest to southeast and bisects the Le Grand Canal. At the juncture a cement weir allows water to flow into the Le Grand Canal. The channel continues both northeast and southwest beyond the recorded section to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** 10 feet deep
- **d. Length of Segment:** 330 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** W



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of willow, non-native grasses, starthistle, cattail, and other swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. Inclusions were composed of 0-5% shale pebbles.

L7. Integrity Considerations: The resource is in fair condition with moderate impacts from vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of the Le Grand Canal and channel that runs northeast in the background on the left. September 21, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 16, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

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(See Continuation Sheet)

***D6. Significance (Continued):**

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The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of a channelized segment of Mills Creek. Research has yielded no information to suggest that this channelized creek is specifically associated with important historical events. It is one of thousands of channelized creek constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this channelized creek is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this channelized creek represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-30 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

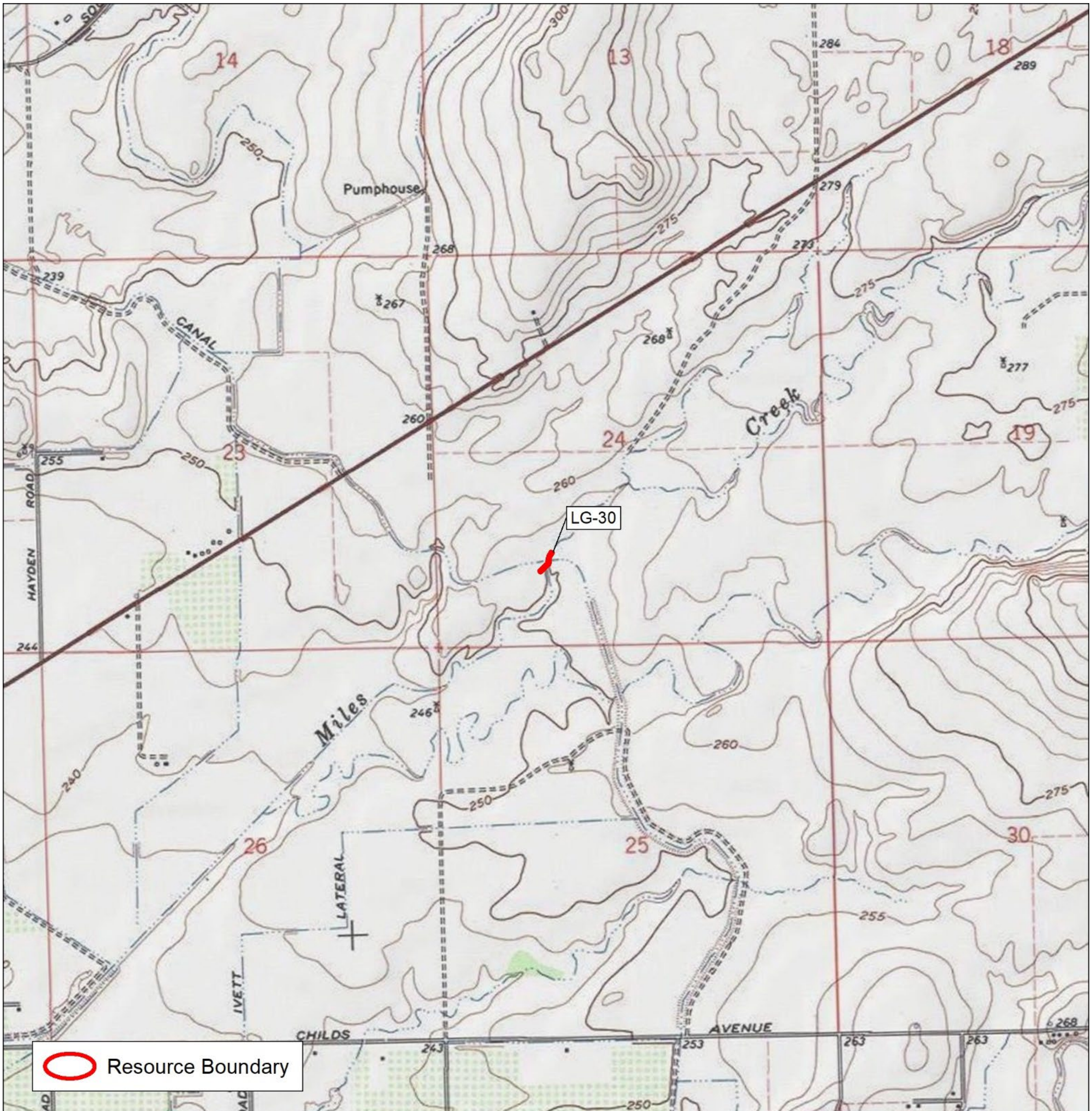
Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

*Resource Name or # **(Assigned by recorder)** LG-30

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 24
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-30
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9**

*Resource Name or # **(Assigned by recorder)** LG-30

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet

0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-30
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

***Resource Name or #:** Ivett Lateral (LG-31)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand **Date** 1961 **T** 7S; **R** 15E; SE **of** NW **of Sec** 25; M.D. **B.M**.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 741162 mE, 4131137 mN
Western end of recorded segment: 10N, 741133 mE, 4131135 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of Planada travel east on E. Child's Ave. for approximately 1.67 miles and turn left onto Cunningham. Travel north approximately 0.55 miles, cross the Le Grand Canal, and turn right onto the dirt access road. Proceed east for approximately 0.5 miles. The recorded segment of canal will be on the right.

***P3a. Description:** LG-31 consists of the recorded segment of the Ivett Lateral, an earthen irrigation lateral canal constructed prior to 1946 (NETR 2021). The recorded segment is approximately 35-feet wide and 95-feet long. It has an east-west alignment and joins the Le Grand Canal at a cement-lined sluice culvert inlet. A tag reading "089596 R 24 L 07 00 U" was observed on the sluice gate. The canal is flanked by dirt access roads. The lateral was observed on a historic topographic map from 1961 (USGS1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Cement-lined sluice and west facing canal segment. View northwest. September 21, 2021.

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca 1961

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Ivett Lateral
B2. Common Name: Ivett Lateral
B3. Original Use: irrigation lateral **B4. Present Use:** irrigation lateral
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation lateral **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

State of California—The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LINEAR FEATURE RECORD**	Primary # HRI # Trinomial

 *Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)

L1. Historic and/or Common Name:

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation** **Designation:**

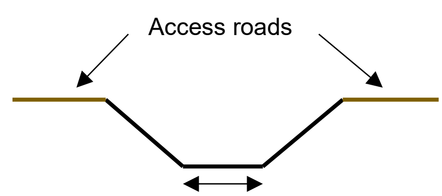
b. Location of point segment: Intersection with the Le Grand Canal: 741162 mE, 4131137 mN
Western end of recorded segment: 741133 mE, 4131135 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen irrigation branch canal and cement-lined sluice culvert inlet.

L4. Dimensions:
- a. **Top Width:** 35 feet
- b. **Bottom Width:** 6 feet
- c. **Height or Depth:** 10 feet deep
- d. **Length of Segment:** 95 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

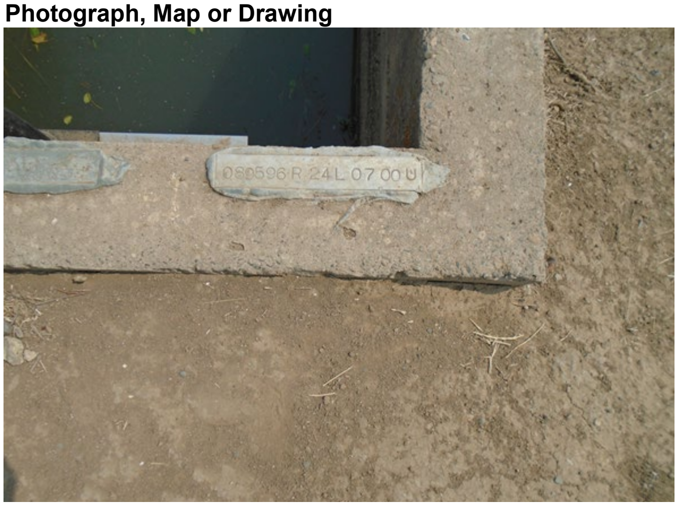
L4e. Sketch of Cross-Section (Include scale) **Facing:** West



L6. Setting: Vegetation near the site consists of non-native grasses and swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. Inclusions of 0-5% pebble-sized shale were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Detail of tag located on the cement sluice. September 21, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**

Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>

The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>

With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of Ivett Lateral. Research has yielded no information to suggest that this irrigation lateral is specifically associated with important historical events. It is one of hundreds of irrigation laterals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation lateral is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation lateral represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation laterals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-31 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

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Dice, Michael
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2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

Primary #
HRI#

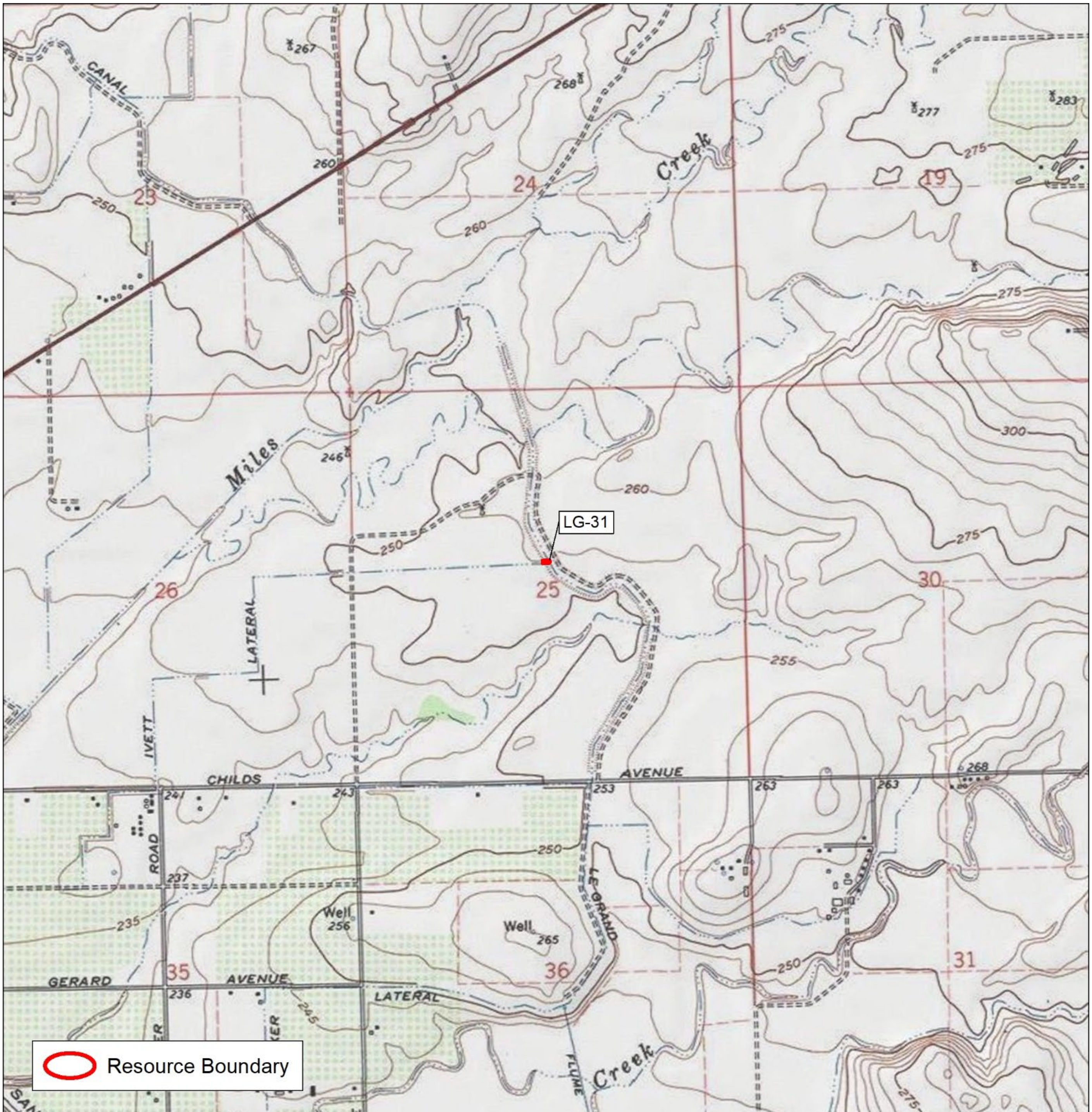
LOCATION MAP

Trinomial

*Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 25
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-31
Merced County, California

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

Page **9 of 9**
*Resource Name or # **(Assigned by recorder)** Ivett Lateral (LG-31)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒**Continuation** ☐ **Update**
Drawn by: Chelsea Barker-Switzer

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code	
Other Listings Review Code	Reviewer	Date

***Resource Name or #:** LG-32

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada Date 1961 T 7S; R 15E; NW of NE of Sec 36; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Intersection with the Le Grand Canal: 10N, 741323 mE, 4130040 mN
Eastern end of the recorded segment: 10N, 741353 mE, 4130040 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel east on E. Childs Ave. for approximately 2.12 miles and cross the Le Grand Canal. Turn right onto the dirt access road and travel south for approximately 630 feet. The recorded segment of canal is on the left at this point.

***P3a. Description:** LG-32 consists of a segment of earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The recorded section has an east-west alignment approximately 24 feet wide. The canal intersects with the La Grand canal by a wood sluice gate and culvert. The canal was observed on a historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

Overview of canal and wooden sluice inlet from the Le Grand Canal. View east. September 22, 2021.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** LG-32

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name:

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

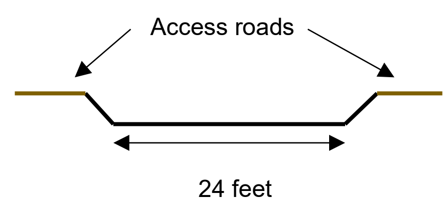
b. Location of point segment: Intersection with the Le Grand Canal: 741323 mE, 4130040 mN
Eastern end of the recorded segment: 741353 mE, 4130040 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal constructed prior to 1946.

L4. Dimensions:
- **a. Top Width:** 24 feet
- **b. Bottom Width:** 20 feet
- **c. Height or Depth:** 6 feet deep
- **d. Length of Segment:** 80 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

L4e. Sketch of Cross-Section (Include scale) **Facing:** East



L6. Setting: Vegetation at the site consists of non-native grasses, starthistle, and other swamp shrubs. The slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Overview of east facing canal channel (on left) and the Le Grand Canal (on right). View south. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

Agriculture in the San Joaquin Valley
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

Historic Period Roads
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-32 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

United States Geological Survey (USGS)
1961 Le Grand, California. 1:24,000 scale.

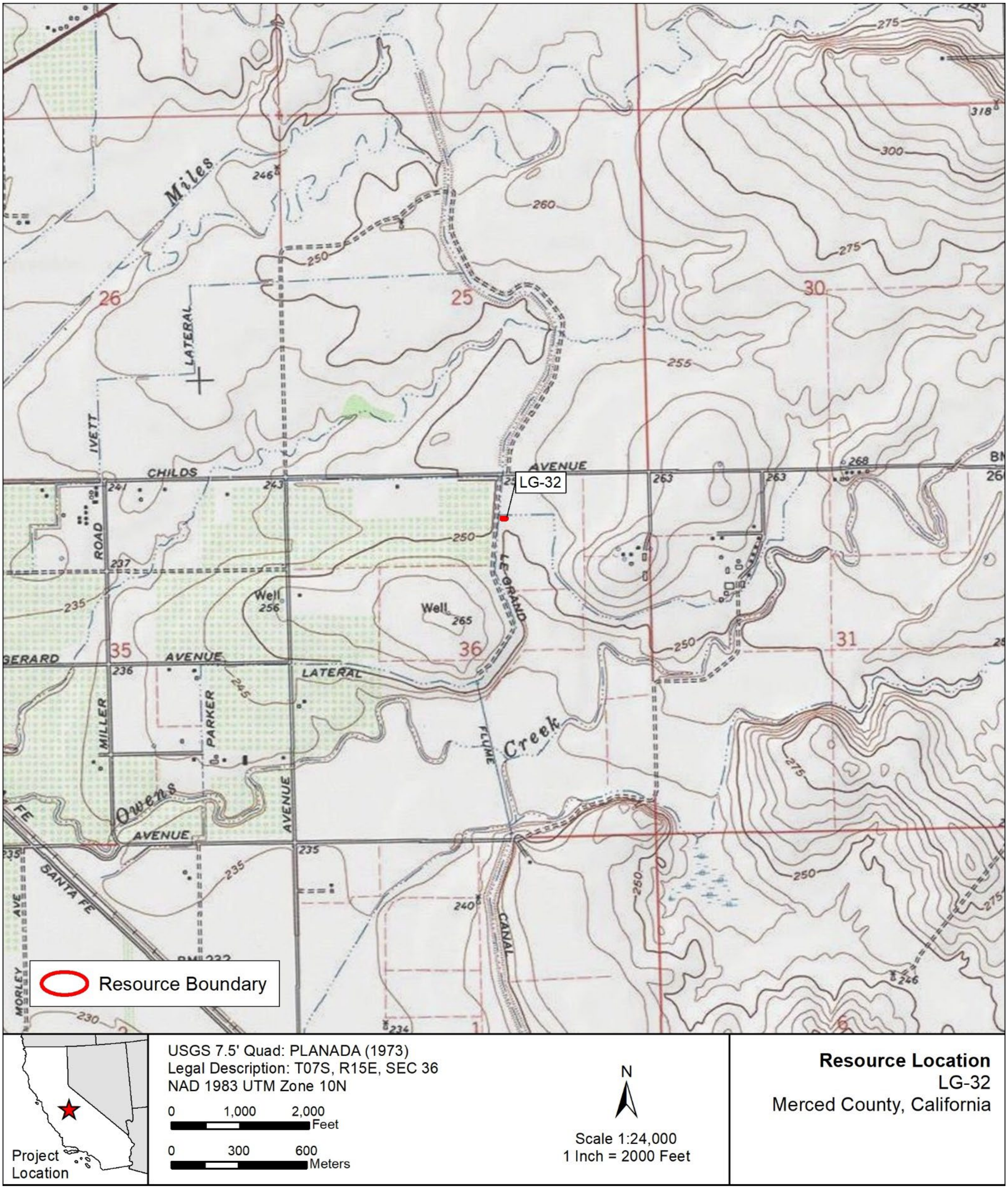
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-32

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



*Required information

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI#
SKETCH MAP	Trinomial

*Resource Name or # **(Assigned by recorder)** LG-32

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-32
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** Parker Lateral (LG-33)

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada Date 1961 T 7S; R 15E; NW of SE of Sec 36; M.D. B.M

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Zone: Intersection with the Le Grand Canal: Zone: 10N, 741245 mE, 4129335 mN
Western end of recorded segment: Zone: 10N, 741185 mE, 4129308 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

From the town of Planada travel east on E. Child's Ave. for approximately 1.7 miles and turn right onto S. Burchell Ave. Proceed south for approximately 0.52 miles and turn left onto the dirt access road along the south side of the canal. Proceed east 0.52 miles. The recorded segment of canal will be on the left.

***P3a. Description:** LG-33 consists of a recorded portion of the Parker Lateral constructed prior to 1946 (NETR 2021). The recorded portion of the Parker Lateral is an earthen branch irrigation canal with an east-west orientation. The canal intersects with the Le Grand Canal via a metal sluice gate and concrete culvert on the west bank of the Le Grand Canal. The recorded section of the parker lateral is approximately 16 feet wide.

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Overview of cement sluice and westward flowing canal channel from the Le Grand Canal. View southwest. September 22, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 16, 2021

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: Parker Lateral
B2. Common Name: Parker Lateral
B3. Original Use: irrigation lateral **B4. Present Use:** irrigation lateral
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation lateral **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: Parker Lateral

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

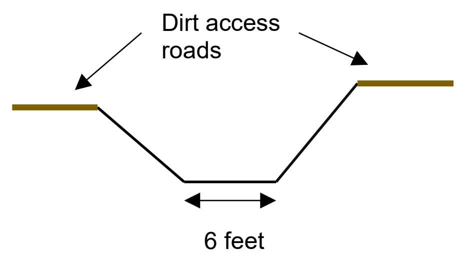
b. Location of point segment: Intersection with the Le Grand Canal: Zone: 10N, 741245 mE, 4129335 mN
Western end of recorded segment: Zone 10N, 741185 mE, 4129308 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of the Parker Lateral. The canal flows west and receives water from a sluice on the west bank of the Le Grand Canal. The canal continues west beyond the recorded segment to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 16 feet
- **b. Bottom Width:** 6 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 235 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

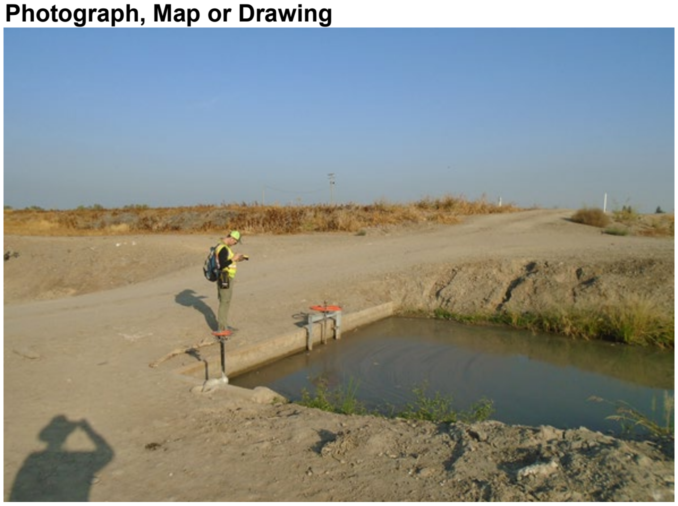
L4e. Sketch of Cross-Section (Include scale) **Facing:** West



L6. Setting: Vegetation at the site consists of non-native grasses, cattail, and swamp brush. The slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Cement-lined sluice leading to the recorded segment of canal to the left. View west. September 22, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and "Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of Parker Lateral. Research has yielded no information to suggest that this irrigation lateral is specifically associated with important historical events. It is one of hundreds of irrigation laterals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation lateral is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation lateral represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation laterals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-33 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

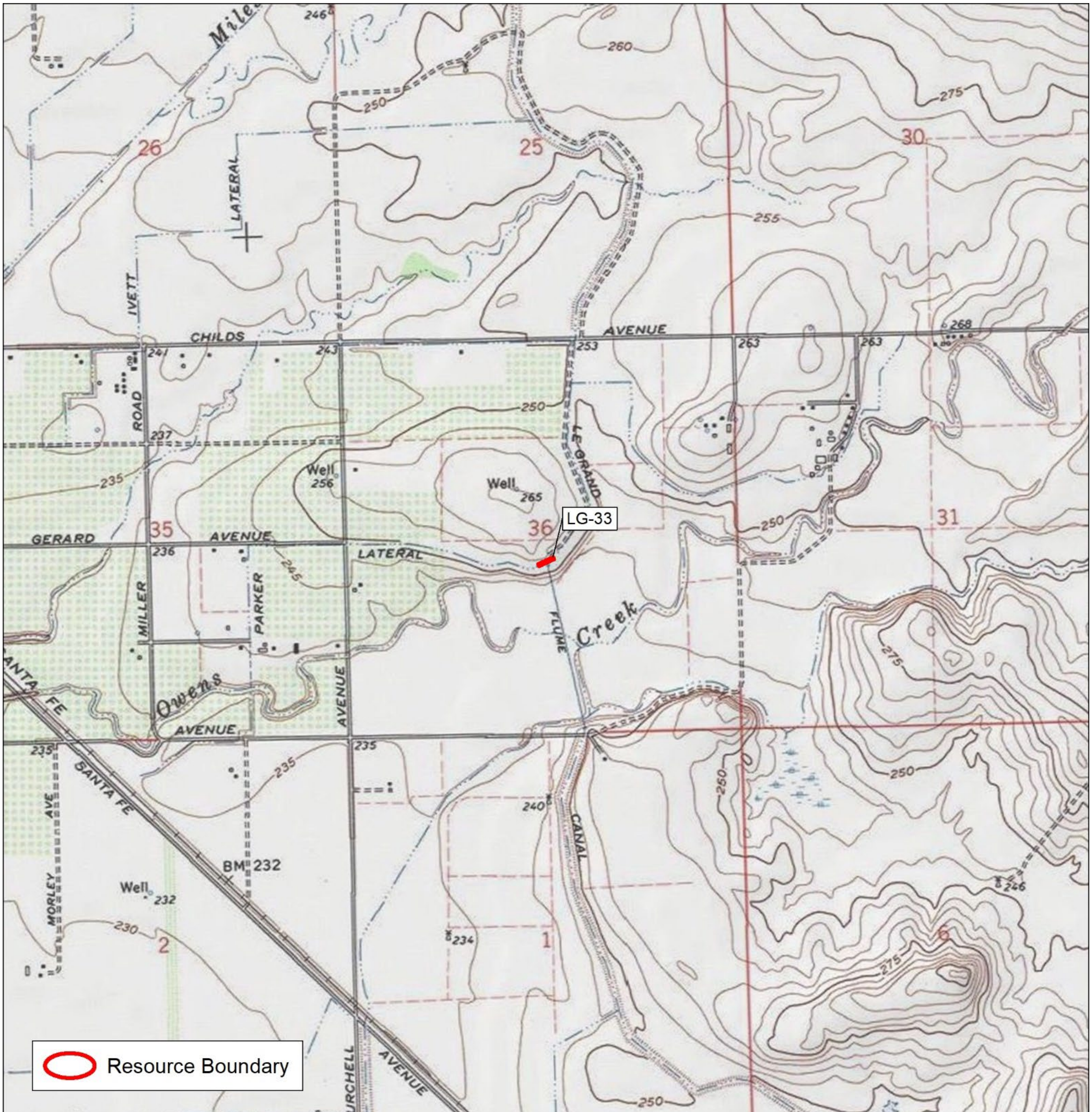
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Page **8 of 9**
*Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)
*Recorded by: **Kleinfelder**
*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T07S, R15E, SEC 36
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-33
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION SKETCH MAP	Primary # HRI# Trinomial

Page **9 of 9** *Resource Name or # **(Assigned by recorder)** Parker Lateral (LG-33)

*Recorded by: **Kleinfelder** *Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

Sketch Map
LG-33
Merced County, California

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial CRHR Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** LG-34

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Planada Date 1961 T 8S; R 15E; NW of SE of Sec 1; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 741518 mE, 4127484 mN
Southwestern end of the recorded segment: 10N, 741478 mE, 4127461 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal.

***P3a. Description:** LG-34 consists of a recorded segment of an earthen branch irrigation canal constructed prior to 1946 (NETR 2021). The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. It is observed in the historic topographic map from 1961 (USGS 1961).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo:
Cement-lined sluice and canal segment. View west.
September 23, 2021

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐Prehistoric ☐Both
Ca. 1946 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** September 23, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:**
Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced and Madera Counties, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒ Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Resource Name or # **(Assigned by recorder)** LG-34

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca, 1946
***B7. Moved?** ☒ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

L1. Historic and/or Common Name: N/A

L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

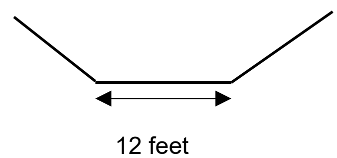
b. Location of point segment: Intersection with the Le Grand Canal: 741518 mE, 4127484 mN
Southwestern end of the recorded segment: 741478 mE, 4127461 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of an earthen segment of canal. The canal flows southwest from a cement-lined sluice on the west bank of the La Grand Canal. The canal continues towards the southwest to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 25 feet
- **b. Bottom Width:** 12 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 155 feet

L5. Associated Resources: P-24-000608: the Le Grand Canal

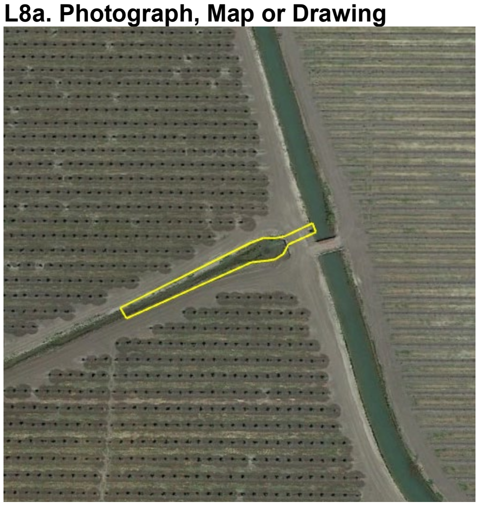
L4e. Sketch of Cross-Section (Include scale) **Facing:** Southwest



L6. Setting: Vegetation at the site consists of almond trees (orchards), non-native grasses, and other swamp brush. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion and vegetation growth.

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Aerial imagery of the recorded canal segment. From Google Earth 2022.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: October 1, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

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The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

(See Continuation Sheet)

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

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In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

<u>Historic Period Roads</u>
With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**
In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation
NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-34 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

Castells, Justin
2017 Historic American Engineering Record (HAER) of Varner Road/Former U.S. Highway 60/70/99.

Dice, Michael
2010 DPR 523 Series form for the Merced irrigation District (P-24-001909). On file at the Central California Information Center.

JRP Historical Resources Consulting Services (JRP)
2007 Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California.

Mintier Harnish, Environmental Planning Partners, Inc., KD Anderson, EPS, NOLTE
2013 2030 Merced County General Plan Background Report. Prepared for Merced County, December 2013

Nationwide Environmental Title Research (NETR)
2021 “Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018” accessed at https://historicaerials.com/ on December 1, 2021.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

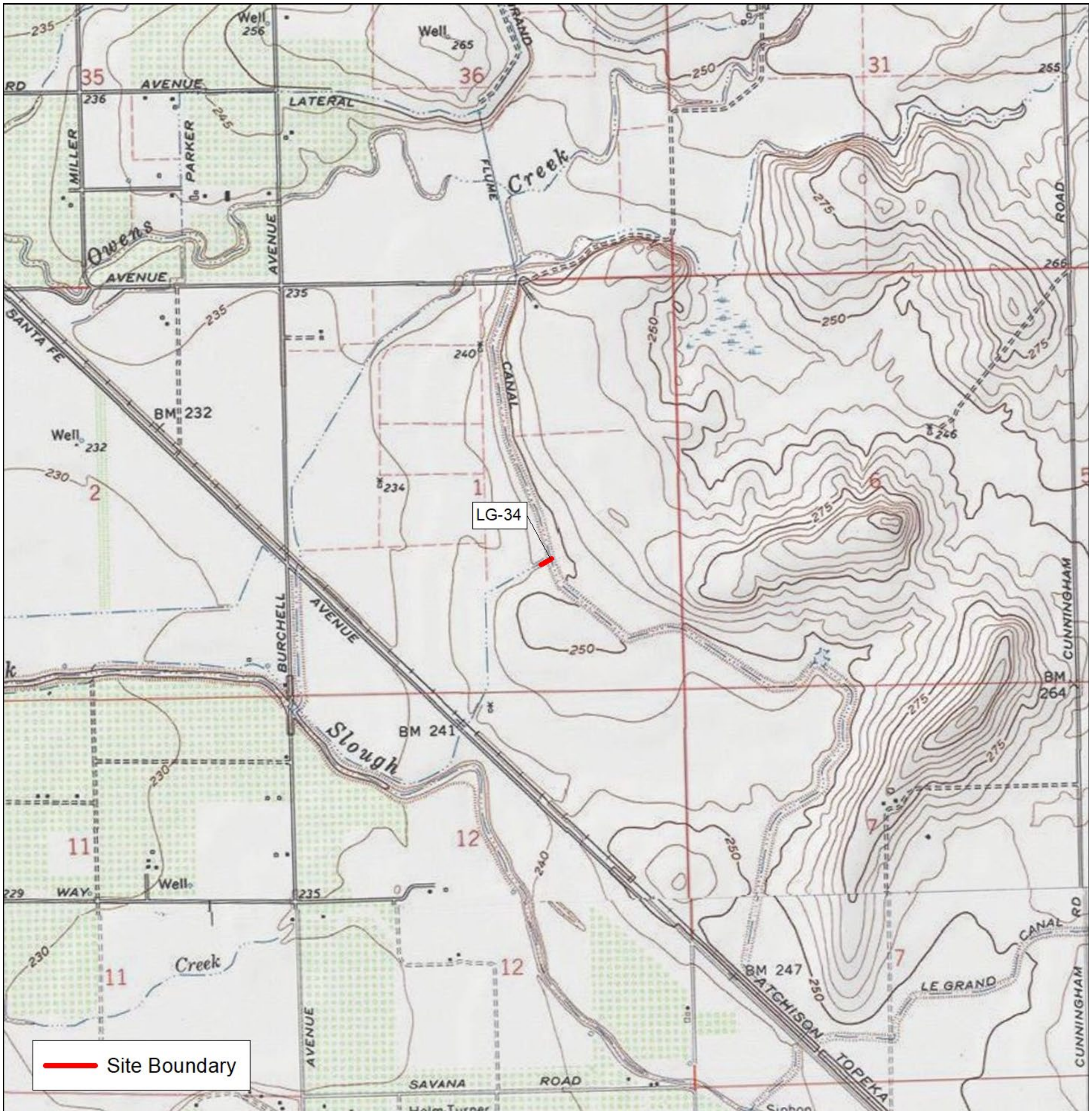
LOCATION MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-34

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**



USGS 7.5' Quad: PLANADA (1973)
Legal Description: T08S, R15E, SEC 1
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

Project Location

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-34
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name or # **(Assigned by recorder)** LG-34

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒ **Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-34
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
CRHR Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** LG-35

P1. Other Identifier: N/A

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Merced

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Le Grand Date 1961 T 8S; R 16E; SW of NW of Sec 16; M.D. B.M.

c. Address: N/A City: Le Grand Zip: 95333

d. UTM: Intersection with the Le Grand Canal: 10N, 745687 mE, 4124921 mN
Eastern end of recorded segment: 10N, 745748 mE, 4124920 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the town of La Grand travel east on La Grand Rd. Turn left onto S. Fresno Rd. Travel north for approximately 0.75 miles and turn right onto Jordan Rd. Travel east for approximately 0.73 miles and turn right onto the dirt canal access road. Travel south for approximately 330 feet. The recorded segment of canal will be on the left.

***P3a. Description:** LG-35 consists of a segment of earthen canal constructed ca. 1945. The recorded segment of the canal is approximately 20 feet wide and 200 feet long. It has a east-west orientation and connects with the Le Grand Canal via wooden sluice on the west terminus. The canal first appears of the USGS map from 1946 (USGS 1946) and is visible on historic aerials from 1945 (NETR 2021).

***P3b. Resource Attributes:** HP20 (canal) and AH6 (water conveyance system)

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

Overview of east-flowing canal channel with the Le Grand Canal visible at bottom. View east. September 29, 2021

***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Ca. 1945 (NETR 2021)

***P7. Owner and Address:**
Merced Irrigation District
744 W 20th St.
Merced, CA 95340

***P8. Recorded by:**
Zack Starke and Nick Lucatorto
Kleinfelder
435 Lincoln Way
Auburn, CA 95603

***P9. Date Recorded:** November 18, 2021

***P10. Survey Type:**
Intensive Pedestrian

***P11. Report Citation:** Cultural Resources Identification and Evaluation Report for the Le Grand Athlone Water District Intertie Project in Merced County, California, 2022, by Jessica Neal, Zack Starke, and Justin Castells.

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*Recorded by: **Kleinfelder** *Date: September 2021

B1. Historic Name: N/A
B2. Common Name: N/A
B3. Original Use: irrigation canal **B4. Present Use:** irrigation canal
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1946
***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** irrigation canal **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Merced County was initially formed from portions of Fresno County in 1855 from portions of Mariposa County. Agriculture and ranching attracted settlers to Merced County and formed the basis of the county's economy into the 21st century (Mintier Harnish et. al. 2013).

The history of Merced County is tied to the productivity of agriculture and the ability for residents of the county to get goods to market. The land the comprises Merced County was largely used for cattle ranching, but in 1872 the Central Pacific Railroad entered Merced County, connecting the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874 much of the county was under cultivation, wheat being a major crop, while remaining grasslands were still used for cattle ranching (Mintier Harnish et. al. 2013).

As controlled irrigation developed in the Central Valley, most of the former land grants were broken up into numerous small farms, and the Valley began to take on its present densely settled, highly productive aspect. The key to intensive agriculture was a means of overcoming seasonal aridity and the equally damaging seasonal floods produced when the Valley fields were inundated by melt water from the Sierra Nevada snowpack. Seasonal floods were controlled by constructing reservoirs from which water was gradually released during the growing season. Controlled irrigation in Merced County began in 1888 under the aegis of the Crocker-Huffman Land Company. In its heyday the company had over 400 miles of canals that irrigated 30,000 acres. Their canal system was extended until 1922, when the Merced Irrigation District purchased the system for $2.25 million. Crocker-Huffman was more than a water company; it was a company of speculation and promotion. Huge tracts of land were purchased and sold off with water contracts for colonization, such as the Winn Ranch (present-day Winton). U.S. 99 was paved through the county about 1913, and other roads, such as the "Yosemite-to-the-Sea Highway," were constructed in the 1920s. The expanded network of paved roads represents the on-going trend toward increased urbanization, concentration of populations in urban centers, and reduction of agricultural land in favor of sprawling "planned communities" (Mintier Harnish et. al. 2013).

(See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**
Refer to Continuation Sheet

B13. Remarks: N/A

***B14. Evaluator:** J. Castells, M.A.

***Date of Evaluation:** January 2022

(Sketch Map with north arrow required.)

Please see attached

LINEAR FEATURE RECORD

Trinomial

L1. Historic and/or Common Name:

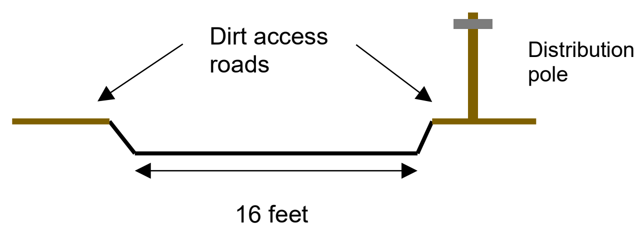
L2 a. Portion Described: ☐ **Entire Resource** ☒ **Segment** ☐ **Point Observation Designation:**

b. Location of point segment: Intersection with the Le Grand Canal: 745687 mE, 4124921 mN
Eastern end of recorded segment: 745748 mE, 4124920 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/ point. Provide plans/sections as appropriate.)
The resource consists of a segment of earthen canal. Water flows east from the Le Grand Canal through a badly eroded wooden sluice. A distribution line runs along the access road 13 feet south of the canal. The canal continues east to an undetermined distance.

L4. Dimensions:
- **a. Top Width:** 20 feet
- **b. Bottom Width:** 16 feet
- **c. Height or Depth:** 8 feet deep
- **d. Length of Segment:** 200 feet

L4e. Sketch of Cross-Section (Include scale) **Facing:** E



L5. Associated Resources: P-24-000608: the Le Grand Canal

L6. Setting: Vegetation near the site consists of non-native grasses. Slope is under 1% with an open aspect. Deposition is alluvial. Soils consist of tan sandy loam. 0-5% pebble-sized shale inclusions were observed.

L7. Integrity Considerations: The resource is in good condition with minor impacts from erosion.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)
Badly eroded wooden sluice on the east side of the Le Grand Canal. View southwest. September 29, 2021.

L9. Remarks: N/A

L10. Form Prepared by:
Zack Starke
Kleinfelder, Inc.
435 Lincoln Way
Auburn, CA 95603

L11. Date: November 18, 2021

***D6. Significance (Continued):**

Irrigation Systems in the San Joaquin Valley

Unless otherwise noted, the following history irrigation systems in the San Joaquin Valley is excerpted from "Water Conveyance Systems in Californian, Historic Context development and Evaluation Procedures" (Caltrans et al 20000) and **"**Historical Resources Inventory and Evaluation Report, Atwater- Merced Expressway Project, Merced County, California" (JRP 2007).

Stimulated largely by the relatively arid conditions of the region, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, roughly made, and diverted water by means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra Nevada mountains. The earliest of these ditches were built in the vicinity of Visalia in 1852-1853. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1860s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush. By 1870 there were only about 60,000 irrigated acres in California (JRP 2007).

Nevertheless, cycles of drought and flooding, an unstable wheat market, soil exhaustion, developing markets for irrigated crops, advancements in irrigation technology, and unreliable precipitation during the 1860s and 1870s led to a growing interest in irrigation. During this period, both private companies and groups of individual farmers attempted to expand and diversify irrigated agriculture. One of the first irrigation companies organized in the San Joaquin Valley was the Fresno Canal and Irrigation Company, which incorporated in 1870, and was providing water by 1872. Many other such companies formed in the 1870s and 1880s (JRP 2007).

As a result of conflicts over water and a desire to expand and diversify irrigation in California, by the 1880s many farmers and landowners became interested in forming irrigation districts. This groundswell culminated in the passage of the landmark Wright Act of 1887, which allowed for the formation of such districts. The Wright Act is significant because it provided the means for local democratic control over water and promoted irrigation as a means for community and regional development. The first irrigation district organized under the Wright Act was the Turlock Irrigation District (JRP 2007).

Forty-nine irrigation districts, mostly in the San Joaquin Valley, were organized under the Wright Act between 1887 and 1897, when the law was repealed in favor of revised irrigation district legislation. By the turn of twentieth century, there were over 2.6 million irrigated acres in California. Despite this apparent success, a combination of unsympathetic large landowners, owners of riparian water rights, inadequate planning, inexperienced directors and opportunists within districts contributed to the failure of most Wright Act districts. Progressive legislation passed in 1911-1913 increased state supervision over district organization and financing, making investment in irrigation district bonds more attractive. Demand for agriculture products grew around this time and remained high throughout World War I resulting in a marked increase in district formation beginning in 1915. As a consequence of this resurgence, 94 irrigation districts were active in California by 1930 (JRP 2007). The Merced Irrigation District formed in 1919 through the purchase and consolidation of several previously established privately developed irrigation canals. With the purchase of the Crocker-Huffman Land and Water Company, the Merced Irrigation District became the largest irrigation district in the region (Dice 2010).

Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, and concrete-lined irrigation canals that developed in the mid-twentieth century. Perhaps the most common canal type in California is the irrigation canal. These conduits carry water for pastures, row crops, orchards, and vineyards, and vary widely in size, shape, and construction materials. As with other canals, they are typically part of a larger system. Beginning from a storage dam or diversion weir, water is diverted through a main canal, into laterals, and then through outlet gates or other control structures into individual farm distribution ditches (Caltrans et al 2000).

The cross section or profile of open canals varied with the material through which the conduit was constructed and with the method of construction employed. If constructed in rock, the canal tended to be more rectangular with side slopes as steep as 1:0.5; in earth, the canal shape became more trapezoidal, with side slopes varying from 1:1 to 1:5, depending on material. Early canals that were built with scrapers in the alluvial soils of the Central Valley had rounded bottoms and long side slopes, with rounded berms mounded up on each side of the cut. In similar locations, irrigation channels cut with modern machinery and blades have a V-shape, with steep side slopes and flat broad berms (Caltrans et al 2000).

***D6. Significance (Continued):**
Concrete linings were first used in canals in southern California in the 1880s when increasing value of water made it necessary to prevent conveyance losses in earth canals. The practice was largely confined to southern California until the early twentieth century. As water became more valuable in the Central Valley, seepage losses became an increasing concern for water companies and irrigation districts and in the first two decades of the twentieth century, the practice rapidly spread throughout California. Frequently, old canals were improved by changes in alignment to correct hydraulic gradients before lining. Irrigation districts and private water companies in the Central Valley frequently opted for lining canal segments where conveyance losses by seepage were excessive because conversion of a canal system from an earthen ditch to a concrete canal was expensive (JRP 2007).

Most water delivery systems included water control and cleansing devices. A variety of structures were developed to measure and regulate flow rates, dispose of excess water, and trap sediment and debris. Gates, valves, checks, and gauges could adjust the volume of water passing a particular point in the system and drops and chutes reduced the velocity of the water at abrupt changes in gradient. Gates could be as simple as sliding wood slats, while drop gates of wood, metal, and even concrete were also common. Smaller gates were typically adjusted by hand; large gates were either counterweighted or mechanically assisted. A variety of valves, air vents, and other specialized equipment was also employed on penstocks and other pipelines subject to high pressure (JRP 2000).

In most systems, provision had to be made for disposal of excess water to prevent erosion. Spillways, wasteways, and other overflow devices were important at transition points—from diversion structures to conduits, from one type of conduit to another, and particularly at the terminus of the system. The most effective and lasting wasteways were made of durable materials, such as bedrock, masonry, metal, or wood (JRP 2000).

<u>Agriculture in the San Joaquin Valley</u>
The San Joaquin Valley forms the southernmost part of the California's Central Valley and includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Caltrans 2007).

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Cotton has been among the most important field crops in the valley since its introduction in 1871. Livestock is widely distributed throughout the valley. Other products include milk, chickens, turkeys, eggs, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Caltrans 2007).

Property types associated with agriculture in the San Joaquin Valley include ranches and farms. Agricultural irrigation and water conveyance systems are also associated with agricultural properties but have been addressed as their own category. Ranches are comprised of buildings and structures for the raising of livestock for domestic and commercial uses. Farm properties are comprised of buildings and structures associated with the cultivation of food (Caltrans 2007). Certain characteristics and use overlap between the two property types and, in some cases, they are not mutually exclusive. These property types can also include residential buildings such as single-family residences and bunkhouses.

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With the development of the first affordable, mass-produced automobile by the Ford Motor Company in 1908, the United States quickly entered the era of the automobile. As the popularity of automobiles grew, so did the demand for drivable roads. Existing unpaved farm roads, historically developed for horse and carts, were improved to accommodate automobile. These developments began in urban areas, but the poor condition of rural roads and the demands that increasingly industrial farming had on the roadways led to improvements in rural roads including grading, widening, and paving of existing roads as well as the development of new roads and highways (Caltrans 2016). Despite advancements in materials such as concrete and asphalt, many rural roads remained unpaved into the present due to the cost of construction and maintenance.

(See Continuation Sheet)

***D6. Significance (Continued):**

In 1909, the California legislature provided $18 million for construction and acquisition of a State Highways System. This was the basis of the Legislative Route Number (LRN) system and the first large expansion of California state roads. Gaps in funding required several state bonds issued during the 1910s, and a new gasoline tax enacted to pay for the required construction. A provision of the 1909 State Highways Act created the State of California Highway Commission, who adopted the standards for road building from nation-wide studies of successes and failures. The Federal-Aid Road Act, approved July 11, 1916, provided federal funding for road improvement and extended the country's road system. While the Federal-Aid Road Act of 1916 resulted in much-needed funds to improve the nation's roads, the continued rise of automobile use and the demand for more convenient and safer routes led Congress to adopt the Federal Highway Act of 1921. The intent of the Federal Aid Highway Act of 1921, successor to the earlier highway appropriations legislation of 1916, was to create a coherent highway network by requiring that Federal aid be concentrated on projects that would expedite completion of an adequate and connected system of interstate highways (Castells 2017).

A framework for the historical evaluation of roads in California was established by Caltrans. They suggested three primary themes by which roads and highways in California can be evaluated: Roads and Highways as Reflections of culture, roads and highways as symbols of commerce and trade, and roads and highways as symbols of engineering achievement. The theme associated with reflections of the cultural are associated with events of significance that changed the cultural history of a community, the state, or nation. Properties associated with the theme of commerce and trade are typified by highways and roads that expanded commerce and trade by opening new markets. The theme associated with engineering achievement is associated with roads and highways that represent new advancements in road construction and design (Caltrans 2016).

NRHP and CRHR Evaluation

NRHP Criterion A/ CRHR Criterion 1: This resource does not meet NRHP Criterion A or CRHR Criterion 1 for association with events that have made a significant contribution to the broad patterns of history and cultural heritage. This resource is comprised of an irrigation canal. Research has yielded no information to suggest that this irrigation canal is specifically associated with important historical events. It is one of thousands of irrigation canals constructed throughout the region, California, and united states during the twentieth century. Therefore, this resource is not eligible for the NRHP under Criterion A or the CRHR under Criterion 1.

NRHP Criterion B/ CRHR Criterion 2: This resource does not meet NRHP Criterion B or CRHR Criterion 2 for any direct associations with the productive lives of persons important in local, state, or national history. Research has yielded no information to suggest that this irrigation canal is specifically associated with any persons of historical significance. Therefore, this resource is not eligible for the NRHP under Criterion B or the CRHR under Criterion 2.

NRHP Criterion C/ CRHR Criterion 3: This resource does not meet NRHP Criterion C or CRHR Criterion 3 for embodying the distinctive characteristics of a type, period, and method of construction, or as the work of an important creative individual, or as having high artistic value. Research has yielded no information to suggest that this irrigation canal represents any significant departure from standard building and design from its period of construction. It is essentially similar to other irrigation canals constructed before and after the period of construction. Therefore, this resource is not eligible for the NRHP under Criterion C or the CRHR under Criterion 3.

NRHP Criterion D/ CRHR Criterion 4: This resource does not meet NRHP Criterion D or CRHR Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the development of the region, California, or the United States. Therefore, this resource is not eligible for the NRHP under Criterion D or the CRHR under Criterion 4.

Therefore, LG-35 is not a historic property for the purposes of Section 106 or a historical resource for the purposes of CEQA.

***B12. References (Continued):**

California Department of Transportation (Caltrans)
2007 A Historical Context and Archeological Research Design for Agricultural Properties in California
2016 A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California.

California Department of Transportation (Caltrans) and JRP Historical Consulting Services (JRP)
2000 Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures.

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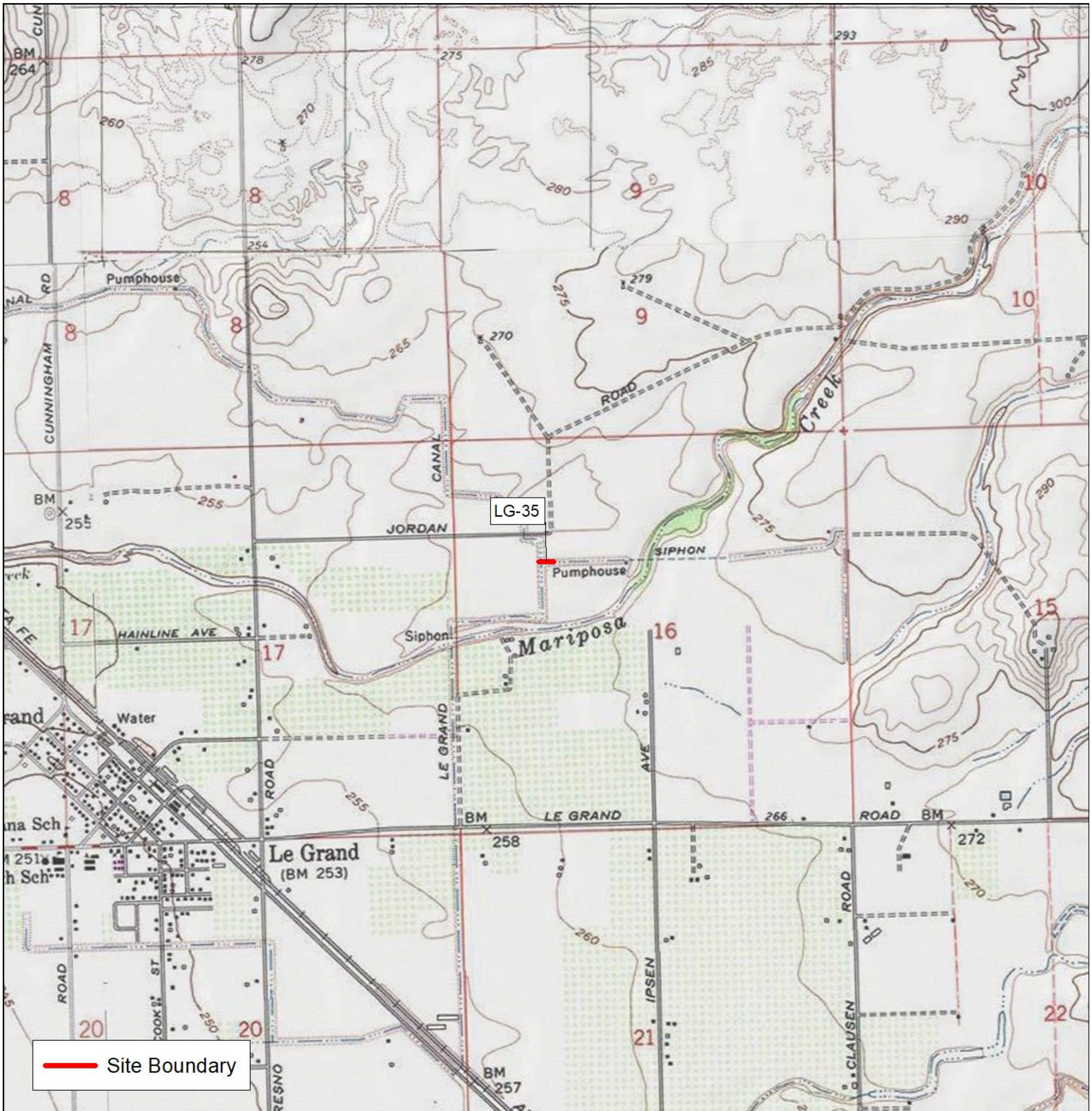
Nationwide Environmental Title Research (NETR)
2021 "Historic Aerials: 1946, 1958, 1998, 2005, 2009, 2010, 2012, 2014, 2016, and 2018" accessed at https://historicaerials.com/ on December 1, 2021.

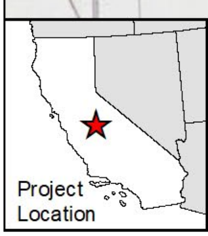
United States Geological Survey (USGS)
1946 Le Grand, California. 1:62,500 scale.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI#
LOCATION MAP	Trinomial

Page **8** **of** **9** *Resource Name or # **(Assigned by recorder)** LG-35

*Recorded by: **Kleinfelder** *Date: September 2021 ☒**Continuation** ☐ **Update**





USGS 7.5' Quad: LE GRAND (1981)
Legal Description: T08S, R16E, SEC 16
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
LG-35
Merced County, California

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

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*Resource Name or # **(Assigned by recorder)** LG-35

*Recorded by: **Kleinfelder**

*Date: September 2021 ☒**Continuation** ☐ **Update**

Drawn by: Chelsea Barker-Switzer

NAD 1983 UTM Zone 10N

0 50 100 Feet
0 15 30 Meters

N

Scale 1:1,200
1 inch = 100 feet

Sketch Map
LG-35
Merced County, California