Dunnigan and Orland-Artois Water Districts

Dunnigan, Wildwood, Zamora, and Fruto NE Annexations

Final Initial Study / Negative Declaration

January 2020

Prepared for:
Dunnigan and Orland-Artois Water Districts

Prepared by:
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Acronyms and Abbreviations

AB ..... Assembly Bill
AFY ..... Acre Feet per year
AL-20 ..... LimitedAgricultural
APN ..... Assessor's Parcel Number
CAA ..... Clean Air Act
CalEEMod ..... California Emissions Estimator Model
CalEPA ..... California Environmental Protection Agency
CARB ..... California Air Resources Board
CAAQS ..... California Ambient Air Quality Standards
CCAA ..... California Clean Air Act
CCR ..... California Code of Regulations
CDFW ..... California Department of Fish and Wildlife
CEC ..... California Energy Commission
CEQA ..... California Environmental Quality Act
CFR ..... U.S. Code of Federal Regulations
CGS ..... California Geological Survey
CH_4 ..... Methane
CNDDB ..... California Department of Fish and Wildlife Natural Diversity Database
CNPS ..... California Native Plant Society
CPUC ..... California Public Utilities Commission
CO ..... Carbon Monoxide
CO_2e ..... Carbon Dioxide Equivalent
CUPA ..... Certified Unified Program Agency
CVP ..... Central Valley Project
CWA ..... Clean Water Act
DDW ..... Division of Drinking Water
Districts ..... Dunnigan and Orland-Artois Water Districts
DOC ..... California Department of Conservations
DPM ..... Diesel Particulate Matter
DTSC ..... Department of Toxic Substance Control
DWD ..... Dunnigan Water District
DWR ..... Department of Water Resources
EDP ..... ethylene dibromide

EIR ..... Environmental Impact Report
EPA ..... U.S. Environmental Protection Agency
FEMA ..... Federal Emergency Management Agency
FIRM ..... Flood Insurance Rate Maps
FMMP ..... Farmland Mapping and Monitoring Program
GC ..... Government Code
GHG ..... Greenhouse Gas
GIS ..... Geographic Information System
IPaC ..... U.S. Fish and Wildlife Service's Information for Planning and Consultation system
IS ..... Initial Study
IS/ND ..... Initial Study/Negative Declaration
MBTA ..... Migratory Bird Treaty Act
MCL ..... Maximum Contaminant Level
MMRP ..... Mitigation Monitoring & Reporting Program
MMT ..... Million Metric Tons
MRZ ..... Mineral Resource Zones
MT CO_2e ..... Metric Tons of Carbon Dioxide Equivalent
NAAQS ..... National Ambient Air Quality Standards
ND ..... Negative Declaration
NEPA ..... National Environmental Policy Act
NFIP ..... National Flood Insurance Program
NO_2 ..... Nitrogen Dioxide
NOX ..... Nitrogen Oxide
NPDES ..... National Pollutant Discharge Elimination System
NRCS ..... Natural Resources Conservation Service
O_3 ..... Ozone
OAWD ..... Orland-Artois Water District
Pb ..... Lead
PC ..... Production-Consumption
PM_{10} ..... Particulate Matter less than 10 microns in diameter
$PM_{2.5}$ ..... Particulate Matter less than 2.5 microns in diameter
Project ..... Dunnigan, Wildwood, Zamora, and Fruto NE Annexations
RCRA ..... Resource Conservation and Recovery Act
RWQCB ..... Regional Water Quality Control Board

SB ..... Senate Bill
SHC ..... Streets and Highways Code
SIP ..... State Implementation Plan
SO_2 ..... Sulfur Dioxide
SR ..... State Route
SWRCB ..... State Water Resources Control Board
SWPPP ..... Storm Water Pollution Prevention Plan
TAC ..... Toxic Air Contaminants
TCP 1,2,3-trichloropropane
TPY ..... Tons Per Year
USACE ..... U. S. Army Corps of Engineers
USDA ..... U. S. Department of Agriculture
USFWS ..... U. S. Fish and Wildlife Service
USGS ..... U. S. Geological Survey
WC ..... Water Code

Chapter 1 Introduction

Provost & Pritchard Consulting Group (Provost & Pritchard) has prepared this Initial Study/Negative Declaration (IS/ND) on behalf of the Dunnigan and Orland-Artois Water Districts to address the environmental effects of the Dunnigan, Wildwood, Zamora, and Fruto NE Annexations (Project). This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 *et.seq*. The **Dunnigan Water District** is the CEQA lead agency for this proposed Project.

The site and the proposed Project are described in detail in the **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/ND contains four chapters and four appendices. **Chapter 1 Introduction**, provides an overview of the proposed Project and the CEQA process. **Chapter 2 Project Description**, provides a detailed description of proposed Project components and objectives. **Chapter 3 Impacts Analysis** presents the CEQA checklist and environmental analysis for all impact areas, mandatory findings of significance, and feasible mitigation measures. If the proposed 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 proposed 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.

The Cultural Resources Information and NRCS Soil Resource Report are provided as technical **Appendix A, and Appendix B,** respectively, at the end of this document.

Chapter 2 Project Description

2.1 Project Background and Objectives

2.1.1 Project Title

Dunnigan and Orland-Artois Water Districts: Dunnigan, Wildwood, Zamora, and Fruto NE Annexations

2.1.2 Lead Agency Name and Address

Dunnigan Water District
3817 1st Street
P.O. Box 84
Dunnigan, CA 95937

2.1.3 Contact Person and Phone Number

Lead Agency Contact

William Vanderwaal, PE, General Manager
(530) 724-3271

CEQA Consultant

Provost & Pritchard Consulting Group
Dawn E. Marple, Environmental Project Manager
(559) 636-1166

2.1.4 Project Location

The Project is located in Glenn and Yolo Counties in California, approximately 85 and 33 miles northwest of Sacramento (see **Figure 2-1**), respectively. The proposed site of Dunnigan, Wildwood, Zamora, and Fruto NE Annexations is located approximately 1,449 acres, 837 of which are in Yolo County and 612 in Glenn County.

2.1.5 Latitude and Longitude

The centroid of the Project area is 39°09'40.8"N 122°05'25.6"W.

2.1.6 General Plan Designation and Zoning

Table 2-1 General Plan Designation and Zone District

Water District	APN	General Plan Designation	Zone District
Dunnigan	051-140-035	Agriculture (AG)	A-X (Agricultural Extensive)
	051-140-037	Agriculture (AG)	A-N (Agricultural Intensive)
	052-010-006	Agriculture (AG)	A-N (Agricultural Intensive)
	052-100-004 (portion)	Agriculture (AG)	A-X (Agricultural Extensive)
	052-110-001	Agriculture (AG)	A-N (Agricultural Intensive)
	054-020-014	Agriculture (AG)	A-X (Agricultural Extensive)
Orland-Artois	024-220-020	Intensive Agriculture	AP-80 (Agricultural Preserve)
	024-220-023	Intensive Agriculture	AP-80 (Agricultural Preserve)

2.1.7 Description of Project

2.1.7.1 Project Background and Purpose

DWD is an independent special district formed in 1956 by landowners in the Dunnigan area to access CVP water through the proposed Tehama-Colusa Canal. However, 28 more years passed before delivery of water began in 1983. DWD's initial contract with USBR for CVP water was executed in 1963. The last segment of the Tehama-Colusa Canal, Reach 8, was completed in 1980. The DWD distribution system connecting the Tehama-Colusa Canal to DWD lands through an underground pipeline system was completed in 1981. The 1963 CVP contract expired in 1995. DWD contract renewals with USBR since then have maintained the original 19,000 acre-feet per year CVP allocation. The DWD will continue to utilize this allocation to provide surface water to its current users and the proposed six (6) new properties for the purpose of reducing groundwater pumping.

Form in 1953 as a unit of the Central Valley Project, the OAWD began delivering water in 1977. By 1983, the District was completed, delivering water throughout its service boundary. OAWD serves approximately 29,000 acres using 110 miles of pipeline and over 300 metered deliveries from five (5) diversions off of the Tehama Colusa Canal.

2.1.7.2 Project Description

The Dunnigan Water District (DWD) seeks to amend its Sphere of Influence to include six (6) new properties, totaling 837 acres, and annex them into the DWD. The six properties will be deemed Class II users, which means that should USBR allocate less than the maximum allotment for a year, Class II users would be served last.

The Orland-Artois Water District (OAWD) seeks to annex two (2) properties, as well as abutting portions of the Wilson Creek right-of-way, totaling 612 acres, into the OAWD.

No construction, nor are any operational or maintenance changes proposed with this project at this time.

2.1.8 Site and Surrounding Land Uses and Setting

See **Figure 2-4, Figure 2-5, Figure 2-6, and Figure 2-7** below for the general plan and zoning designations, respectively.

2.1.9 Other Public Agencies Whose Approval May Be Required

- Glenn County LAFCo
- Yolo County LAFCo
- United States Bureau of Reclamation

2.1.10 Consultation with California Native American Tribes

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 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.

Dunnigan and Orland-Artois Water Districts have not received any written correspondence from a Tribe pursuant to Public Resources Code Section 21080.3.1 requesting notification of proposed Project.

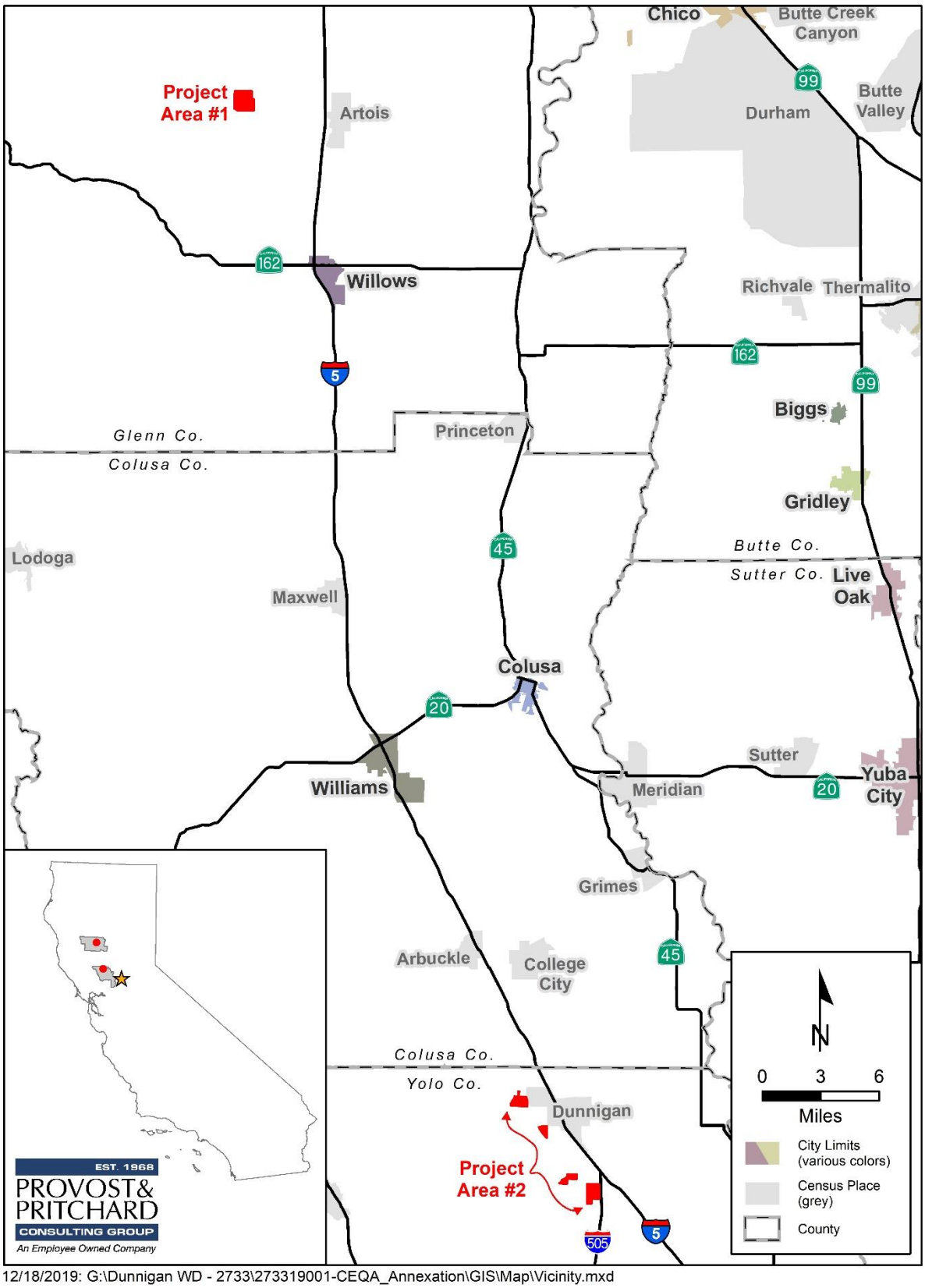

Figure 2-1 Regional Location

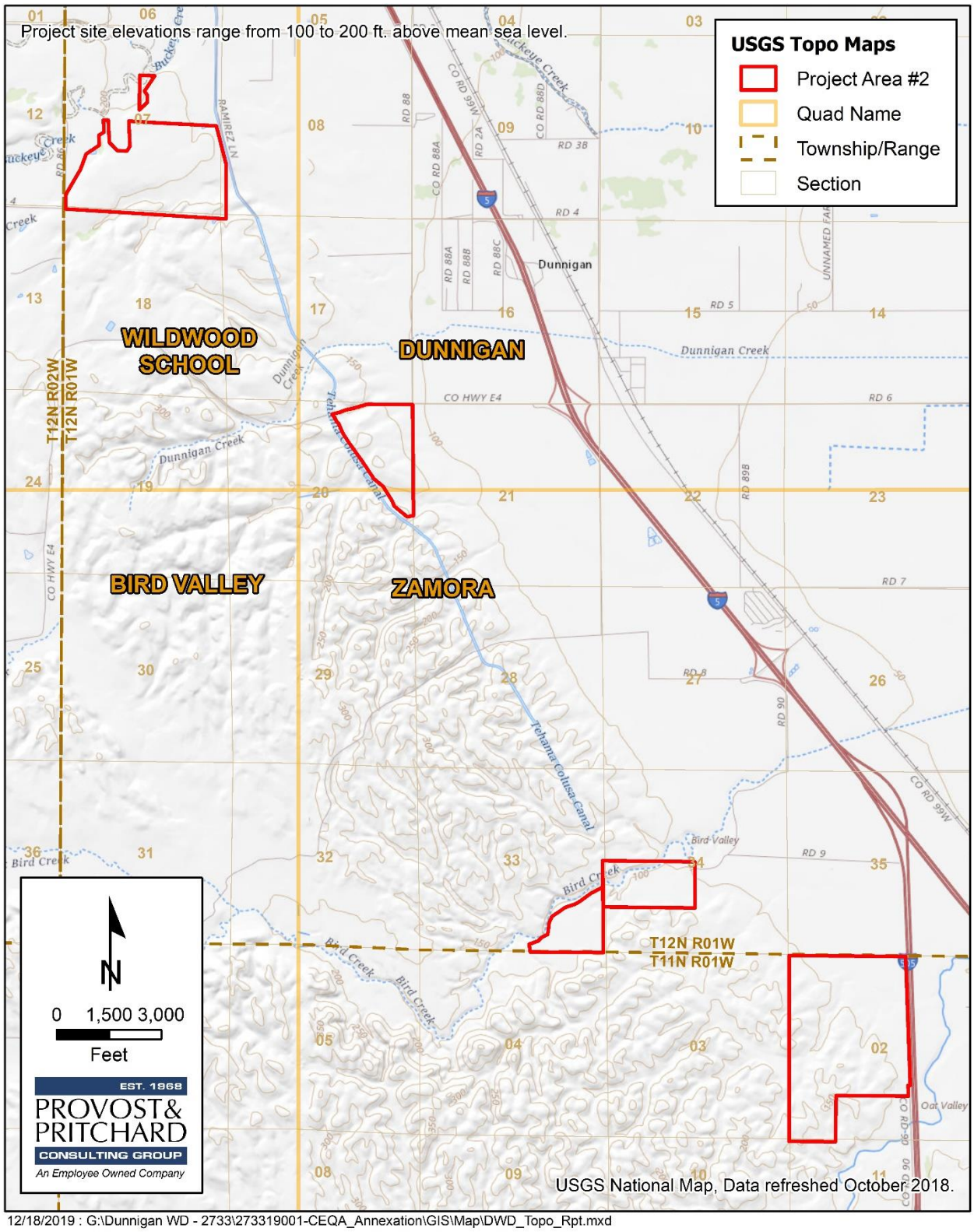

Figure 2-2 Topographic Quadrangle Map, Wildwood School, Dunnigan, and Zamora Quads

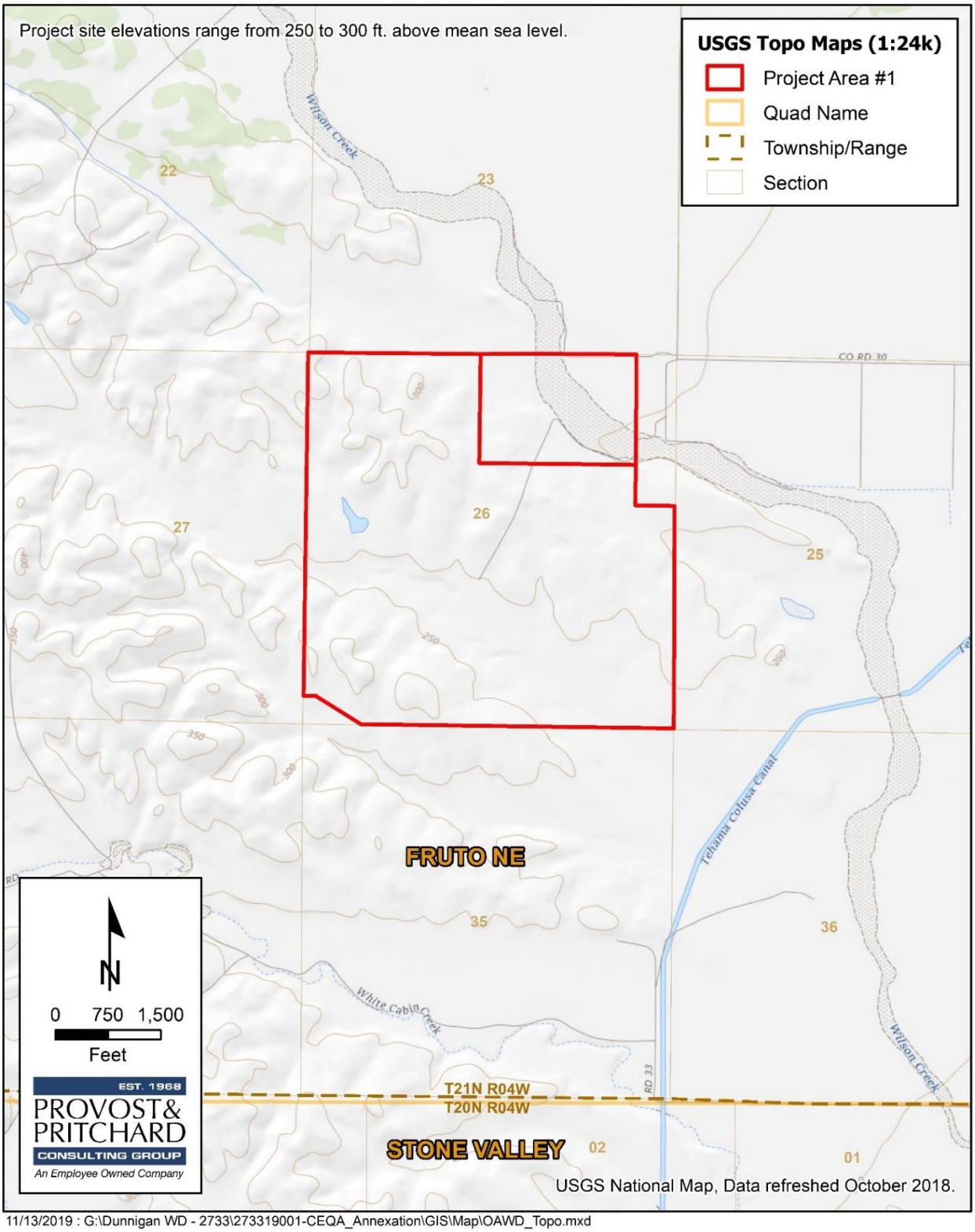

Figure 2-3 Topographic Quadrangle Map, Fruto NE Quad

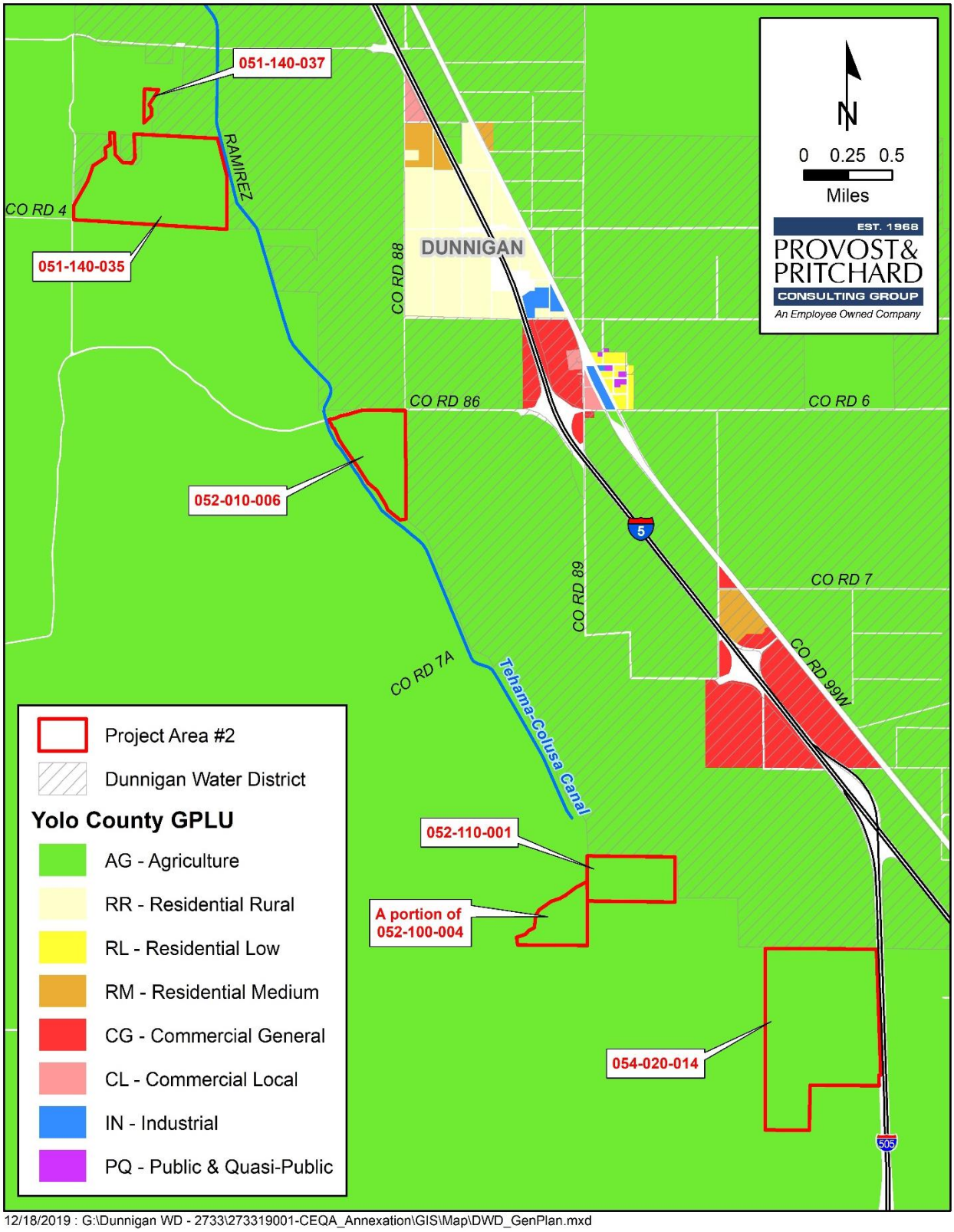

Figure 2-4 General Plan Land Use Designation Map, Dunnigan

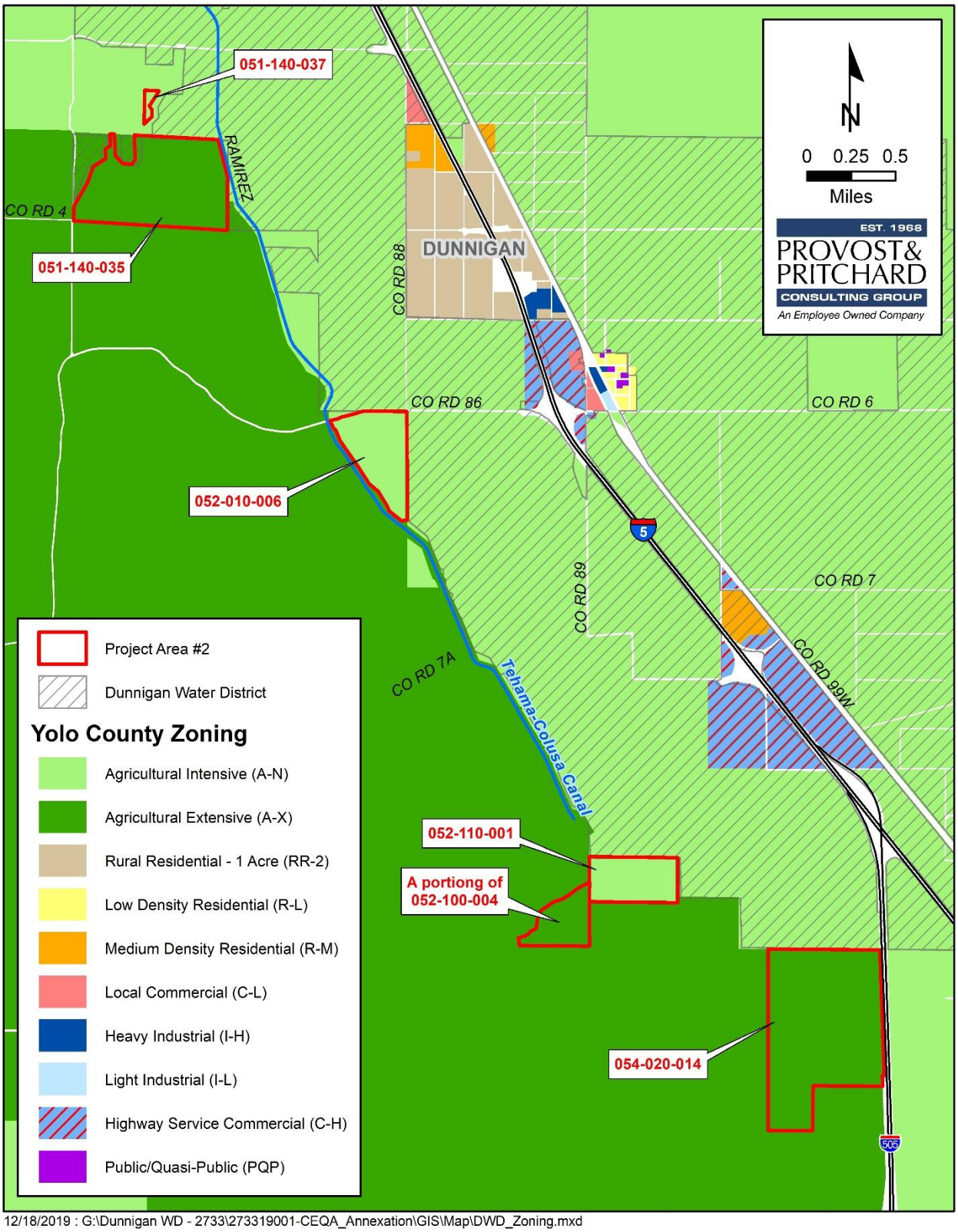

Figure 2-5 Zone District Map, Dunnigan

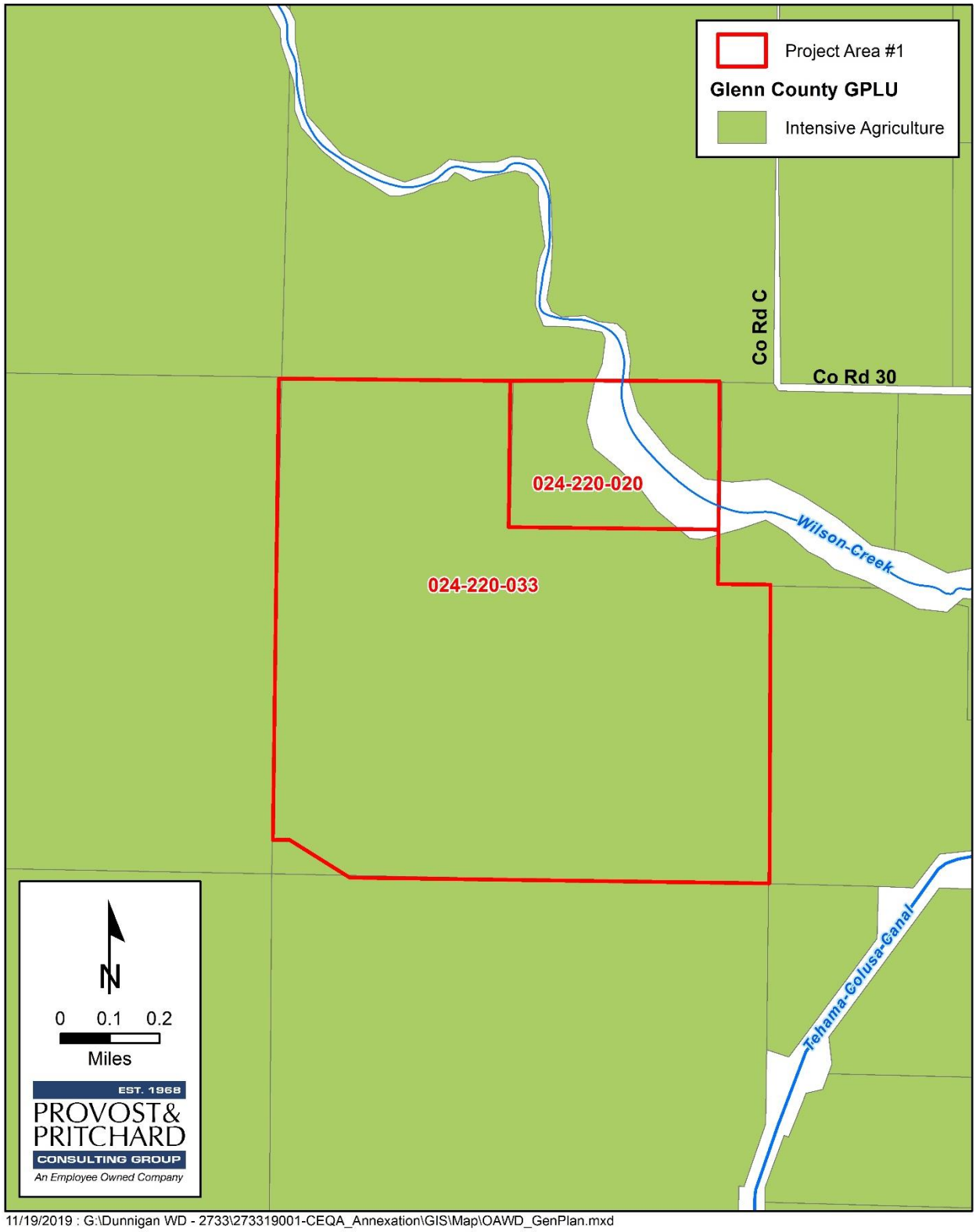

Figure 2-6 General Plan Land Use Designation Map, Orland-Artois

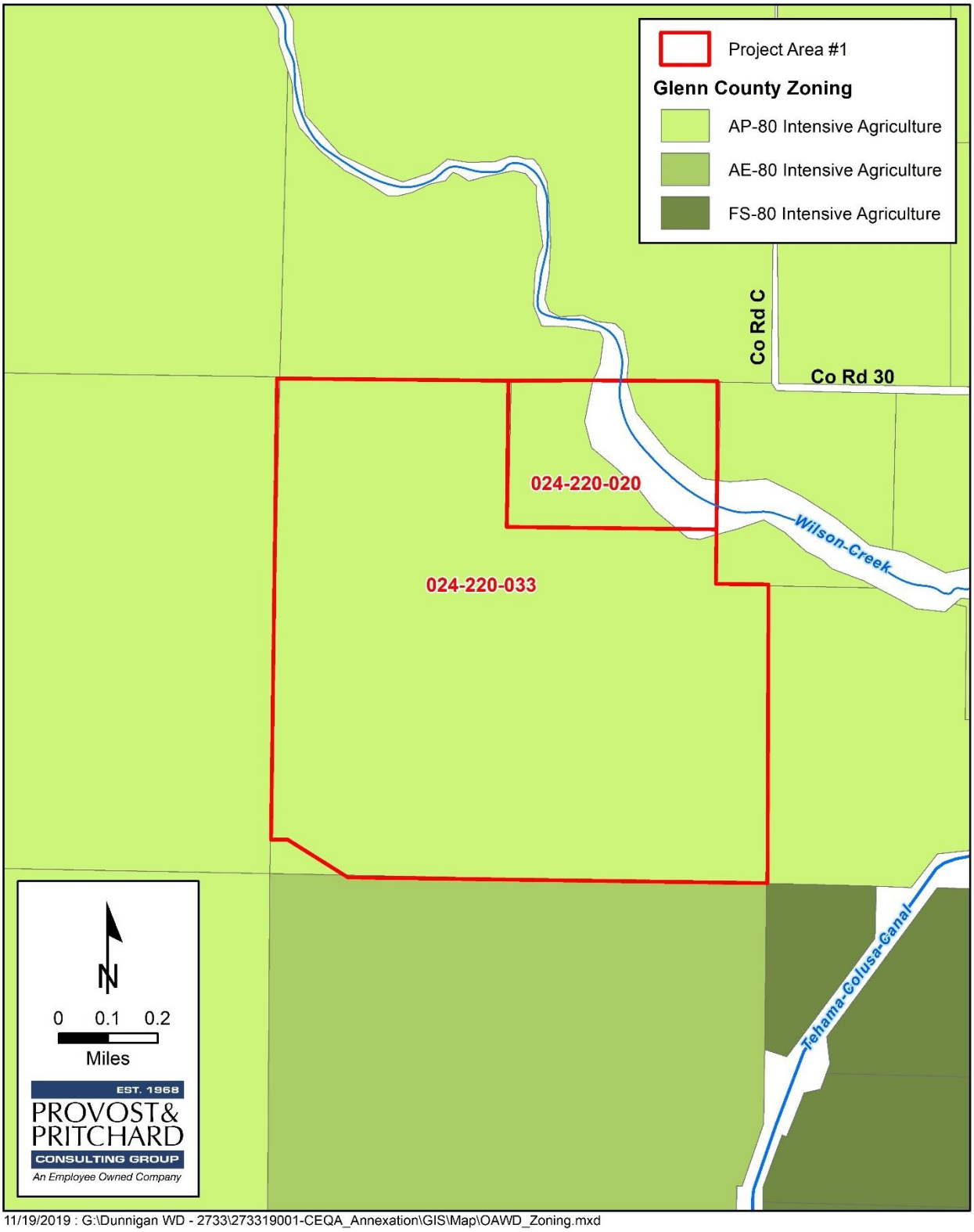

Figure 2-7 Zone District Map, Orland-Artois

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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 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/Traffic	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

The analyses of environmental impacts here in **Chapter 3 Impact Analysis** 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 Setting and Baseline Conditions

The proposed Project is located in northern Glenn and Yolo Counties. Lands in the Project vicinity consist of relatively flat, irrigated farmland. Agricultural practices in the vicinity consist of row crop, field crop, and orchard cultivation. Additionally, the immediate vicinity contains rural roadways, canals, water retention basins and other infrastructure typical of rural agricultural areas along the Interstate 5 (I-5) corridor in the Sacramento Valley.

3.2.2 Regulatory Setting

There are no federal, state or local regulations, plans, programs, or guidelines associated with aesthetics that are applicable to the proposed Project.

3.2.3 Impact Assessment

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

No Impact. A scenic vista is generally defined as a public vantage point with an expansive view of a significant landscape feature. The proposed Project site is farmland and grazing land located on relatively flat land. The proposed Project would include the annexation of existing lands. Therefore, the proposed Project would not have an impact on a scenic vista.

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

No Impact. According to the California Department of Transportation mapping of State Scenic Highways,[1] there are no officially designated State Scenic Highways located in Glenn or Yolo Counties. One eligible State Scenic is located in Colusa County, approximately 22 miles away from the Dunnigan Water District. Since there are no eligible or officially designated State scenic highways within the immediate vicinity of the Project Site, the Project would not impact a designated state scenic highway. Furthermore, the eligibility of the State Scenic Highway, scenic resources located within the highway segments or its viewshed would not be impacted by the proposed Project. Therefore, no impact on scenic resources within a state scenic highway would occur as a result of the proposed Project.

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?

No Impact. The Project Site is currently used as farmland and grazing land. The proposed Project would include the annexation of properties into water districts. Therefore, as there would be no change to the lands, the Project would not substantially degrade the visual character or quality of the site and its surroundings, and thus the proposed Project would have no impact.

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

No Impact. The Project Site is located in a rural area, not subject to preexisting exterior lighting from surrounding development and existing street lighting often found in urban areas. The proposed Project would not introduce new sources of light and glare to the area in the form of exterior safety and security lighting, and thus there is no light and glare impacts.

[1] California Department of Transportation, List of eligible and officially designated State Scenic Highways, https://dot.ca.gov/-/media/dot-media/programs/design/documents/2017-03desigandeligible-a11y.xlsx, (accessed on November 18, 2019).

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 Setting

Agriculture is the most extensive land use in Glenn County and the most significant component of the county's economy. Two-thirds of Glenn County's 1,317 square miles are comprised of agricultural croplands and pasture. With the exception of range land acreage, rice is by far the largest crop in both production acreage and valuation. In 1990, rice accounted for more than one-fourth of total agricultural value generated in the county. Almonds, prunes and alfalfa hay are also large cash crops; each accounting for more than $10 million in value in 1990. It is important to note that both agricultural production and its value vary significantly from year to year. This can be due to a variety of factors including climatic variations, rainfall, and market conditions.[2] A wide range of commodities are grown in Glenn County, with major production of almonds, rice, walnuts, livestock, and alfalfa[3].

Yolo County primary production crops include almonds, tomatoes, wine grapes, sunflower seed, nursery productions, and cattle.[4]

[2] Glenn County Environmental Setting Technical Paper. 1993. https://www.countyofglenn.net/sites/default/files/images/3%20Environmental%20Setting%20Technical%20Paper%20Glenn%20County%20GP%20Vol.%20III%20Reduced%20Size.pdf. Accessed 15 December 2019.
[3] Glenn County 2018 Annual Agriculture Report. 2019. https://www.countyofglenn.net/sites/default/files/Agriculture/Crop%20Report%202018.pdf. Accessed 15 December 2019.
[4] Yolo County Agricultural Crop Report 2018. https://www.yolocounty.org/home/showdocument?id=59219. Accessed November 18, 2019.

3.3.2 Regulatory Setting

There are no federal, state, or local regulations, plans, programs, or guidelines associated with agriculture and forestry resources that are applicable to the proposed Project.

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.
The California DOC's 2012 FMMP 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[5]:

• 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 four 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 four 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 four 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

[5] California Department of Conservation. FMMP – Report and Statistics. https://www.conservation.ca.gov/dlrp/fmmp/Pages/Important-Farmland-Categories.aspx. Accessed November 18, 2019.

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.

FMMP farmland designations are shown in **Figure 3-1** and **Figure 3-2**.

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?

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

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))?

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

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?

No Impact. The subject properties are of varying levels of agricultural land quality, as depicted in Figure 3-1 and Figure 3-2 below, ranging from Grazing Land to Prime Farmland. The Project seeks to annex existing farmland, and zoned appropriately so, into a Water District. No construction or operational changes are proposed at this time. As a result, there will be no impact to agricultural resources.

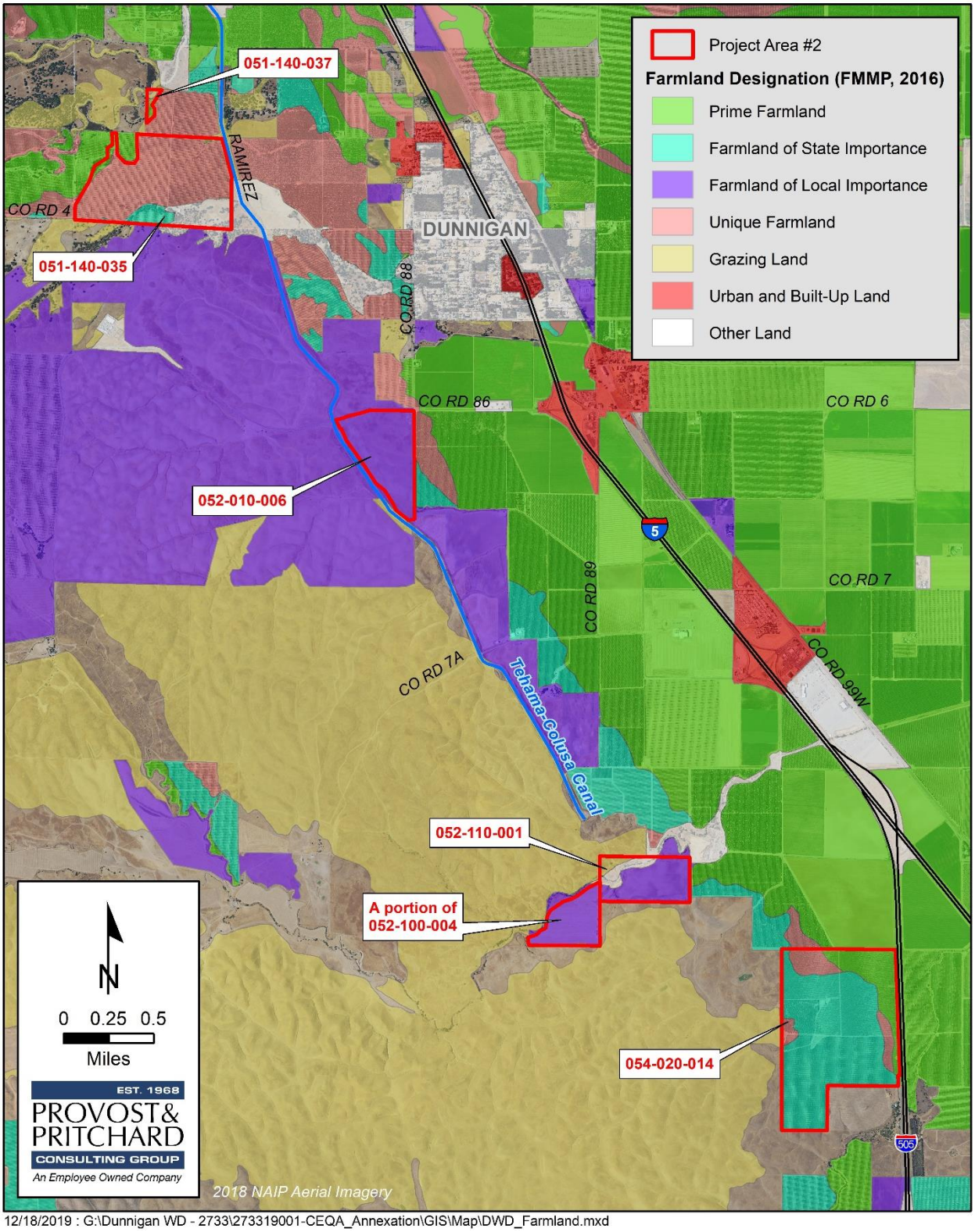

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Figure 3-1 Farmland Designation Map, Dunnigan Water District

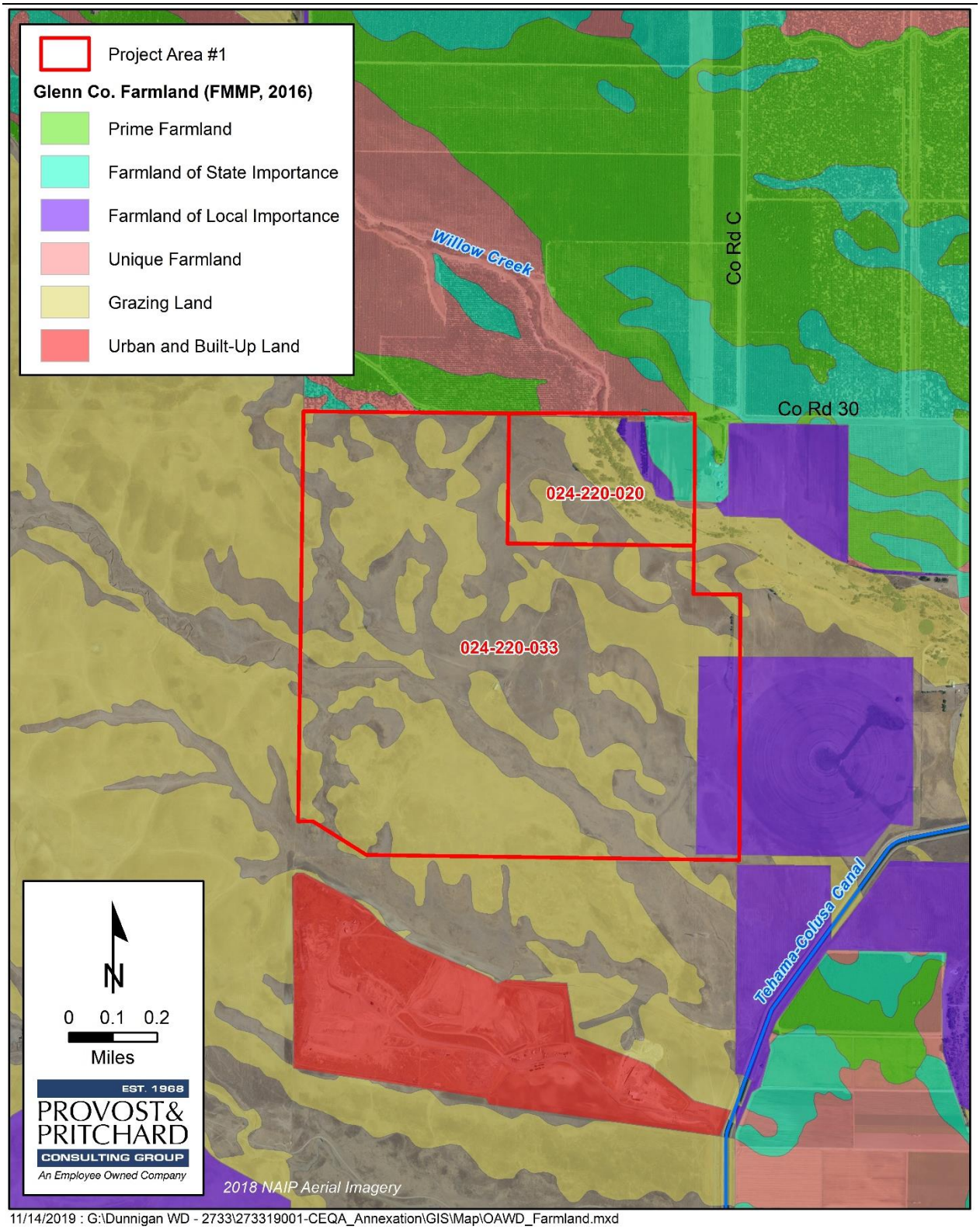

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Figure 3-2 Farmland Designation Map, Orland-Artois Water District

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 Setting and Baseline Conditions

The Project is located within Glenn and Yolo Counties, within the Sacramento Valley Air Basin (SVAB). The SVAB is within the jurisdiction of the Glenn County Air Pollution Control District (GCAPCD) and Yolo-Solano Air Quality Management District (YSAQMD) for their respective counties. Air quality in the SVAB is influenced by a variety of factors, including topography, local, and regional meteorology.

3.4.1.1 Regulatory Attainment Designations

Under the CCAA, the 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 EPA 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, 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 EPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, EPA 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."

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

Summary of Ambient Air Quality Standards & 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	Attainment	0.075 ppm	Attainment/ Unclassified
Particulate Matter (PM_{10})	AAM	20 µg/m^3	Nonattainment	–	Unclassified
	24-hour	50 µg/m^3		150 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	Attainment	12 µg/m^3	Attainment/ Unclassified
	24-hour	No Standard		35 µg/m^3	
Carbon Monoxide (CO)	1-hour	20 ppm	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		
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*
Source: CARB 2015

3.4.2 Impact Assessment

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

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?

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

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

No Impact. The Project consists of the expansion of a Sphere of Influence and the annexation of land into Water Districts. No construction nor operational changes are proposed with the Project, thus there is no impact.

3.5 Biological Resources

Table 3-5 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 Wildlife 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 Wildlife 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 Setting and Baseline Conditions

A California Natural Diversity Database (CNDDB) search was run on November 15, 2019 to identify federally threatened or endangered species within the APE as well as the California Department of Fish and Wildlife's (CDFW) determinations of Species of Special Concern (SSC) and species identified on the Watch List (WL). The results are presented below in **Table 3-6**.

Table 3-6 CNDDB Search of Threatened and Endangered Species Identified within the APE.

Quads	Species	Status	Habitat
Wildwood School	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.
Dunnigan, Fruto NE, Wildwood School, Zamora	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.
Wildwood School	golden eagle (*Aquila chrysaetos*)	CFP, CWL	Inhabits open country from barren areas to open coniferous forests. They are primarily in hilly and mountainous regions, but also in rugged deserts, on the plains, and in tundra. The golden eagle prefers cliffs and large trees with large horizontal branches and for roosting and perching.
Fruto NE, Wildwood School, Zamora	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 burrowing mammals, most often ground squirrels.
Dunnigan, Fruto NE, Wildwood School, Zamora	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.
Dunnigan, Zamora	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.
Dunnigan	white-tailed kite (*Elanus leucurus*)	CFP	Nests in tall shrubs and trees, forages in grasslands, agricultural fields, and marshes.
Dunnigan	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.
Zamora	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.
Dunnigan	western pond turtle (*Emys marmorata*)	CSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches

Quads	Species	Status	Habitat
			with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.
Dunnigan, Zamora	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.
Dunnigan, Wildwood School, Zamora	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.
Fruto NE	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.
Dunnigan, Wildwood School	Ferris' milk-vetch (*Astragalus tener var. ferrisiae*)	1B	Found in vernally mesic meadows and seeps. Blooms April – May.
Dunnigan, Wildwood School	palmate-bracted bird's-beak (*Chloropyron palmatum*)	FE, CE, 1B	Found in the San Joaquin Valley and Sacramento Valley in alkaline soils (usually Pescadero silty clay) in chenopod scrub, valley and foothill grassland at elevations below 500 feet. Blooms June – August.
Dunnigan, Wildwood School	San Joaquin spearscale (*Extriplex joaquinana*)	1B	Found in alkali wetlands, sinks, and scrublands in the San Joaquin Valley and Delta-Bay region of California. Associated with Distichlis spicata, Frankenia, and other scrub species at elevations below 1,150 feet. Blooms April – September.
Dunnigan, Wildwood School	Coulter's goldfields (*Lasthenia glabrata ssp. coulteri*)	1B	Found in salt marshes, playas, and vernal pools at elevations below 3200 feet. Blooms April – May.
Dunnigan, Wildwood School	Colusa layia (*Layia septentrionalis*)	1B	Found in sandy, serpentinite valley and foothill grassland. Blooms April – May.
Zamora	Heckard's pepper-grass (*Lepidium latipes var. heckardii*)	1B	Found alkaline Valley and foothill grasslands. Blooms March – May.
Dunnigan, Wildwood School	Baker's navarretia (*Navarretia leucocephala ssp. bakeri*)	1B	Found in Meadows, seeps, valley and foothill grasslands, and vernal pools. Blooms April – July.
Dunnigan	Wright's trichocoronis (*Trichocoronis wrightii var. wrightii*)	2	Found in Meadows, seeps, valley and foothill grasslands, and vernal pools. Blooms May – September.

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

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

3.5.2 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 Wildlife or U.S. Fish and Wildlife Service?

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?

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?

d) 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?

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

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 proposes to expand a Sphere of Influence and annex existing farmland and grazing land into a Water District. No construction nor operational changes are proposed at this time, and thus there is no impact.

3.6 Cultural Resources

Table 3-7 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 Setting and Baseline Conditions

An Extended CHRIS Records Search was performed by the Northwest and Northeast Information Centers, at CSU Chico and Sonoma State University, respectively.

For the DWD and OAWD sites, no prehistoric nor historic resources have been recorded in the Project area or in a one-mile vicinity of the sites.

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?

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

No Impact. As the Project consists of the expansion of a Sphere of Influence and annexation of existing farmland and grazing land into a Water District, and the lack of any ground-disturbing construction activities nor operational changes, there will be no impact to historical or archeological resources.

3.7 Energy

Table 3-8 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 Setting and Baseline Conditions

Pacific Gas and Electric Company (PG&E) provides electricity and natural gas to the Project areas, as well as most of northern California. All of the project properties currently pump groundwater for their irrigation operations.

At the local level, Glenn County's 1993 Energy Element includes the following policies:

- *3.7(b) – Evaluate methods to increase the efficiency of agricultural water pumping, including the possibility of increasing the use of surface water delivery systems and establishing a regional or basin-wide irrigation return system.*

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?

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

No Impact. The Project consists of the expansion of a sphere of influence and annexation of the subject properties. As there are no construction activities nor operational changes proposed at this time, there would be no impact due to wasteful, inefficient, or unnecessary consumption of energy resources, nor would the Project have any impact on state or local plans for renewable energy or energy efficiency.

3.8 Geology and Soils

Table 3-9 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 most recently adopted Uniform Building Code 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 geologic feature?	☐	☐	☐	☒

3.8.1 Environmental Setting and Baseline Conditions

Although most of Glenn and Yolo Counties are situated within an area of relatively low seismic activity by comparison to other areas of the state, the faults and fault systems that lie along the eastern and western boundaries of the county, as well as other regional faults, have the potential to produce high-magnitude earthquakes throughout the county. The principle earthquake hazard is groundshaking. Older buildings constructed before building codes were established and newer buildings constructed before earthquake-resistant provisions were included in the building codes are the most likely to be damaged during an earthquake.

Using the USDA NRCS soil survey of the Project site, an analysis of the soils onsite was performed **Appendix B.**

Table 3-10. Soils of the Project site, Orland-Artois Area

Soils of the Study Area				
Soils Series	**Parent Material**	**Drainage Class**	**Hydric?**	**Percentage of Project site**
Altamont clay, 3 to 15 percent slopes	Residuum weathered from sedimentary rock	Well drained	No	36.9%
Altamont-Shedd association, 3 to 15 percent slopes	Residuum weathered from sedimentary rock	Well drained	No	0.1%
Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17	Alluvium derived from metamorphic and sedimentary rock	Well drained	No	0.0%
Arbuckle gravelly loam, clayey substratum, 0 to 2 percent slope	Alluvium derived from conglomerate	Well drained	No	0.0%
Corning gravelly loam, 0 to 2 percent slopes	Gravelly alluvium derived from sedimentary rock	Well drained	No	2.3%
Corning gravelly loam, 2 to 8 percent slopes	Gravelly alluvium derived from sedimentary rock	Well drained	No	12.8%
Cortina very gravelly sandy loam, 0 to 3 percent slopes	Gravelly alluvium	Somewhat excessively drained	No	0.2%
Hillgate loam, 0 to 2 percent slopes, MLRA 17	Alluvium derived from metamorphic and sedimentary rock	Well drained	No	1.7%
Myers clay, 0 to 1 percent slopes, MLRA 17	Clayey alluvium derived from igneous, metamorphic and sedimentary rock	Moderately well drained	No	0.1%
Newville gravelly loam, 3 to 15 percent slopes	Gravelly alluvium	Well drained	No	4.5%
Newville gravelly loam, 15 to 30 percent slopes	Gravelly alluvium	Well drained	No	9.4%
Riverwash	Gravelly alluvium	Excessively drained	Yes	5.3%

Soils of the Study Area				
Soils Series	**Parent Material**	**Drainage Class**	**Hydric?**	**Percentage of Project site**
Shedd silty clay loam, 3 to 15 percent slopes	Residuum weathered from calcareous shale	Well drained	No	4.7%
Shedd silty clay loam, 15 to 30 percent slopes, MLRA 15	Residuum weathered from sandstone and shale	Well drained	No	13.6%
Shedd-Altamont association, 10 to 30 percent slopes	Residuum weathered from calcareous shale	Well drained	No	0.5%
Tehama silt loam, 0 to 3 percent slopes, MLRA 17	Fine-silty alluvium derived from metamorphic and sedimentary rock	Well drained	No	7.8%

Table 3-11. Soils of the Project site, Dunnigan Areas

Soils of the Study Area				
Soils Series	**Parent Material**	**Drainage Class**	**Hydric?**	**Percentage of Project site**
Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17	Alluvium derived from metamorphic and sedimentary rock	Well drained	No	1.1%
Corning gravelly loam, 0 to 12 percent slopes, MLRA 17	Old alluvium derived from metamorphic and sedimentary rock	Well drained	No	27.5%
Hillgate loam, 2 to 9 percent slopes, eroded	Mixed alluvium	Well drained	No	3.8%
Rincon silty clay loam	Alluvium derived from sedimentary rock	Well drained	No	6.9%
Riverwash	Mixed sandy and gravelly alluvium	Excessively drained	Yes	0.1%
Sehorn-Balcom complex, 2 to 15 percent slopes	Calcareous residuum weathered from sedimentary rock	Well drained	No	44.9%
Sehorn-Balcom complex, 15 to 30 percent slopes, eroded	Calcareous residuum weathered from sedimentary rock	Well drained	No	2.8%
Tehama loam, 0 to 2 percent slopes, loamy substratum, MLRA 17	Mixed fine-loamy alluvium derived from sedimentary rock	Well drained	No	12.8%

3.8.1.1 Liquefaction

The potential for liquefaction, which is the loss of soil strength due to seismic forces, is dependent on soil types and density, depth to groundwater, and the duration and intensity of ground shaking. No specific liquefaction hazard areas have been identified in Glenn and Yolo Counties. No structures will be constructed as part of this Project. Liquefaction hazards would be negligible.

3.8.1.2 Soil Subsidence

Subsidence occurs when a large land area settles due to over-saturation or extensive withdrawal of ground water, oil, or natural gas. These areas are typically composed of open-textured soils, high in silt or clay content, that become saturated.

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?

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

a-iv) Landslides?

No Impact. The nearest fault zones are Lakes Pillsburg and Bangor, approximately 40 and 47 miles to the southwest and southeast, respectively. The DWD areas are located in a Low Landslide Susceptibility area[6], Due to the nature of the Project, to annex properties into a Water District, which would result in no construction or ground disturbance, there would be no impact.

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

No Impact. As the Project does not propose construction, nor the disturbance of any soil, there would be no impact.

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?

No Impact. As described in the project description and 3.8.1 above, the Project does not propose construction or any ground disturbance. Therefore, there would be no impact.

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

No Impact. As the Project does not propose construction or any ground disturbance, there would be no impact to any expansive soils.

[6] https://www.yolocounty.org/home/showdocument?id=55805.

e) Would the project 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 waste water?

No Impact. As the project does not propose to use septic tanks, nor generate any waste water, due to the nature of the Project, there would be no impact.

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

No Impact. The Project does not propose any construction or ground disturbance. Therefore, there is no impact.

3.9 Greenhouse Gas Emissions

Table 3-12 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 Setting and Baseline Conditions

Commonly identified 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.

3.9.2 Impact Assessment

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

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

No Impact. The proposed Project seeks to increase a Water District's Sphere of Influence and to annex land into a Water District. No construction, ground disturbing activities, nor operational changes are proposed at this time. Thus, the Project would not generate greenhouse gas emissions, nor would it conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing greenhouse gas emissions.

3.10 Hazards and Hazardous Materials

Table 3-13. 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 Setting

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 (GC) Section 65962.5 requires the California Environmental Protection Agency (CalEPA) 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 State Water Resources Control Board (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 (SLIC) sites, Department of Defense (DOD) sites, and Land Disposal program. A search of the DTSC EnviroStor database and the SWRCB Geotracker performed on November 15, 2019 determined that there are no known active hazardous waste generators or hazardous material spill sites within the Project sites or immediate surrounding vicinity.

3.10.2 Regulatory Setting

There are no federal, state, or local regulations, plans, programs, or guidelines associated with hazards and hazardous materials that are applicable to the proposed Project.

3.10.3 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?

No Impact. There would be no transport, use or disposal of hazardous materials. There would be no impact.

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?

No Impact. The Project would not create a significant hazard to the public or the environment as the Project would not discharge hazardous materials into the environment. There would be no impact.

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 Project involves no new construction and would not emit hazardous emissions, involve hazardous materials, or create a hazard to the schools in any way. 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. On November 15, 2019 an EnviroStor search was done in the Project area. According to that search the Project does not involve land that is listed as an active hazardous materials site pursuant to Government Code Section 65962.5 and is not included on a list compiled by the Department of Toxic Substances Control. 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?; and,

No Impact. The Project would not result in a safety hazard or excessive noise for people residing or working in the Project area as it will not result in any additional people residing or working in the Project area. 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?

No Impact. The Project occurs on existing waterways and would not interfere with the emergency response and evacuation procedures outlined in the Glenn County, CA Multi-Jurisdiction Hazard Mitigation Plan and 2018

Yolo Operational Area Multi-Jurisdictional Hazard Mitigation Plan, as approved by the Federal Emergency Management Agency (FEMA). The Mitigation Plans establish the Standardized Emergency Management System required by State law, and includes information on mutual aid agreements, hierarchies of command, and different levels of response in emergency situations. There would be no impact.

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

No Impact. According to the California Department of Forestry and Fire Prevention Fire Hazard Severity Zones Map, the proposed Project site is not located in a Very High Fire Hazard Severity Zone. Therefore, the Project will not be exposed to risks from wildland fires. The proposed Project is not adjacent to urbanized areas or residences that are intermixed with wildlands. There will be no impact.

3.11 Hydrology and Water Quality

Table 3-14 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 offsite;	☐	☐	☐	☒
	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 Impact Assessment

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

No Impact. Project does not involve any new construction, earthmoving activities or change in land use and would not violate any water quality standards nor would it impact waste discharge requirements. There would be no impact.

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

No Impact. The Project proposes the expansion of a sphere of influence for Water Districts and to annex properties into those water districts. As there are no operational changes or construction activities proposed, there is no impact.

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;

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

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

c-iv) impede or redirect flood flows?

No Impact. No grading or construction would occur as a result of the Project; therefore, drainage patterns will not be altered. The Project proposes to utilize existing water conveyance facilities. There would be no impact.

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

No Impact. Despite several locations being located in 100-year floodplains, annexing properties into a water district would not risk the release of pollutants from inundations. There would be no impact.

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

No Impact. OAWD is located in the Glenn Groundwater Authority Groundwater Sustainability Agency (GSA) and DWD is located in the Yolo Subbasin GSA. In accordance with the Sustainable Groundwater Management Act (SGMA), GSAs not located in areas in critical overdraft are required to adopt Groundwater Sustainability Plans by 2022. The GSA has initiated its working group for purposes of creating its Groundwater Sustainability Plan (GSP), however the GSAs have not yet adopted plans.

While it is anticipated that the Project will be subject to and held in compliance with the GSPs and all applicable plans, the Project nevertheless proposes no operational changes, construction, or ground-disturbing. Therefore, there will be no impact.

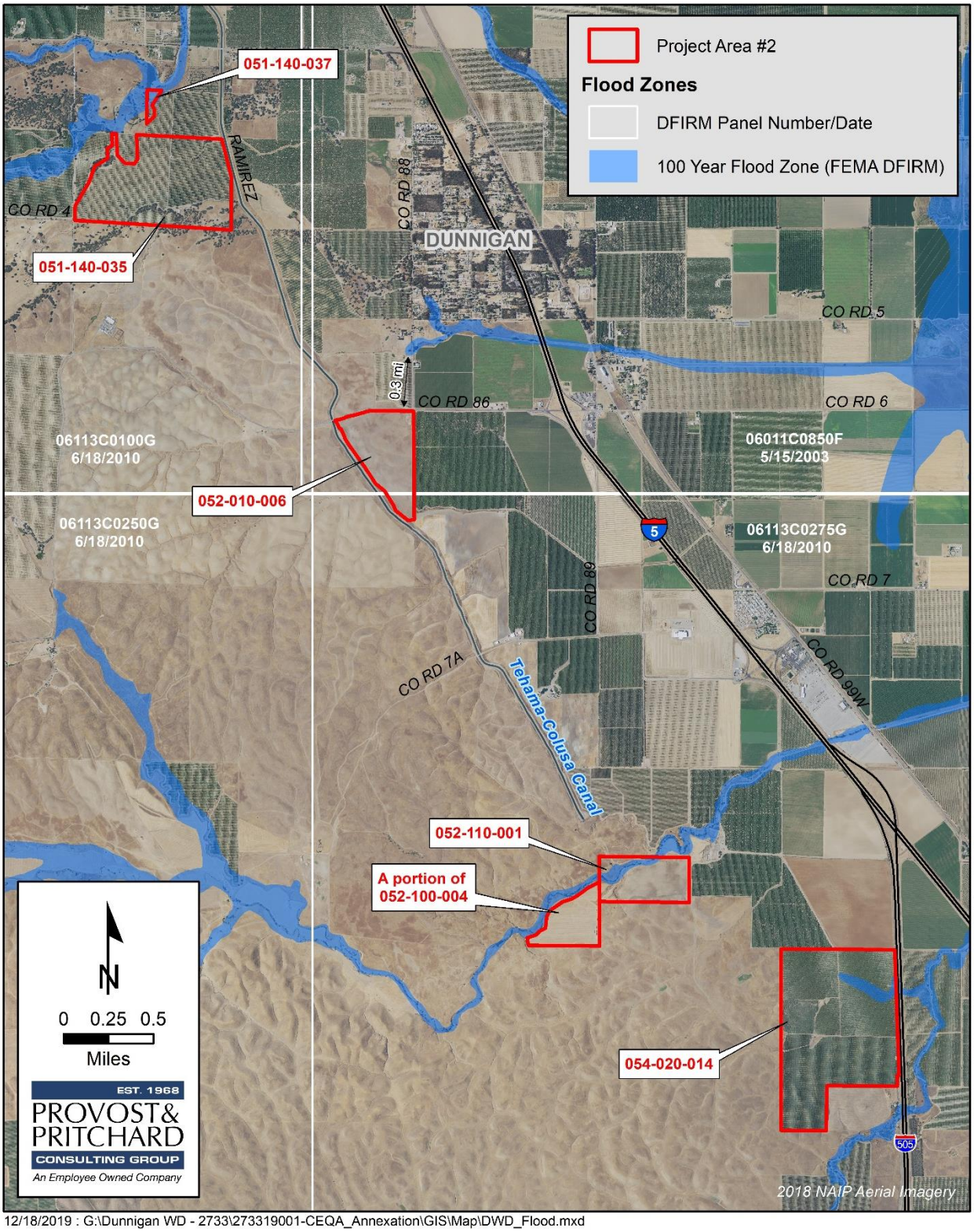


Figure 3-3 FEMA Map, Dunnigan Water District

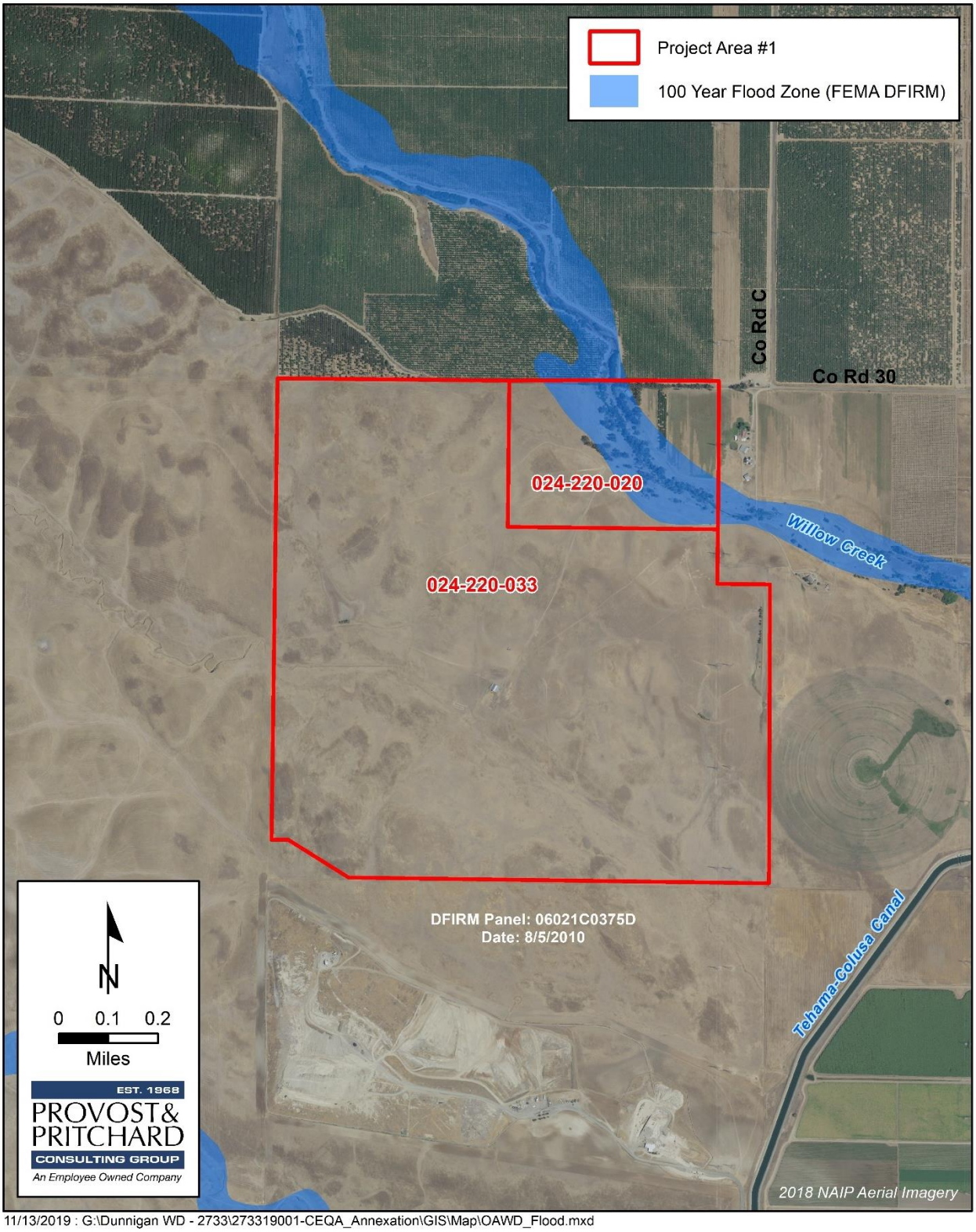


Figure 3-4 FEMA Map, Orland-Artois Water District

3.12 Land Use and Planning

Table 3-15 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 Setting and Baseline Conditions

General Plan Land Use Designations and Zone Districts are illustrated in **Figure 2-4, Figure 2-5, Figure 2-6, and Figure 2-7**, respectively.

3.12.2 Impact Assessment

a) Would the project physically divide an established community?

No Impact. The Project areas are surrounded by other properties designated Important Farmland, are designated by their respective General Plans as agriculture, and are accordingly zoned for agricultural uses. Furthermore, the annexation does not change the existing use of the properties, which is farmland and grazing land. Therefore, there is 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. There are no applicable General Plan policies in each respective County that was adopted for the purpose of avoiding or mitigating an environmental effect that this Project would cause. Therefore, there is no impact.

3.13 Mineral Resources

Table 3-16 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 Setting and Baseline Conditions

Aggregate (i.e. sand and gravel) and natural gas resources are the primary mineral resources of economic importance in Glenn County. Current mining activities occur primarily within fluvial deposits along river and stream drainages[7].

Yolo County has two primary mineral resources, mined aggregate and natural gas. These resources are located throughout the County. There are six aggregate mines and 25 natural gas fields currently in operation in Yolo County.[8]

3.13.2 Regulatory Setting

There are no federal, state or local regulations, plans, programs, or guidelines associated with mineral resources that are applicable to the proposed Project.

3.13.3 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?

No Impact. The proposed Project would not result in significant impacts associated with the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, considering there will be no construction or earthmoving activities associated with implementation. Therefore, there is no impact.

[7] Glenn County EIR. 1993. Page 3-34. https://www.countyofglenn.net/sites/default/files/images/4%20EIR%20Glenn%20County%20General%20Plan%20Vol.%20IV%20Reduced%20Size.pdf. Accessed 15 November 2019.

[8] Yolo County General Plan, Conservation and Open Space Element. 2009. Page CO-43. https://www.yolocounty.org/home/showdocument?id=14464. Accessed 15 November 2019.

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?

No Impact. The proposed Project seeks to annex existing farmland into a Water District's service boundary, and no construction nor operational changes are proposed. The subject properties are not located on any adopted land use plan that designates those areas as a locally important mineral resource recovery site. The Project does not propose to excavate the subject properties nor does it preclude the future recovery of any mineral resources. Therefore, there is no impact.

3.14 Noise

Table 3-16 Noise Impacts

Noise Impacts					
Would the project:		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 groundborne vibration or groundborne 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 Regulatory Setting

There are no federal, state or local regulations, plans, programs, or guidelines associated with noise that are applicable to the proposed Project.

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?

No Impact. The proposed Project consists of the expansion of a Sphere of Influence and annexation of existing farmland into a Water District's service boundary. No construction or earthmoving activities are proposed with the Project and accordingly, there would be no impact resulting from noise or vibration.

b) Would the project result in Generation of excessive groundborne vibration or groundborne noise levels?

No Impact. The proposed Project consists of the expansion of a Sphere of Influence and annexation of existing farmland into a Water District's service boundary. No construction or earthmoving activities are proposed with the Project and accordingly, there would be no impact resulting from noise or vibration.

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? and,

No Impact. In the OAWD, the nearest airports are Orland-Haigh Field and Willows-Glenn County Airport, approximately 8.8 and 9.5 miles away, respectively. In the DWD, the nearest airport is Sacramento International Airport, approximately 24 miles away. The proposed Project consists of the annexation of existing farmland into a Water District's service boundary. Therefore, the Project would not expose people residing or working to an increase in noise levels. There would be no impact.

3.15 Population and Housing

Table 3-17 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 Regulatory Setting

There are no federal, state or local regulations, plans, programs, or guidelines associated with population and housing that are applicable to the proposed Project.

3.15.2 Impact Assessment

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

No Impact. The proposed Project would utilize existing water conveyance facilities and does not propose any new construction or earthmoving activities. Lands wanting to receive surface water must currently be developed with an agricultural use in order to be able to participate in this Project, therefore no new lands will be placed into agricultural production as a result of the Project. The proposed Project would improve the reliability of farmland's existing water supply. Implementation of the proposed Project will not indirectly or directly induce population growth in the area. There would be no impact.

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

No Impact. The Project does not propose any construction. No housing or people would be displaced, and no new housing would be constructed as part of the Project or required as a result of it. There would be no impact.

3.16 Public Services

Table 3-18 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) 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:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

3.16.1 Environmental Setting and Baseline Conditions

Fire Protection: In the Dunnigan Water District, Fire Station 12 is approximately 3.2 miles away from the Project Sites. The Artois Fire District is approximately 5 miles away to the east.

Police Protection: In the Dunnigan Water District, the Yolo County Sheriff's Office is approximately 17.5 miles to the southeast. In the Orland-Artois Water District, the nearest sheriff station is 9.6 miles away in the City of Willows.

Schools: In the Orland Artois Water District, the closest schools are Fairview Elementary School and CK Price Middle School, both of which are approximately 7.5 miles northeast of the Project. In the Dunnigan Water District, the nearest school is Wildwood School, approximately 7.8 miles northeast of the Project, measured from the furthest point of the Water District annexation boundary.

Parks: Dunnigan Community Park is approximately 3.3 miles away. Vinsonhaler Park is the nearest park to the Orland-Artois Project Site, approximately 8.8 miles away to the northeast.

3.16.2 Regulatory Setting

There are no federal, state or local regulations, plans, programs, or guidelines associated with public services that are applicable to the proposed Project.

3.16.3 **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. As the proposed Project does not propose the construction of any structure or disturb soil, there would be no impact to public services.

3.17 Recreation

Table 3-19 Recreation Impacts

Recreation Impacts				
Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
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?	☐	☐	☐	☒
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 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?

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. The implementation of the Project will annex existing farmland and grazing lands into Water Districts. It would not increase the demand for recreational facilities or put a strain on existing recreational facilities. No population growth would be associated with the Project or be necessitated by the Project. Furthermore, the Project does not include recreational facilities. No construction or expansion of nearby recreational facilities would not be necessary. Therefore, there would be no impact.

3.18 Transportation

Table 3-20 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 an program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b)	Would the project 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 Settings and Baseline Conditions

The Project sites are within unincorporated areas of Glenn and Yolo counties. The Project vicinity is dominated by agricultural uses, sparse rural residential, and water infrastructure. There are no public improvements proposed along the annexation boundaries.

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?

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

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)?

d) Would the project result in inadequate emergency access?

No Impact. There is no population growth associated with the Project, nor will implementation of the Project result in an increase of staff or drivers utilizing roadways in the area. Therefore, implementation of the Project will not increase the demand for any changes to congestion management programs or interfere with existing level of service standards during the operational phase. Therefore, there would be no impact to transportation.

3.19 Tribal Cultural Resources

Table 3-21 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 a 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, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☒	☐

3.19.1 Impact Assessment

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:

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

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, the lead agency shall consider the significance of the resource to a California Native American tribe.

On November 7, 2019, a request was sent to the Native American Heritage Commission (NAHC) for a search of its Sacred Lands File and contact information for local Native American representatives who may have information about the APE. The NAHC responded to the request on November 13 and 14, 2019, with negative findings for the Sacred Lands File search of the APE; however, they caution that the absence of information in the Sacred Lands File does not indicate the absence of Native American cultural resources within the APE. The NAHC provided a list of tribal representatives for outreach to local tribal groups regarding any sites of cultural or spiritual significance in the APE. Contacts recommended by the NAHC include:

- *Chairperson Charlie Wright of Cortina Rancheria - Kletsel Dehe Band of Wintun Indians;*
- *Chairperson Gene Whitehouse of the United Auburn Indian Community of the Auburn Rancheria;*
- *Chairperson Anthony Roberts of the Yocha Dehe Wintun Nation;*
- *Chairperson Ronald Kirk of the Grindstone Rancheria of Wintun-Wailaik; and,*
- *Chairperson Andrew Alejandre of the Paskenta Band of Nomlaki Indians.*

On November 21, 2019, outreach letters were delivered to each of the contacts identified by the NAHC and a log was kept of all responses. The outreach letter is standard best practices within cultural resource management and is not part of AB 52 or NHPA Section 106 government-to-government consultation. Follow-up phone calls were made on December 5, 2019. No responses from the Native American contacts have been received to date.

Despite the lack of negative findings from the NAHC-recommended contacts, the annexation of farmland and grazing land into a Water District would not 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. Therefore there would be a less than significant impact.

3.20 Utilities and Service Systems

Table 3-22 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 reductions goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

3.20.1 Environmental Setting and Baseline Conditions

The Glenn County LAFCo adopted Municipal Service Review (MSR) and Sphere of Influence (SOI) Plan for the Orland-Artois Water District on April 9, 2019. The Cortese-Knox-Hertzberg Act requires that a Municipal Service Review (MSR) be conducted prior to, or in conjunction with, the update of an SOI. A MSR is a comprehensive analysis of service provision by each of the special districts, cities, and the unincorporated county service areas within the legislative authority of the LAFCo. It essentially evaluates the capability of a jurisdiction to serve its existing residents and future development in its SOI. The legislative authority for conducting MSRs is provided in Section 56430 of the CKH Act, which states ". . . in order to prepare and to update Spheres of Influence in accordance with Section 56425, LAFCos are required to conduct a MSR of the municipal services provided in the County…"

OAWD maintains the following water storage infrastructure facilities:

Location Name (TCC Mile Location)	Type	Capacity
33.6	40' by 40' Steel Ground Tank	376,000 gal.
38.6	40' by 40' Steel Ground Tank	376,000 gal.
	40' Steel Elevated Tank	300,000 gal.
41.2	40' by 50' Steel Ground Tank	300,000 gal.
44.1	30' Steel Elevated Tank	100,000 gal.
Deep Well 2	15' Plastic Ground Tank	15,000 gal.

DWD's USBR contractual allocation is 19,000 acre-feet per year. DWD's last Municipal Service Review, adopted in November 2013, refers to the Dunnigan Specific Plan's Water/Recycled Water Technical Analysis, prepared by Pacific Advanced Civil Engineering, Inc. In it, it states that the Dunnigan Specific Plan had rights to 5,194 acre-feet per year of Tehama Colusa Canal water. As of February 21, 2017, the Yolo County Board of Supervisors voted to rescind the Dunnigan Specific Plan references from all General Plan documents, which reduced the allowed residential growth of Yolo County by approximately 8,108 dwelling units and 450 acres of commercial and industrial growth.

An analysis of previous Tehama-Colusa Canal diversions over the course of 36 years were divided by the amount of acreage located within the Dunnigan Water District's current Sphere of Influence of 10,000 acres, to create an Acre-Feet per Acre variable. The annual amount drawn was increased by the amount of acres to be added to the Sphere of Influence—837—multiplied by the annual Acre Feet per Acre variable. Below are the results of the calculation.

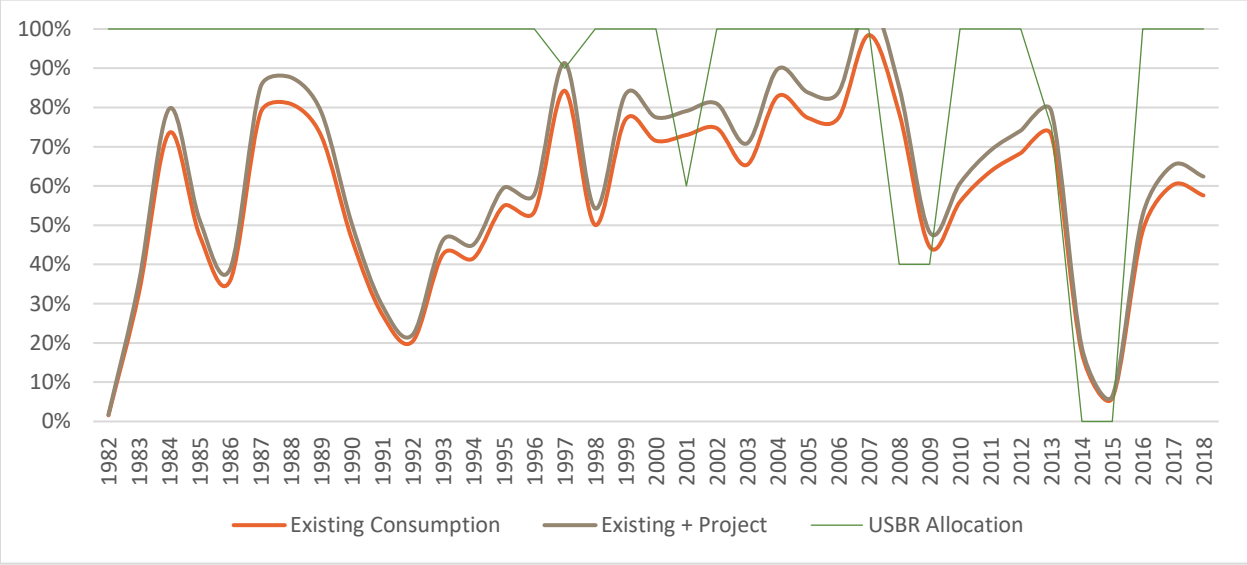


Figure 3-5 Annual Water Diversions, Dunnigan Water District

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. The proposed Project will not involve the relocation or construction of any new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities. No construction nor operational changes are proposed. Therefore, there will be no impact.

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

No Impact. No new or expanded water entitlements would be required for the proposed Project. The average consumption of CVP water, from 1982 to 2018, is 1.09 acre-feet per acre, which is approximately 57% of its USBR allocation. Increasing the DWD Sphere of Influence by the proposed 837 acres would increase the acreage by approximately 8.4%, resulting in sufficient supplies for the Project during normal years. Increasing the utilization of CVP water will recharge the basin, reducing the need for groundwater pumping in dry and multiple dry years. Nevertheless, no water is utilized as part of the Project. Therefore, there is no impact.

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?

No Impact. The proposed Project would not generate additional wastewater. 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?

No Impact. As the proposed Project would not generate solid waste, there would be no need for an increase in solid waste capacity for the Project. Therefore, there would be no impact.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. As discussed above, the Project would no generate solid waste. Therefore, there would be no impact to any statutes or regulations related to solid waste.

3.21 Wildfire

Table 3-23 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 Setting and Baseline Conditions

a) Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

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

c) Would the project 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?

No Impact. The OAWD Project Area is in a State Responsibility Area (SRA) classified as Moderate Risk[9] and is approximately 11 miles away from a Very High Fire Hazard Severity Zone, and portions of DWD Project Areas are classified in Moderate Severity Zones, located in a Local Responsibility Area (LRA)[10] approximately 5.5 miles away from a Very High Fire Hazard Severity Zone. Thus, neither are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. Additionally, there are no structures being built as part of this Project, and no population increase because of this Project. Therefore, further analysis of the Projects potential impacts to wildfire are not warranted. Thus, there are no impacts.

[9] California Department of Forestry & Fire Protection. Fire and Resource Assessment Program, *Fire Hazard Severity Zones in SRA (adopted November 7, 2007)* https://frap.fire.ca.gov/media/6199/fhszs_map11.pdf. Accessed 15 December 2019.
[10] California Department of Forestry & Fire Protection. Fire and Resource Assessment Program, *Draft Fire Hazard Severity Zones in LRA)* https://frap.fire.ca.gov/media/6423/fhszl06_1_map57.pdf. Accessed 15 November 2019.

3.22 CEQA Mandatory Findings of Significance

Table 3-24 Mandatory Findings of Significance Impacts

Mandatory Findings of Significance Impacts				
Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
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?	☐	☐	☐	☒
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)?	☐	☐	☐	☒
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

3.22.1 Impact Assessment

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?

No Impact: As the Project on proposes to expand a Sphere of Influence, and annex properties into a Water District, the Project has no potential to substantially degrade the environment, reduce the habitat or population of fish or wildlife species, threaten to eliminate a plant or animal community, or restrict, reduce, or eliminate endangered, rare or important plants, animals, or 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)?

No Impact: Cumulatively considerable means that "the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future project." The proposed Project involves the expansion of a sphere of influence, and the annexation of properties into Water Districts. Due to the lack of construction activities, additional vehicle trips, and emissions, the opportunity for cumulatively considerable effects or impacts is not available.

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

No Impact: The proposed Project will not result in substantial adverse effects on human beings, either directly or indirectly. With a lack of construction or any operational changes, there will be no Project impacts.

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.

_____ _____

Signature Date

_____

Printed Name/Position

Appendix A

Cultural Resources

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

December 3, 2019 NWIC File No.: 19-0842

Jarred Olsen
Provost & Pritchard
130 N. Garden Street
Visalia, CA 93291-6362

Re: Record search results for the proposed Dunnigan Water District's Annexation for the purposes of Surface Water Delivery, APNs 051-140-035 (#1), 051-140-037 (#2), 052-010-006 (#3), 052-110-001 (#4), 054-020-014 (#4).

Dear Jarred Olsen:

Per your request received by our office on November 14, 2019, a rapid response records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for Yolo County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates that there have been two archaeological resource studies that cover a small portion of two of the proposed project parcels. Study # 25665 (Egherman and Hatoff 2002) covers approximately 5% of the #1 project area (APN 051-140-035). Study # 3001 (True and West 1977) appears to include approximately 10% of #4 project area (APN 052-110-001) within its record search area, although it is unclear if the area was field surveyed. None of the five project area parcels contain any recorded archaeological resources. The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) lists no recorded buildings or structures within or adjacent to the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within any of the five proposed project parcels.

At the time of Euroamerican contact the Native Americans that lived in the area were speakers of the Patwin language, part of the Southern Wintuan language family (Johnson 1978:350). There are no Native American resources in or adjacent to the proposed project areas referenced in the ethnographic literature (Johnson 1978:350, Kroeber 1932).

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of Yolo County have been found in areas throughout the valleys and basins, near intermittent and perennial watercourses, in upland areas, and near the hill to valley interface. The Dunnigan Water District's Annexation project area #1 (APN 051-140-035) contains a hill to valley interface and is bisected by an unnamed creek. The Dunnigan Water District's Annexation project area #2 (APN 051-140-037) is located immediately adjacent to a portion of the South Fork of Buckeye Creek. The Dunnigan Water District's Annexation project area #3 (APN 052-010-006) is located in the Dunnigan Hills area and contains a narrow ridge and lands down to a narrow valley containing Dunnigan Creek. The Dunnigan Water District's Annexation project area #4 (APN 052-110-001) contains hill to valley interface lands, broad terraces and is bisected by Bird Creek. The Dunnigan Water District's Annexation project area #5 (APN 054-020-014) is located in the Dunnigan Hills area just west of Oat Creek. The #5 project area contains ridges, drainage canyons, and creeks, and low lying terraces above Oat Creek. Given the similarity of one or more of these environmental factors within each of the proposed project parcels, there is a moderate to high potential for unrecorded Native American resources in the each of these proposed Dunnigan Water District's Annexation project areas.

Review of historical literature and maps indicated the possibility of historic-period activity within two of the Dunnigan Water District's Annexation project areas. The 1853 General Land Office Plat Map for Township 11 North Range 1 West indicated a trail or road thru the northeastern portion of #5 project area (APN 054-020-014). Additionally, the 1907 Dunnigan USGS 15-minute topographic quadrangle depicts a long driveway and one building immediately adjacent to the western boundary of project area #5 (APN 054-020-014). This map also indicates a main road now known as County Road 6, through the northern portion of #3 project area (APN 052-010-06). With this in mind, there is a moderate potential for unrecorded historic-period archaeological resources in the proposed Dunnigan Water District's Annexation project areas #5 and #3.

The 1959 Wildwood School USGS 7.5-minute topographic quadrangle depicts one building within the #1 project area (APN 051-140-035). This unrecorded building meets the Office of Historic Preservation's minimum age standard that buildings, structures, and objects 45 years or older may be of historical value.

The 1959 Wildwood School, the 1953 Dunnigan, and 1953 Zamora USGS 7.5-minute topographic quadrangles fails to depict any buildings or structures within the remaining project areas #2 thru #5 (APNs 051-140-037, 052-010-006, 052-110-001, and 054-020-014); therefore, there is a low possibility of identifying any buildings or structures 45 years or older within these project areas.

RECOMMENDATIONS:

1) There is a moderate to high potential of identifying Native American archaeological resources and a moderate potential of identifying historic-period archaeological resources in the project areas. As per the record search request stating that no ground disturbance is proposed at this time, we recommend no further study for archaeological resources at this time.

If the project changes to include any ground disturbing activities, we recommend a qualified archaeologist conduct further archival and field study to identify cultural resources. Field study may include, but is not limited to, pedestrian survey, hand auger sampling, shovel test units, or geoarchaeological analyses as well as other common methods used to identify the presence of archaeological resources. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

2) We recommend the lead agency contact the local Native American tribe(s) regarding traditional, cultural, and religious heritage values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/373-3710.

3) The proposed project area # 1 (APN 051-140-035) contains one unrecorded building; therefore, prior to commencement of project activities, it is recommended that this resource be assessed by a professional familiar with the architecture and history of Yolo County. Additionally, if any of the other proposed project areas contain buildings or structures that meet the minimum age requirement, prior to commencement of project activities, it is recommended that this resource be assessed by a professional familiar with the architecture and history of Yolo County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

4) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

5) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid

altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

6) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

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 California Historical Resources Information System (CHRIS) Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,

Jillian Guldenbrein

Jillian Guldenbrein
Researcher

LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:

Andrews, Wells F.
1972 *Soil Survey of Yolo County, California*. United State Department of Agricultur Soil Conservation Service In Cooperation with University of California Agricultural Experiment Station.

Ashley, P.N.
1900 Official Map of County of Yolo, California

Egherman, R. and B. Hatoff (URS Corporation)
2002 *Roseville Energy Facility, Cultural Resources, Appendix J-1 of Application for Certification.* **NWIC Report S-025665**

Fisher, Ray
1983 Yolo Landmarks Tour. Yolo County Historical Society.

General Land Office
1853, 1872 Survey Plat for Township 12 North/Range 1 West.
1853 Survey Plat for Township 11 North/Range 1 West.

Gudde, Erwin G.
1969 *California Place Names: The Origin and Etymology of Current Geographical Names*. Third Edition. University of California Press, Berkeley and Los Angeles.

Hennings, J.S.
1871 Map of Yolo County, California

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, revised by William N. Abeloe
1966 *Historic Spots in California*. Third Edition. Stanford University Press, Stanford.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, William N. Abeloe, revised by Douglas E. Kyle
1990 *Historic Spots in California*. Fourth Edition. Stanford University Press, Stanford.

Johnson, Patti J.
1978 Patwin. In *California*, edited by Robert F. Heizer, pp. 350-360. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Kroeber, A.L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C. (Reprint by Dover Publications, Inc., New York, 1976).

1932 *The Patwin and their Neighbors*. University of California Publications in American Archaeology and Ethnology 35(2):15-22. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965).

Proctor, A.G.
1926 Official Map of Yolo County, California

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources*. State of California Department of Parks and Recreation, Sacramento.

State of California Department of Parks and Recreation and Office of Historic Preservation
1988 *Five Views: An Ethnic Sites Survey for California*. State of California Department of Parks and Recreation and Office of Historic Preservation, Sacramento.

State of California Office of Historic Preservation **
2012 *Historic Properties Directory*. Listing by City (through April 2012). State of California Office of Historic Preservation, Sacramento.

True, D. L. and J. Gerald West (University of California, Davis)
1977 *Archaeological Survey of the Proposed Oat Reservoir, Oat Valley, and a Portion of the West Valley Canal, Yolo County, California.* **NWIC Report S-003001**

Williams, James C.
1997 *Energy and the Making of Modern California*. The University of Akron Press, Akron OH.

Woodbridge, Sally B.
1988 *California Architecture: Historic American Buildings Survey*. Chronicle Books, San Francisco.

Works Progress Administration
1984 *The WPA Guide to California*. Reprint by Pantheon Books, New York. (Originally published as California: A Guide to the Golden State in 1939 by Books, Inc., distributed by Hastings House Publishers, New York.)

**Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

Northeast Center of the
California Historical Resources
Information System

BUTTE
GLENN
LASSEN
MODOC
PLUMAS
SHASTA
SIERRA
SISKIYOU
SUTTER
TEHAMA
TRINITY

123 West 6th Street, Suite 100
Chico CA 95928
Phone (530) 898-6256
neinfocntr@csuchico.edu

November 18, 2019

Provost & Pritchard Consulting Group
130 N. Garden Street
Visalia, CA 93291
Attn.: Mr. Jarred Olsen

I.C. File # D18-168
Priority Records Search

RE: Orland-Artois Water District Annexation (Project No. 2733-19-001)
T21N, R4W, Section 26 MDBM
USGS Fruto NE 7.5' quad & Fruto (1944) 15' quad maps
612 acres (Glenn County)

Dear Mr. Olsen,

In response to your request, a priority records search for the project cited above was conducted by examining the official maps and records for archaeological sites and surveys in Glenn County.

RESULTS:

Prehistoric Resources: According to our records, no sites of this type have been recorded in the project area or 1-mile project vicinity. The project is located in a boundary region utilized by Konkow Maidu and Nomlaki populations. Unrecorded prehistoric cultural resources may be located within the project area.

Historic Resources: According to our records, no sites of this type have been recorded in the project area or 1-mile project vicinity. Unrecorded historic cultural resources may be located in the project area.

The USGS Fruto (1944) 15' quad map indicates that Wilson Creek, a well, structure, stream, and roads are located within the project area, while the Sacramento Valley, Cherokee School, White Cabin Creek, a transmission line, structures, and roads are located in the general project vicinity. A copy of the historic Walker Creek (1904) quad map depicting Wilson Creek, roads, and a structure within the project area.

Previous Archaeological Investigations: According to our records, portions of the project area have been previously surveyed for cultural resources. The studies are listed below.

Atwell, Ricky, William Hildebrandt, Clayton Lebow, Patricia Mikkelsen, Michael Moratto, Richard Pettigrew, Lester Ross, Randall Schalk, Lynda Sekora, and Lou Ann Speulda (INFOTEC Research, Inc. & Far Western Anthropological Research Group, Inc.)

1995 *Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. IV: Synthesis of Findings.*
NEIC Report 001357F
Resources:
Numerous resources

Bowyer, Gary, Lou Ann Speulda, Lynda Sekora, and Lester Ross (INFOTEC Research, Inc. & Far Western Anthropological Research Group, Inc.)

1995 *Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. III: Summary Reports: Historic Sites.*
NEIC Report 001357E
Resources:
Numerous resources

Bryson, Robert, Craig Skinner, and Richard Pettigrew (INFOTEC Research, Inc. & Far Western Anthropological Research Group, Inc.)

1995 *Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. V: Technical Studies.*
NEIC Report 001357G
Resources:
Numerous resources

Cleland, James H., Michael S. Kelly, and Andrew L. York (Dames & Moore)

1988 *Cultural Resource Evaluation Plan: California-Oregon Transmission Project.*
NEIC Report 008921A
Resources:
Numerous resources

Davy, Douglas M., Humphrey Calicher, and William Shapiro (CH2M Hill)

2007 *Cultural Resources Inventory for the North Area Right-of-Way Maintenance Environmental Assessment CVP and Pacific AC Intertie.*
NEIC Report 013255
Resources:
Numerous resources

2008 *Cultural Resources Inventory for the California-Oregon Transmission Project Right-of-Way Maintenance Environmental Assessment.*
NEIC Report 012267

Resources:
Numerous resources

Hildebrandt, William, Patricia Mikkelsen, Amy Gilreath, Sharon Waechter, John Berg, Paul Bouey, C. Kristina Roper, Randall Milliken, Ricky Atwell, Andrew Bailey, Kelly McGuire, Clayton Lebow, Kurt Katsura, and Jill Onken (INFOTEC Research, Inc. & Far Western Anthropological Research Group, Inc.)

1995 *Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. IIC: Summary Reports: Prehistoric Sites California.*
NEIC Report 001357D
Resources:
Numerous resources

Jermann, Jerry V. and James H. Cleland (Dames & Moore)

1989 *Cultural Resources Inventory of the California-Oregon Transmission Project.*
NEIC Report 008921
Resources:
Numerous resources

Lloyd, Jay, Sandra Flint, Barry Price, Randy Baloian, Douglas Harro, Philip Fulton, Terri Fulton, and Dina Coleman (Applied EarthWorks, Inc.)

2003 *Cultural Resources Investigations along Line 401 Capacity Loops 8 and 9, Modoc and Shasta Counties, California.*
NEIC Report 001357H
Resources:
Numerous resources

Moratto, Michael J., Thomas L. Jackson, Richard Pettigrew, Randall F. Schalk, David Chavez, Eric C. Gibson, Claudia B. Hemphill, Christian J. Miss, Barry A. Price, Melinda Romano, C. Kristina Roper, Brian P. Wickstrom, Michael S. Burney, Clayton G. Lebow, Jon Silvermoon, and Michael K. Crist (INFOTEC Research Inc. & BioSystems Analysis Inc.)

1990 *Cultural Resources Assessment Report, PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California; Phase 1: Survey, Inventory, and Preliminary Evaluation of Cultural Resources.*
NEIC Report 001357
Resources:
Numerous resources

Moratto, Michael, Richard Pettigrew, Barry Price, Lester Ross, and Randall Schalk (INFOTEC Research, Inc. & Far Western Anthropological Research Group, Inc.)

1994 *Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. I: Project Overview, Research Design and Archaeological Inventory.*
NEIC Report 001357C
Resources:
Numerous resources

Price, Barry, Timothy Canaday, Richard Pettigrew, Robert Bryson, Lou Ann Speulda, Ricky Atwell, and Michael Ostrogorsky (INFOTEC Research, Inc.)

1993 *Archaeological Testing and Evaluation Report 1991 Field Season and Historic Properties Treatment Plan for 1992 Field Season, PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California.*
NEIC Report 001357A
Resources:
Numerous resources

Romano, Melinda, Lou Ann Speulda, Jill Onken, Robert Bryson, Pat Mikkelsen, Judith Willig, Fred Crisson, Lynda Sekora, Paul Bouey, Kurt Katsura, Dennis McDougall, Jessica Van der Feen, Barry Price, Craig Skinner, Nancy Sharp, Karl Benedict, and Nancy Stenholm (INFOTEC Research, Inc.)

1993 *Archaeological Testing and Evaluation Report 1991 Field Season and Historic Properties Treatment Plan for 1992 Field Season, PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California - Vol. IID: Descriptive Reports and Data Compendia California.*
NEIC Report 001357B
Resources:
Numerous resources

Literature Search: The official records and maps for archaeological sites and surveys in Glenn County were reviewed. Also reviewed: **National Register of Historic Places - Listed properties and Determined Eligible Properties** (2012); **California Register of Historical Resources** (2012); **California Points of Historical Interest** (2012); **California Inventory of Historic Resources** (1976); **California Historical Landmarks** (2012); **Directory of Properties in the Historic Property Data File for Glenn County** (2012); **Handbook of North American Indians, Vol. 8, California** (1978); and **Historic Spots in California** (2002).

RECOMMENDATIONS:

Based upon the above information and the local topography, and regional history, the project is located in an area considered to be very sensitive for prehistoric, protohistoric, and historic cultural resources. Konkow Maidu and Nomlaki populations used the local region for seasonal and/or permanent settlement, as well as for the gathering of plants, roots, seeds, domestic materials, and hunting seasonal game. Historically, Euro-Americans utilized the region for farming and transportation opportunities.

Therefore, because the entire project area has not been previously surveyed and because the previous surveys are more than ten years old, we recommend that a professional archaeologist be contacted to conduct a cultural resources review of the project area to assess the need for survey or subsurface investigations. The project archaeologist will be able to offer recommendations for the preservation of or mitigation of effects on any cultural resources encountered as a result of field survey. A list of qualified consultants is available online at www.chrisinfo.org.

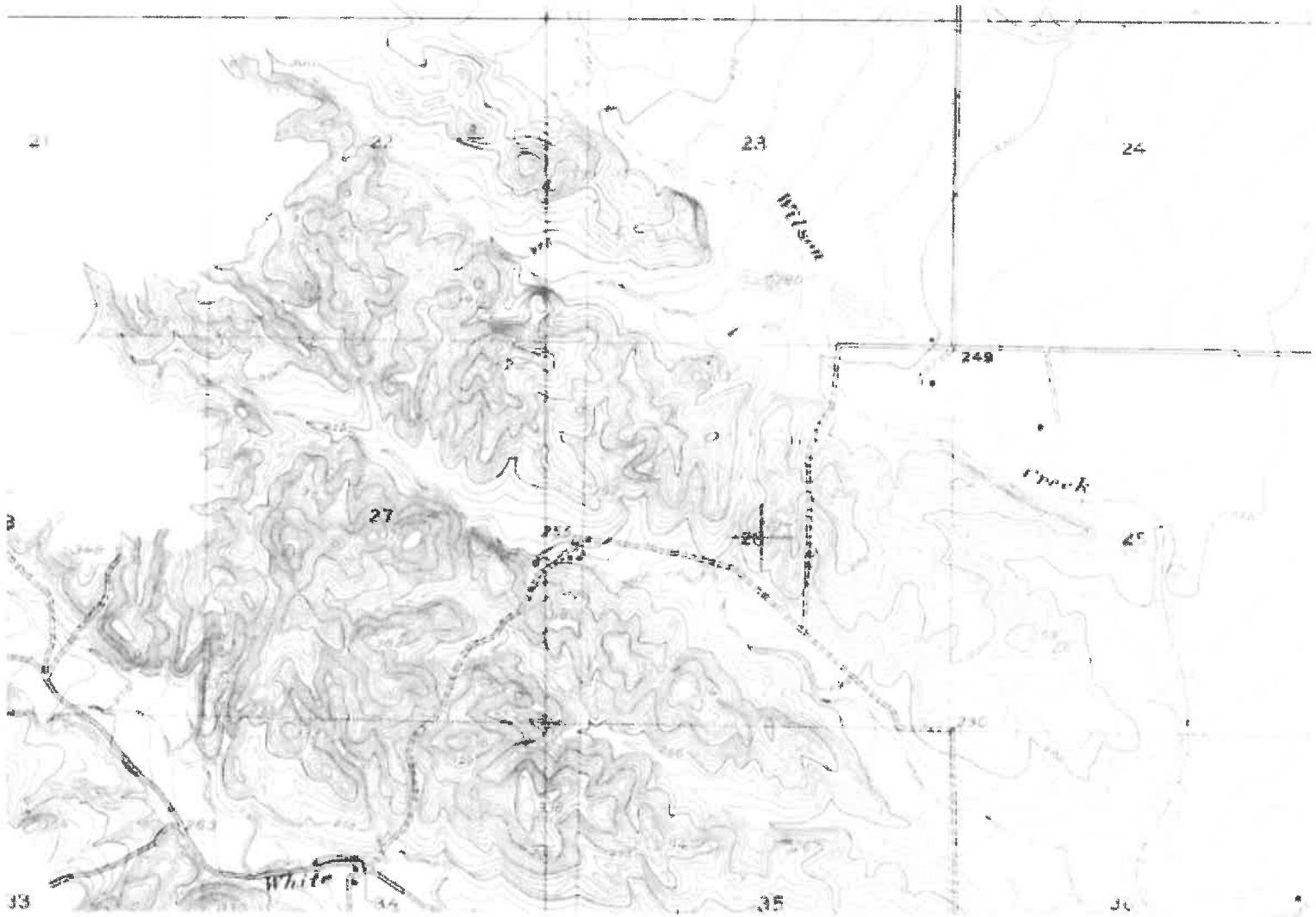
The project archaeologist should also contact the appropriate local Native American representatives for information regarding traditional cultural properties that may be located within project boundaries for which we have no records. The Native American Heritage Commission should be contacted at (916) 373-3710 for information regarding Native American representatives in the vicinity of the project.

During any phase of parcel development, if any potential prehistoric, protohistoric, and/or historic cultural resources are encountered, all work should cease in the area of the find pending an examination of the site and materials by the project archaeologist. This request to cease work in the area of a potential cultural resource find is intended for accidental discoveries made during construction activities, and is not intended as a substitute for the recommended cultural resources survey.

The fee for this records search is $225.15 (1 hour of Priority Information Center Time @ $225.00 per hour, plus 1 copy at $0.15 per page). An invoice will follow from Chico State Enterprises for billing purposes. Thank you for your concern in preserving Glenn County's and California's cultural heritage, and please feel free to contact us if you have any questions or need any further information or assistance.

Sincerely,

Adrienne Springsteen
Research Associate



Walker Creek (1904)

Appendix B

Soil Report

United States Department of Agriculture

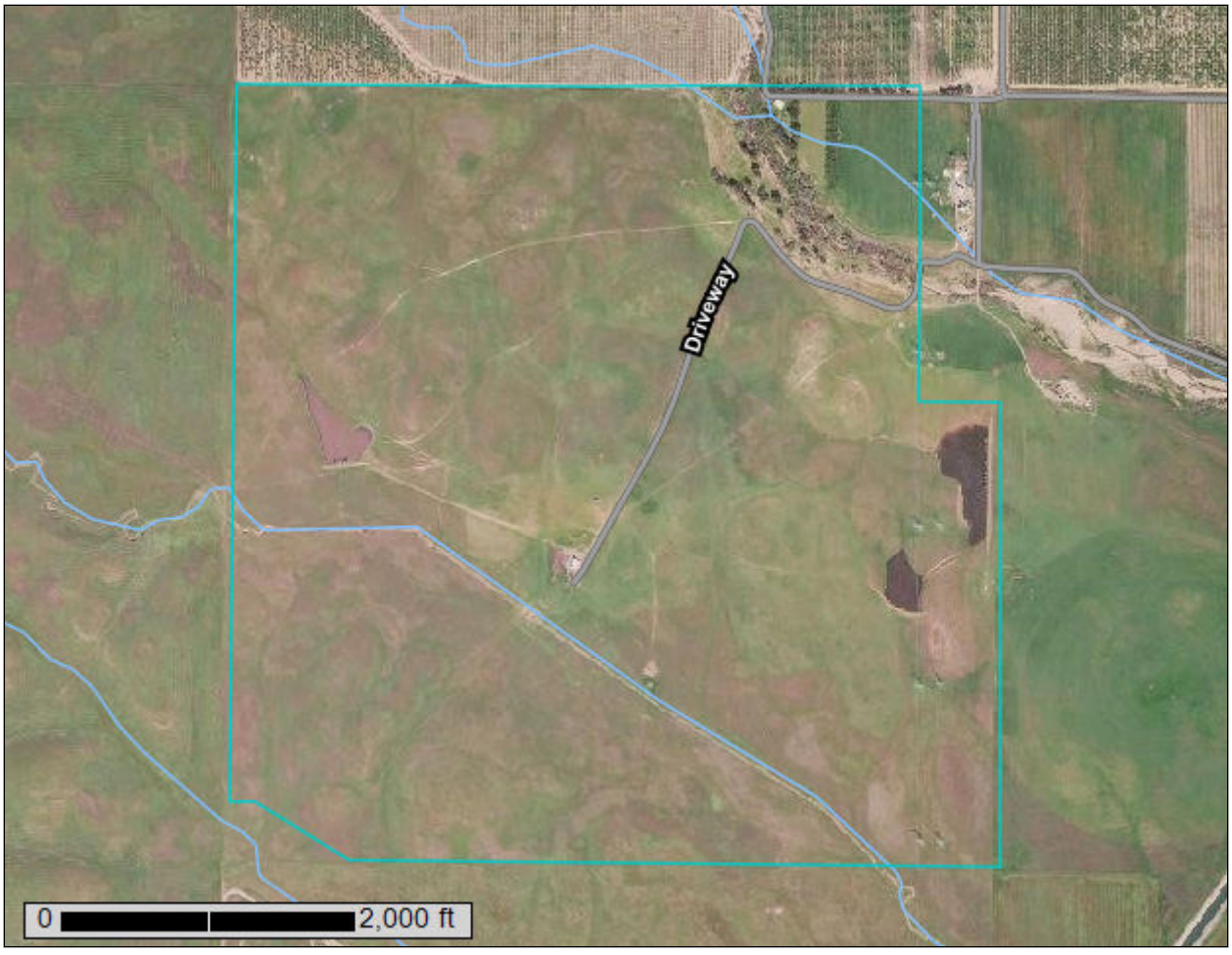
NRCS

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 Glenn County, California

OAWD_Parcels



November 15, 2019

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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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.

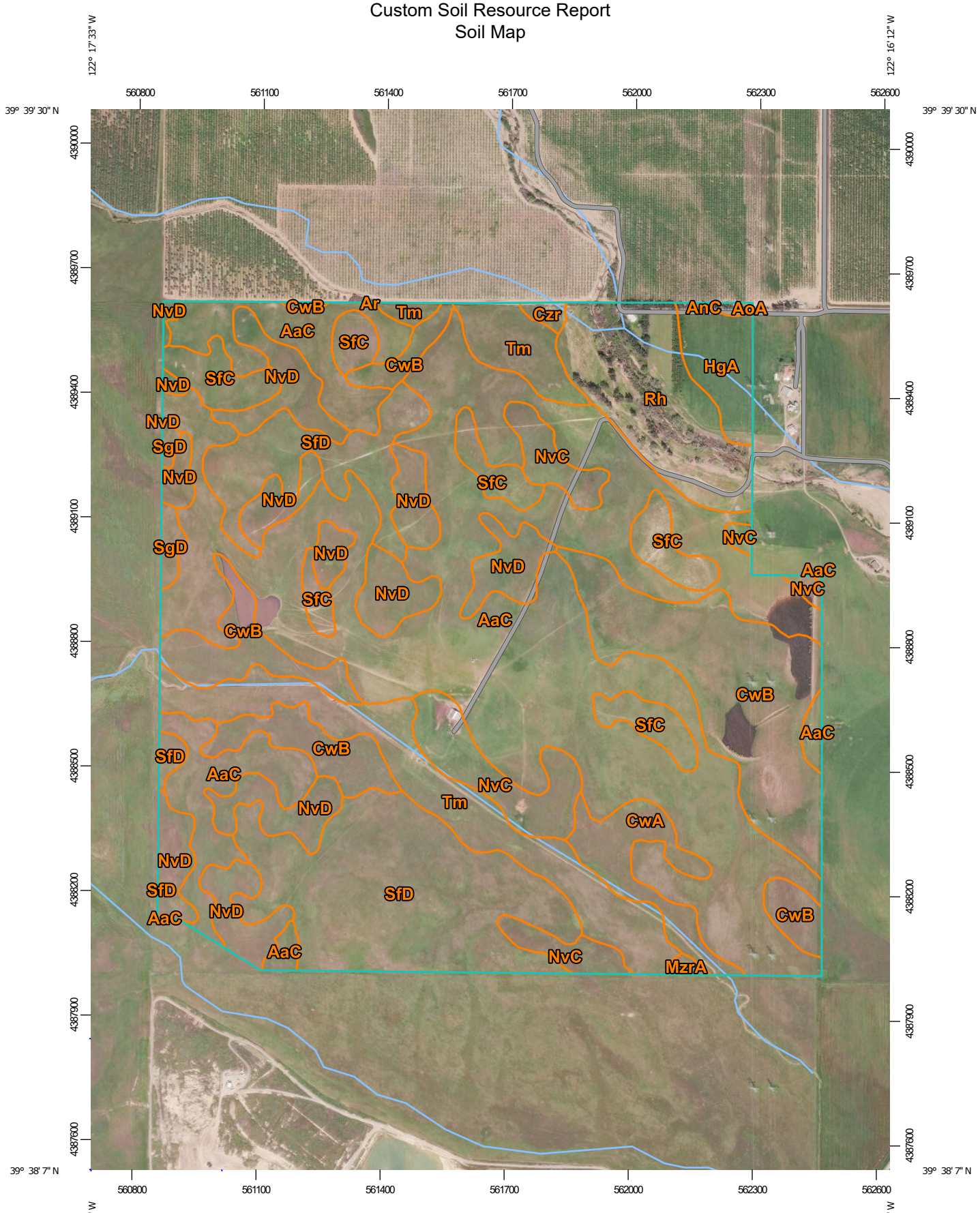
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:12,500 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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: Glenn County, California
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Mar 30, 2017—Nov 4, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background 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
AaC	Altamont clay, 3 to 15 percent slopes	224.8	36.9%
AnC	Altamont-Shedd association, 3 to 15 percent slopes	0.7	0.1%
AoA	Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17	0.1	0.0%
Ar	Arbuckle gravelly loam, clayey substratum, 0 to 2 percent slope	0.0	0.0%
CwA	Corning gravelly loam, 0 to 2 percent slopes	13.8	2.3%
CwB	Corning gravelly loam, 2 to 8 percent slopes	77.8	12.8%
Czr	Cortina very gravelly sandy loam, 0 to 3 percent slopes	1.3	0.2%
HgA	Hillgate loam, 0 to 2 percent slopes, MLRA 17	10.6	1.7%
MzrA	Myers clay, 0 to 1 percent slopes, MLRA 17	0.8	0.1%
NvC	Newville gravelly loam, 3 to 15 percent slopes	27.4	4.5%
NvD	Newville gravelly loam, 15 to 30 percent slopes	57.4	9.4%
Rh	Riverwash	32.4	5.3%
SfC	Shedd silty clay loam, 3 to 15 percent slopes	28.3	4.7%
SfD	Shedd silty clay loam, 15 to 30 percent slopes, MLRA 15	82.9	13.6%
SgD	Shedd-Altamont association, 10 to 30 percent slopes	3.1	0.5%
Tm	Tehama silt loam, 0 to 3 percent slopes, MLRA 17	47.3	7.8%
Totals for Area of Interest		**608.7**	**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.

Glenn County, California

AaC—Altamont clay, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: hd56
Elevation: 200 to 2,300 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Altamont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 43 inches: clay
H3 - 43 to 60 inches: weathered bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

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

Minor Components

Unnamed

Percent of map unit: 13 percent

Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Landform: Fan remnants
Hydric soil rating: Yes

AnC—Altamont-Shedd association, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: hd5t
Elevation: 200 to 2,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Altamont and similar soils: 65 percent
Shedd and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting

Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 43 inches: clay
H3 - 43 to 60 inches: weathered bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

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

Description of Shedd

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 29 inches: silty clay loam
H3 - 29 to 40 inches: weathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

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

Minor Components

Nacimiento

Percent of map unit: 8 percent
Hydric soil rating: No

Newville

Percent of map unit: 7 percent
Hydric soil rating: No

AoA—Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2t7r8
Elevation: 30 to 1,420 feet
Mean annual precipitation: 20 to 32 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Arbuckle

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

A1 - 0 to 2 inches: gravelly loam
A2 - 2 to 14 inches: gravelly loam
Bt1 - 14 to 25 inches: gravelly loam
Bt2 - 25 to 59 inches: gravelly sandy clay loam
Bt3 - 59 to 72 inches: very gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.28 to 1.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

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

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

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

Ar—Arbuckle gravelly loam, clayey substratum, 0 to 2 percent slope

Map Unit Setting
National map unit symbol: hd5z
Elevation: 100 to 1,600 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

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

Description of Arbuckle

Setting
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from conglomerate

Typical profile
H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 60 inches: gravelly loam
H3 - 60 to 65 inches: clay

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: 60 inches to strongly contrasting textural stratification
Natural 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: About 24 to 72 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

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

Minor Components

Cortina

Percent of map unit: 11 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Riverwash

Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

CwA—Corning gravelly loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hd76
Elevation: 80 to 1,000 feet
Mean annual precipitation: 16 to 30 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Corning

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 14 inches: gravelly loam
H2 - 14 to 27 inches: gravelly clay

H3 - 27 to 40 inches: gravelly clay
H4 - 40 to 60 inches: stratified gravelly sandy loam to gravelly clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: About 14 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
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 storage in profile: Very low (about 1.7 inches)

Interpretive groups

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

Minor Components

Unnamed

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

Unnamed

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

CwB—Corning gravelly loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hd77
Elevation: 80 to 1,000 feet
Mean annual precipitation: 16 to 30 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Corning

Setting

Landform: Terraces

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium derived from sedimentary rock

Typical profile
H1 - 0 to 14 inches: gravelly loam
H2 - 14 to 27 inches: gravelly clay
H3 - 27 to 40 inches: gravelly clay
H4 - 40 to 60 inches: stratified gravelly sandy loam to gravelly clay loam

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: About 14 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
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 storage in profile: Very low (about 1.7 inches)

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

Minor Components

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

Unnamed
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Czr—Cortina very gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: hd7h
Elevation: 30 to 2,400 feet
Mean annual precipitation: 8 to 20 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 240 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition
Cortina and similar soils: 85 percent

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

Description of Cortina

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 8 inches: very gravelly sandy loam
H2 - 8 to 40 inches: stratified very gravelly loamy sand to very gravelly loam
H3 - 40 to 60 inches: stratified very gravelly sand to very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: About 40 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively 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: Occasional
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

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

Minor Components

Unnamed

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

Gravel pits

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

Unnamed

Percent of map unit: 5 percent
Landform: Fans
Hydric soil rating: Yes

HgA—Hillgate loam, 0 to 2 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2t7q5
Elevation: 20 to 1,180 feet
Mean annual precipitation: 17 to 21 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 225 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hillgate, loam, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillgate, Loam

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 metamorphic and sedimentary rock

Typical profile

A1 - 0 to 3 inches: loam
A2 - 3 to 11 inches: loam
A3 - 11 to 19 inches: loam
2Bt1 - 19 to 38 inches: clay
2Bt2 - 38 to 53 inches: clay loam
2Bt3 - 53 to 63 inches: clay loam
2Bt4 - 63 to 73 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 6 to 32 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very low
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 in profile: 1 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: Loamy Fan Remnant 8-10" P.Z. (R017XE061CA)
Hydric soil rating: No

Minor Components

Capay, clay loam

Percent of map unit: 3 percent
Landform: Basin floors
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Altamont, silty clay

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ayar, clay

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Channels
Hydric soil rating: Yes

Riverwash

Percent of map unit: 1 percent
Landform: Channels
Hydric soil rating: Yes

Arand, very gravelly sandy loam

Percent of map unit: 1 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

MzrA—Myers clay, 0 to 1 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2xcb8
Elevation: 30 to 410 feet
Mean annual precipitation: 18 to 23 inches
Mean annual air temperature: 62 to 62 degrees F
Frost-free period: 297 to 328 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Myers, Clay

Setting

Landform: Alluvial fans, basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 3 inches: clay
Btss - 3 to 25 inches: clay
Bss1 - 25 to 43 inches: clay
Bss2 - 43 to 56 inches: clay
Bt - 56 to 71 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.2 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.9 inches)

Interpretive groups

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

Minor Components

Capay, clay loam

Percent of map unit: 5 percent
Landform: Basin floors
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Altamont

Percent of map unit: 3 percent
Landform: Strath terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hillgate

Percent of map unit: 2 percent
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Westfan, loam

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arbuckle, sandy loam

Percent of map unit: 2 percent
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Channels
Hydric soil rating: Yes

NvC—Newville gravelly loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: hdd4
Elevation: 300 to 2,000 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Newville

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 15 inches: gravelly loam
H2 - 15 to 26 inches: gravelly clay
H3 - 26 to 60 inches: very gravelly clay loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: About 15 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
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 storage in profile: Very low (about 1.8 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: 10 percent

Hydric soil rating: No

Unnamed

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

NvD—Newville gravelly loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hdd5
Elevation: 300 to 2,000 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Newville

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 15 inches: gravelly loam
H2 - 15 to 26 inches: gravelly clay
H3 - 26 to 60 inches: very gravelly clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: About 15 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
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 storage in profile: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

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

Corning
Percent of map unit: 4 percent
Hydric soil rating: No

Cortina
Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash
Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

Rh—Riverwash

Map Unit Setting
National map unit symbol: hdfm
Elevation: 700 to 2,900 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Riverwash: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile
H1 - 0 to 6 inches: very gravelly sand
H2 - 6 to 60 inches: stratified very gravelly coarse sand to gravelly sand

Properties and qualities
Natural 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 to 24 inches
Frequency of flooding: Frequent
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

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

Minor Components

Unnamed

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

SfC—Shedd silty clay loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: hdg9
Elevation: 200 to 2,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Shedd

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from calcareous shale

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 29 inches: silty clay loam
H3 - 29 to 40 inches: weathered bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Altamont

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

Newville

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

Nacimiento

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

SfD—Shedd silty clay loam, 15 to 30 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2tyzp
Elevation: 110 to 2,860 feet
Mean annual precipitation: 11 to 24 inches
Mean annual air temperature: 56 to 62 degrees F
Frost-free period: 270 to 360 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Shedd

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

A - 0 to 23 inches: silty clay loam
Ck - 23 to 30 inches: silty clay loam
Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 24 to 39 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 8 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: CLAYEY (R015XD001CA)
Hydric soil rating: No

Minor Components

Nacimiento

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Los osos

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Gazos

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Linne

Percent of map unit: 3 percent

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

San benito

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

SgD—Shedd-Altamont association, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: hdgd
Elevation: 200 to 2,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Shedd and similar soils: 50 percent
Altamont and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shedd

Setting

Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from calcareous shale

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 29 inches: silty clay loam
H3 - 29 to 40 inches: weathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

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

Description of Altamont

Setting

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 43 inches: clay
H3 - 43 to 59 inches: weathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

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

Minor Components

Newville

Percent of map unit: 8 percent
Hydric soil rating: No

Nacimiento

Percent of map unit: 7 percent
Hydric soil rating: No

Tm—Tehama silt loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2srj8
Elevation: 100 to 1,180 feet
Mean annual precipitation: 17 to 21 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 180 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Tehama

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
BAt - 9 to 12 inches: silty clay loam
Bt1 - 12 to 19 inches: silty clay loam
Bt2 - 19 to 27 inches: silty clay loam
BCtk1 - 27 to 38 inches: silty clay loam
BCtk2 - 38 to 50 inches: silty clay loam
BCtk3 - 50 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

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

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

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

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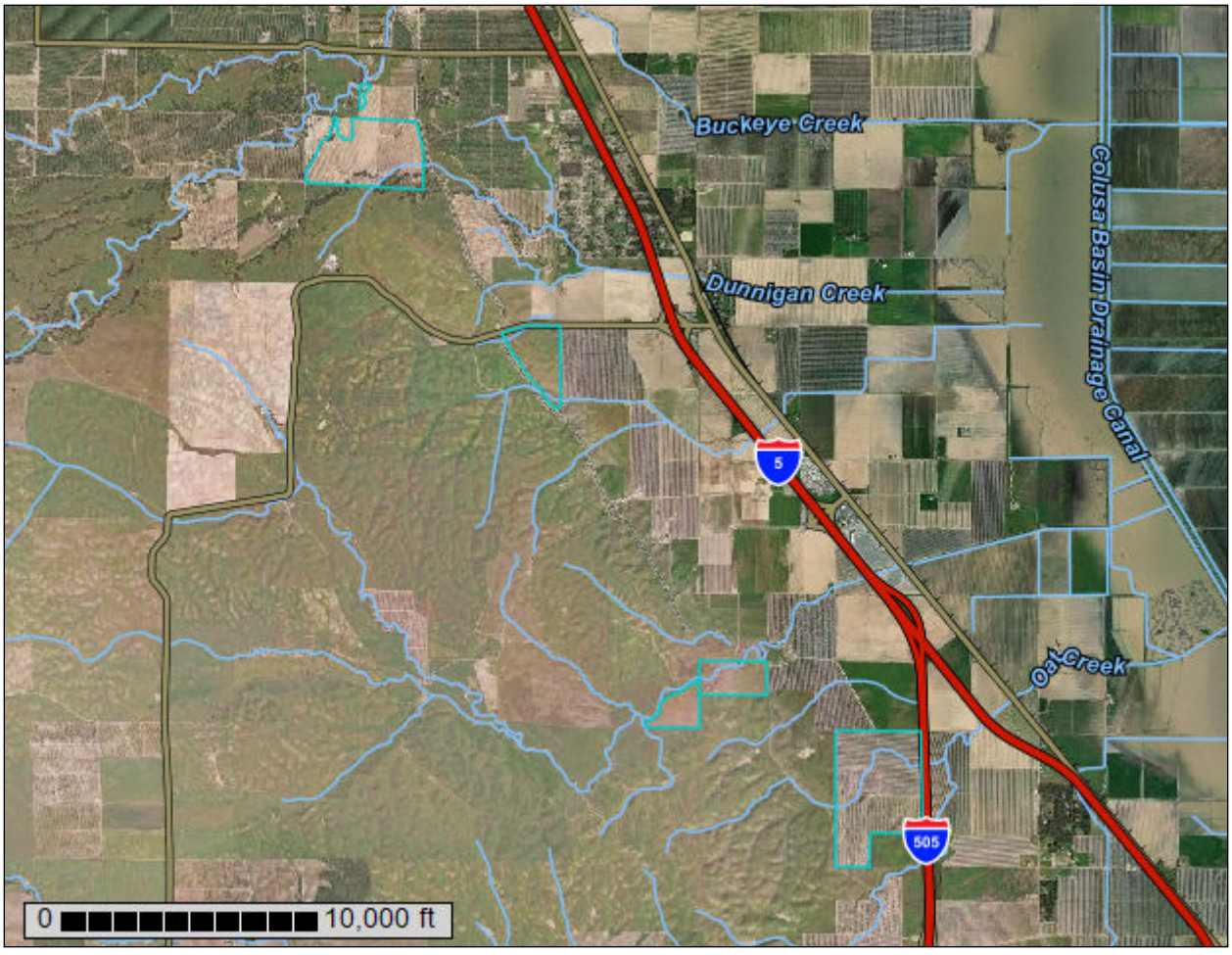
Natural Resources Conservation Service

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 Yolo County, California



December 18, 2019

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.

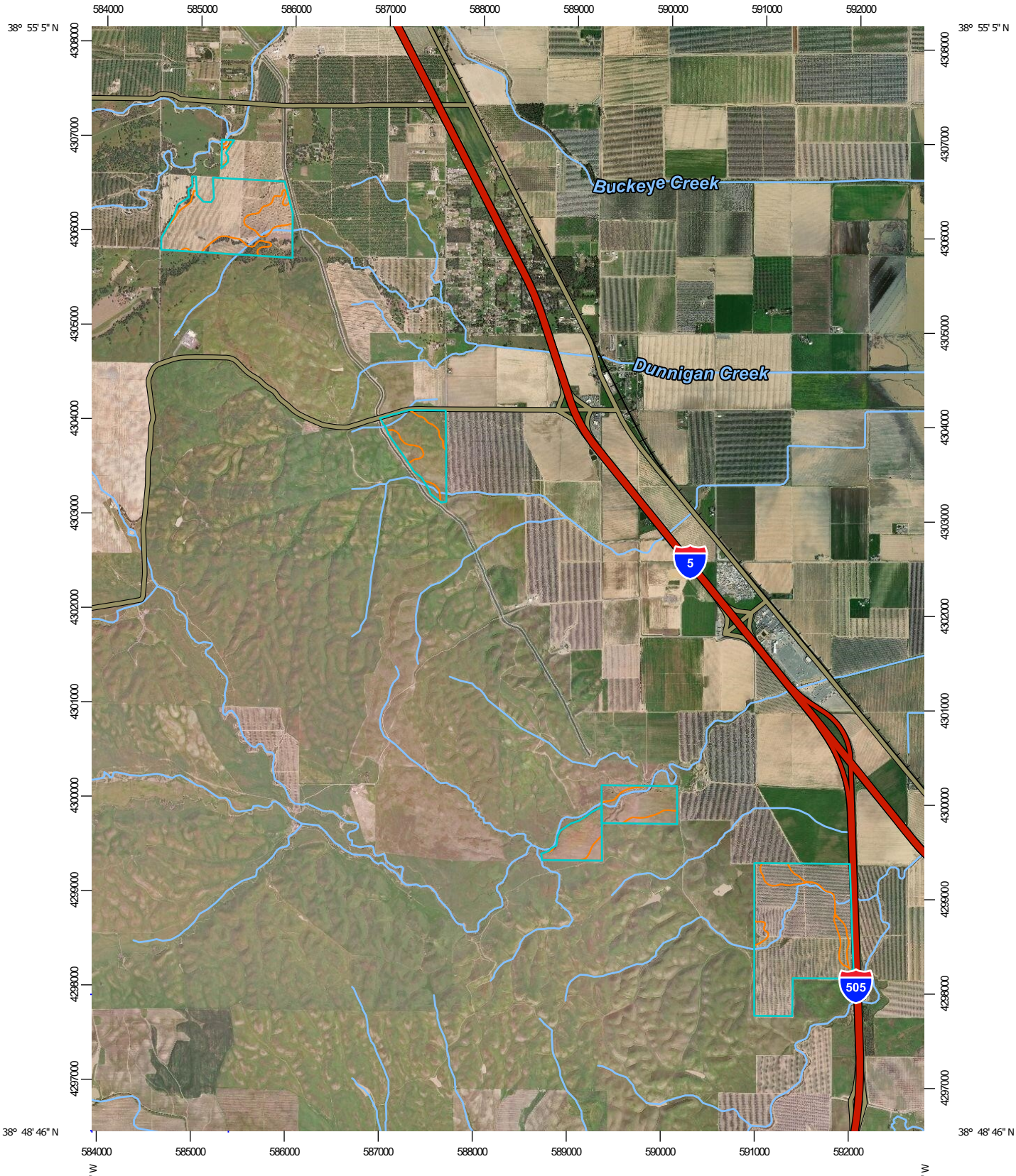
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



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: Yolo County, California
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Feb 25, 2017—Nov 4, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background 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
AaA	Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17	9.1	1.1%
CtD2	Corning gravelly loam, 0 to 12 percent slopes, MLRA 17	227.3	27.5%
HcC2	Hillgate loam, 2 to 9 percent slopes, eroded	31.4	3.8%
Rg	Rincon silty clay loam	57.1	6.9%
Rh	Riverwash	1.2	0.1%
SmD	Sehorn-Balcom complex, 2 to 15 percent slopes	371.3	44.9%
SmE2	Sehorn-Balcom complex, 15 to 30 percent slopes, eroded	23.5	2.8%
TaA	Tehama loam, 0 to 2 percent slopes, loamy substratum, MLRA 17	105.9	12.8%
Totals for Area of Interest		**826.7**	**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.

Yolo County, California

AaA—Arbuckle gravelly loam, 0 to 2 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2t7r8
Elevation: 30 to 1,420 feet
Mean annual precipitation: 20 to 32 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Arbuckle

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

A1 - 0 to 2 inches: gravelly loam
A2 - 2 to 14 inches: gravelly loam
Bt1 - 14 to 25 inches: gravelly loam
Bt2 - 25 to 59 inches: gravelly sandy clay loam
Bt3 - 59 to 72 inches: very gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.28 to 1.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

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

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

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

CtD2—Corning gravelly loam, 0 to 12 percent slopes, MLRA 17

Map Unit Setting
National map unit symbol: 2xc9g
Elevation: 10 to 450 feet
Mean annual precipitation: 21 to 26 inches
Mean annual air temperature: 61 to 62 degrees F
Frost-free period: 300 to 328 days
Farmland classification: Not prime farmland

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

Description of Corning

Setting
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old alluvium derived from metamorphic and sedimentary rock

Typical profile
Ap - 0 to 6 inches: gravelly loam
A - 6 to 11 inches: loam
Bw - 11 to 14 inches: gravelly loam
Bt1 - 14 to 22 inches: clay
Bt2 - 22 to 27 inches: clay
Bt3 - 27 to 38 inches: very gravelly clay
Bt4 - 38 to 60 inches: extremely gravelly clay

Properties and qualities
Slope: 0 to 12 percent
Depth to restrictive feature: 10 to 20 inches to abrupt textural change

Natural 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
Salinity, maximum in profile: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: CLAYPAN (R015XE087CA)
Hydric soil rating: No

Minor Components

Hillgate

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

Positas

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

Balcom

Percent of map unit: 3 percent
Hydric soil rating: No

Sehorn

Percent of map unit: 2 percent
Hydric soil rating: No

HcC2—Hillgate loam, 2 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: hdvv
Elevation: 10 to 350 feet
Mean annual precipitation: 22 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hillgate

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 30 inches: clay
H3 - 30 to 70 inches: clay loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: About 11 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
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 storage in profile: Very low (about 1.7 inches)

Interpretive groups

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

Minor Components

Tehama

Percent of map unit: 7 percent
Hydric soil rating: No

Corning

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

San ysidro

Percent of map unit: 3 percent
Hydric soil rating: No

Rg—Rincon silty clay loam

Map Unit Setting

National map unit symbol: hdww

Elevation: 50 to 350 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 275 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Rincon

Setting

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

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 56 inches: silty clay loam
H3 - 56 to 72 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Brentwood

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

Marvin

Percent of map unit: 3 percent
Hydric soil rating: No

Tehama

Percent of map unit: 3 percent

Hydric soil rating: No

Yolo

Percent of map unit: 2 percent
Hydric soil rating: No

Zamora

Percent of map unit: 2 percent
Hydric soil rating: No

Rh—Riverwash

Map Unit Setting

National map unit symbol: hdwx
Elevation: 0 to 500 feet
Mean annual precipitation: 17 to 20 inches
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Riverwash

Setting

Landform: Channels on streams
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed sandy and gravelly alluvium

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: 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)
Frequency of flooding: Frequent
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

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

Minor Components

Loamy alluvial land
Percent of map unit: 10 percent
Hydric soil rating: No

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

SmD—Sehorn-Balcom complex, 2 to 15 percent slopes

Map Unit Setting
National map unit symbol: hdxf
Elevation: 100 to 2,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Sehorn and similar soils: 60 percent
Balcom and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sehorn

Setting
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 10 inches: clay
H2 - 10 to 40 inches: clay
H3 - 40 to 60 inches: weathered bedrock

Properties and qualities
Slope: 2 to 15 percent
Depth to restrictive feature: About 40 inches to paralithic bedrock
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey Hills 10-14" p.z. (R015XE001CA)
Hydric soil rating: No

Description of Balcom

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from calcareous sandstone

Typical profile

H1 - 0 to 20 inches: silty clay loam
H2 - 20 to 37 inches: silty clay loam
H3 - 37 to 60 inches: weathered bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: About 37 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey Hills 10-14" p.z. (R015XE001CA)
Hydric soil rating: No

Minor Components

Positas

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, in swales

Percent of map unit: 3 percent
Hydric soil rating: No

Corning

Percent of map unit: 2 percent
Hydric soil rating: No

Myers

Percent of map unit: 2 percent
Hydric soil rating: No

SmE2—Sehorn-Balcom complex, 15 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: hdxg
Elevation: 100 to 2,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Sehorn and similar soils: 50 percent
Balcom and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sehorn

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Calcareous residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 8 inches: clay
H2 - 8 to 38 inches: clay
H3 - 38 to 60 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: About 38 inches to paralithic bedrock
Natural 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

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: Clayey Hills 10-14" p.z. (R015XE001CA)
Hydric soil rating: No

Description of Balcom

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from calcareous sandstone

Typical profile
H1 - 0 to 20 inches: silty clay loam
H2 - 20 to 37 inches: silty clay loam
H3 - 37 to 60 inches: weathered bedrock

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: About 37 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey Hills 10-14" p.z. (R015XE001CA)
Hydric soil rating: No

Minor Components

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

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

TaA—Tehama loam, 0 to 2 percent slopes, loamy substratum, MLRA 17

Map Unit Setting

National map unit symbol: 2srj5
Elevation: 50 to 580 feet
Mean annual precipitation: 19 to 27 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 265 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Tehama

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: loam
Bt - 10 to 40 inches: clay loam
BCt - 40 to 63 inches: gravelly loam
C - 63 to 75 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Zamora

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

Yolo

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

Brentwood

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

Rincon

Percent of map unit: 3 percent
Hydric soil rating: No

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