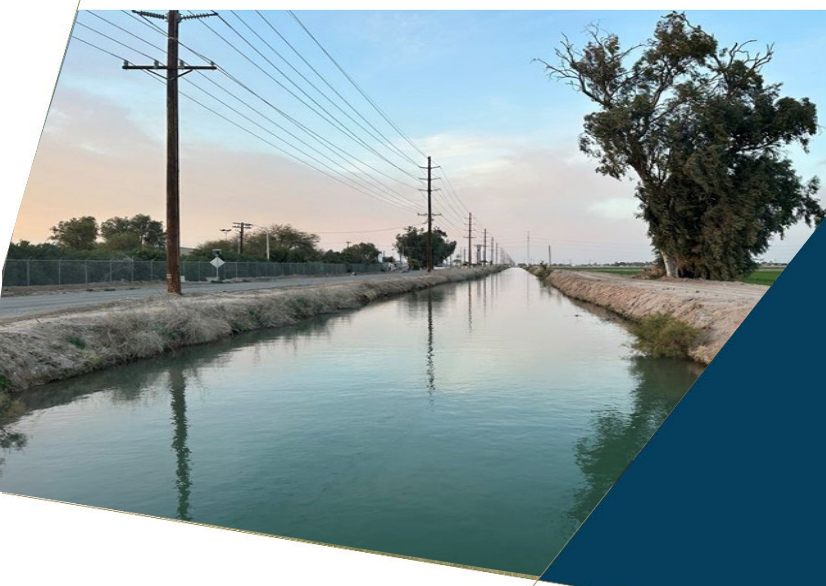

# Preliminary Jurisdictional Report

## *Dogwood Geothermal Energy Project*

Prepared for ORMAT (dba OrHeber 3 LLC)

**March 15, 2024**

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# SECTION 1 Introduction

The OrHeber 3 (OH), LLC, Heber Field Company, LLC (HFC), and the Second Imperial Geothermal Company (collectively, Applicants, subsidiaries of Ormat Technologies, Inc. [ORMAT]), proposes to develop a 25 megawatt (MW; net generation) geothermal energy facility, one new injection well, and three new geothermal production wells with a new 1000-ft section of brine pipeline, and two parasitic solar energy facilities (Dogwood Solar, and Heber 2 Solar) in southern Imperial County, the Dogwood Geothermal Energy Project (proposed project).

## 1.1 Purpose of Report

Catalyst Environmental Solutions (Catalyst) conducted an investigation of jurisdictional features for the proposed project footprint. This Preliminary Jurisdictional Delineation (PJD) Report provides the methods and results of the delineation and serves as guidance in establishing baseline conditions for resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the Colorado River Basin Regional Water Quality Control Board (RWQCB) for the Project. Specifically, the purpose of the Preliminary Jurisdictional Delineation was to determine the location and extent of waters and/or wetlands subject to potential jurisdictional authority within the proposed project survey area. Being situated in an agricultural area, the Project site and surrounding areas are traversed by a network of drains, canals, and other irrigation infrastructure administered by the Imperial Irrigation District (IID), some of which constitute potentially jurisdictional features. As part of the investigation, the entire Project site along with areas in the immediate vicinity were surveyed and represents the survey area for this PJD report.

## 1.2 Project Location

The proposed project is situated in Township 17 South, Range 14 East of the U.S. Geographical Survey (USGS) Heber 7.5-minute topographic quadrangle. The Project is located on approximately 190 acres of private lands owned by ORMAT in southern Imperial County (**Figure 1**). A geothermal power plant with new pipelines and an injection well would be built within the existing Heber 2 Geothermal Energy Complex (HGEC) fence line (referred to as “Dogwood” in this report). Two supplemental solar photovoltaic fields (herein referred to as “solar energy facilities”), substation, and gen-tie line with connection to Dogwood and the existing Heber 2 geothermal plant would be built in and outside of HGEC. The proposed facility footprints are shown in **Figure 2**. The survey area for this project included a 500-foot buffer around the proposed project footprint (**Figure 2**). The total survey area, including the buffer, is 487 acres. The disturbance footprint is the proposed facility footprints and a 25-foot buffer has been applied to linear components to account for working alongside the existing pipeline infrastructure.

The 25-megawatt geothermal power plant will occur within the existing HGEC footprint located at 855 Dogwood Road, Heber, CA. The proposed Dogwood geothermal energy facilities would be located within the existing fence line that accommodates the existing ORMAT facilities. The geothermal plant site is north of Jasper Road and west of South Dogwood Road. The proposed geothermal development site is currently maintained as a materials storage area.

The Dogwood (39.30 ac) and Heber 2 parasitic solar (65.95 ac) photovoltaic facilities would be located immediately southeast of the HGEC south of East Willoughby Road and east of S Dogwood Road on (APN 059-020-001). Two separate solar fields will be developed – one to provide auxiliary power to the proposed Dogwood Project and one for the existing Heber 2 plant. The solar energy facilities will be constructed in an area that is currently used for agricultural crops (alfalfa). One new geothermal injection well and three new production wells will be used for the Project.

### 1.2.1 Driving Directions

Interstate 8 (I-8; Kumeyaay Highway), located approximately 4.5 miles directly north, provides primary highway access to the Project site. Dogwood Road stems off of I-8 and provides immediate site access. From the south, Willoughby Road runs west-east approximately 1,700 feet from the site and connects to Dogwood Road, providing immediate site access.

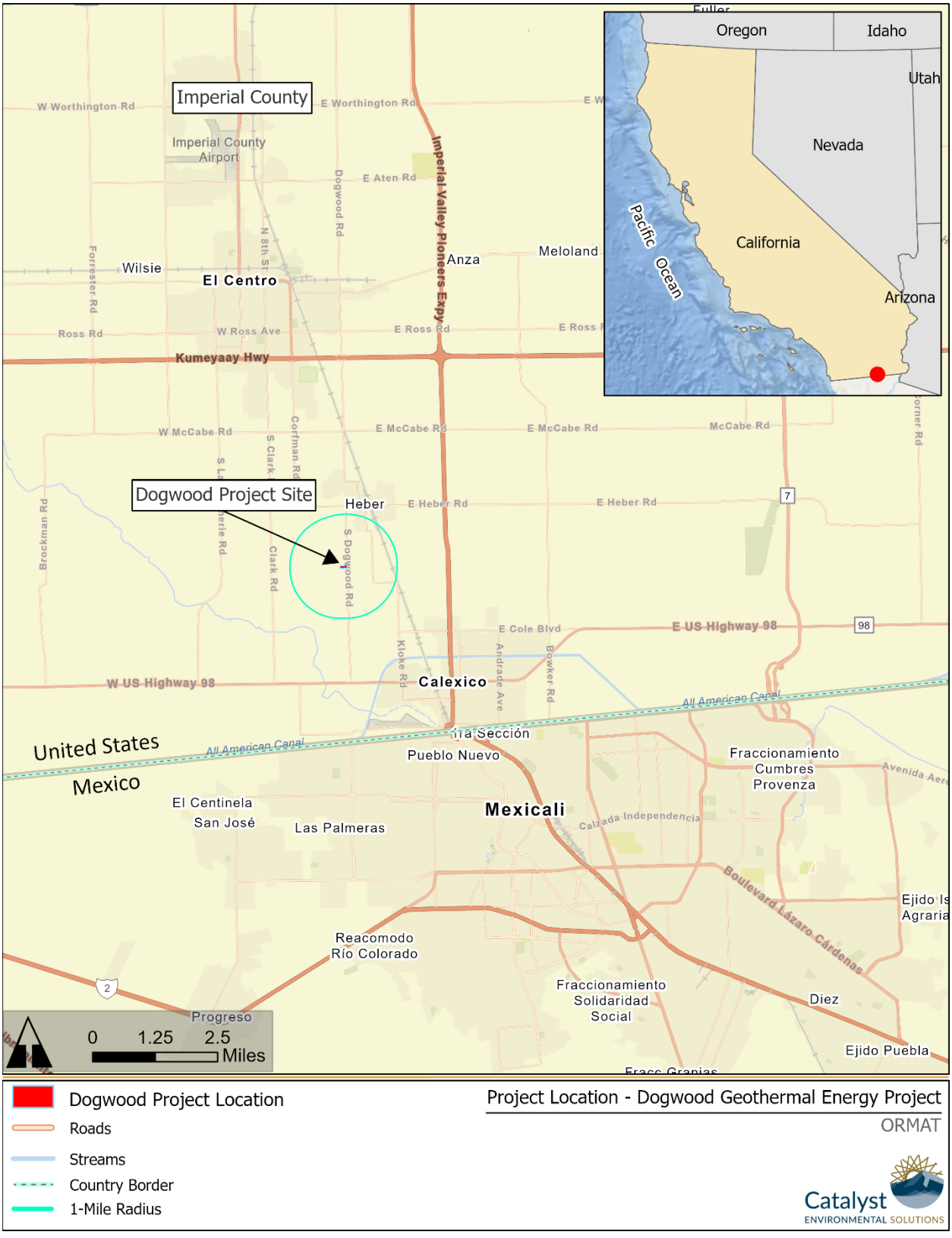


Figure 1. Regional map showing location for the Dogwood Geothermal Energy Project.


## Legend

- Dogwood Geothermal Plant
- Dogwood Parasitic Solar Energy Facilities
- Heber 2 Parasititc Solar Facilities
- Approximate Well Pad
- Existing Heber Substation
- New Dogwood Substation
- XMR and Switch
- Heber Geothermal Energy Complex
- Survey Area
- Area of Disturbance
- Survey Area Drains & Canals
- T-Line Connection to Dogwood
- Exisiting Pipeline
- New Pipeline
- Proposed Production Wells
- Injection Well

FIGURE 2. EXISTING FACILITIES AND PROPOSED DOGWOOD AND SOLAR ENERGY FACILITY

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# SECTION 2 Existing Conditions

## 2.1 Topography and Surrounding Land Uses

The Project is located within the Imperial Valley south of the Salton Sea in the Colorado Desert. The topography within the survey area is generally flat with an elevation of -7 feet below mean sea level (msl). The surrounding lands support solar facilities, agricultural cultivation, a construction/aggregates company, and geothermal well pads and pipelines present throughout the local vicinity. Unpaved and paved roads, irrigation ditches, and other farming infrastructure are present throughout. Lands within the survey area are zoned General Agricultural with a Renewable Energy Geothermal Overlay (A-2-G-SPA).

## 2.2 Vegetation

Plant community descriptions generally follow the MCV II classification system which is described in the second edition of *A Manual of California Vegetation* (Sawyer et al. 2009). The survey area supports three land cover types: agricultural land, developed/disturbed land, and arrow weed thickets.

### 2.2.1 Agricultural Land

This land cover type is not described within A Manual of California Vegetation (Sawyer et al. 2009). At the time of survey, this land cover type was observed to contain primarily active alfalfa (*Medicago sativa*) cultivation and harvest and associated irrigation canals were present adjacent to and bisecting fields. Approximately 105 acres of agricultural land would be converted to install the solar energy facilities.

### 2.2.2 Developed/Disturbed Land

This land cover type is not described within A Manual of California Vegetation (Sawyer et al. 2009), but includes developed areas like roads and existing solar/geothermal facilities. These areas are predominantly devoid of vegetation, but can support ruderal herbaceous scrub, including non-native grasses and other weed species, and planted or landscape trees/shrubs. The Dogwood geothermal development site falls within this land cover type, and is nearly devoid of vegetation. The perimeter fence supported narrow strips of vegetation, including desert mallow (*Sphaeralcea ambigua*), Mexican fan palm (*Washingtonia robusta*), and nettle-leaved goosefoot (*Chenopodiastrum murale*). Several willow acacia (*Acacia salicina*) and a solitary mesquite (*Prosopis* sp.) were identified within the fenced area as well.

### 2.2.3 Arrow Weed Thicket

Arrow weed (*Pluchea sericea*) is the dominant vegetation on the steep banks of Central Main Canal, Beech Drain, and the Dogwood Canal. Other species such as cattails (*Typha* spp.) and saltcedar (*Tamarisk ramosissima*) are also present but in much smaller numbers. The *Pluchea sericea* Shrubland Alliance (arrow weed thickets) occur around springs, seeps, irrigation ditches, canyon bottoms, stream

borders, and seasonally flooded washes (Sawyer et al. 2009). Vegetation is dense in some areas along the canals and very sparse in others. Arrow weed thickets are recognized by CDFW as a sensitive vegetation type. The proposed transmission line connection would span Beech Drain, Central Main Canal, and Dogwood Lateral 1. A narrow band of arrow weed thicket is present and would be spanned by the connection and would not be removed or disturbed by project activities Representative photos of vegetated banks are provided in Appendix B.

## 2.3 Climate

The region experiences a desert climate characterized by hot, dry summers and warm winters. Average annual high temperatures range from 69 degrees Fahrenheit (°F) in December to 106°F in July, and average annual low temperatures range from 40°F in December to 76°F in August. The average annual precipitation measures 2.9 inches (U.S. Climate Data 2023).

## 2.4 Hydrology and Geomorphology

The Project area is within the Colorado River Basin and is within the Imperial Hydrologic Unit (HUC8 18100204) (USGS 2023). Irrigation water is supplied to the surrounding agricultural fields by an engineered system of canals operated and maintained by the IID. Water that flows through the Project area originates at Imperial Dam located north of Yuma, Arizona. Water diverted at Imperial Dam for use in the Imperial Valley passes through three desilting basins and is then delivered to the Imperial Valley via the All-American Canal. The 80-mile-long All-American Canal distributes water to three main canals, East Highline, Central Main, and Westside Main. These three main canals then distribute water to smaller lateral canals throughout the Imperial Valley. Farmers receive water in private ditches from the lateral canals. The lateral drain system operates by gravity flow drainage (IID 2023). When a field is irrigated, water is allowed to flow from the IID delivery canal to a smaller earthen or concrete-lined v-ditch (e.g., a “head ditch”), which then distributes the water evenly across the field. At the opposite and lower elevation end of the field, excess water is collected in another ditch (e.g., a “tail ditch”) and directed back into an IID drain (e.g., Beech Drain in the survey area). Some tail ditches are unlined and plowed over/filled in and then re-dug as needed for irrigation. All waters in the project area ultimately drain to the Salton Sea via the New River (e.g., Beech Drain) or the Alamo River (e.g., Date Drain No. 3).

The Central Main Canal and several smaller IID canals and drains pass through the survey area. The alfalfa fields in the project area are graded for flood irrigation and most were undergoing irrigation during the survey and were either very muddy or had standing water. The v-ditches present in the solar energy field are all concrete lined.

The National Wetlands Inventory (NWI) of surface waters and wetlands (USFWS 2023) has mapped and classified several of the waterways in or adjacent to the project area (**Figure 3**). The Central Main Canal is classified as Riverine (R2UBHx: Lower Perennial, Unconsolidated Bottom Permanently Flooded Excavated). The Central Main Canal is a manmade channel excavated in previously upland areas and has a natural sediment bottom. West of Dogwood Road, the Dogwood Lateral 1 canal parallels the Central Main Canal for a short distance.

Beech Drain is classified as Riverine (R4SBCx: Intermittent Streambed Seasonally Flooded Excavated). It features a natural sediment bottom and varying densities of riparian vegetation below the top of bank.

Beech Drain has steep banks estimated to be approximately 15 feet from top-of-bank to the bottom of the channel. Beech Drain flows parallel to the northern and eastern extent of the proposed solar energy field footprint but is separated from the solar field (presently planted with alfalfa) by unpaved access roads. Date Drain No. 3 is not mapped in the NWI, but also features a natural bottom.

The unnamed concrete lined v-ditches that run east-west through the proposed solar energy facilities are not mapped or classified by the NWI. These likely function as head ditches and tail ditches and contain water only when ordered for irrigation.

The ground disturbance footprint for Dogwood and the solar energy facilities are adjacent to but do not overlap the NWI-mapped canals and drain. The proposed transmission line connection would span Beech Drain, Central Main Canal, and Dogwood Lateral 1. No other waterbodies would be intersected by project ground disturbance. All canals, drains, and ditches are manmade and excavated in upland areas. These canals are primarily used for agricultural irrigation.

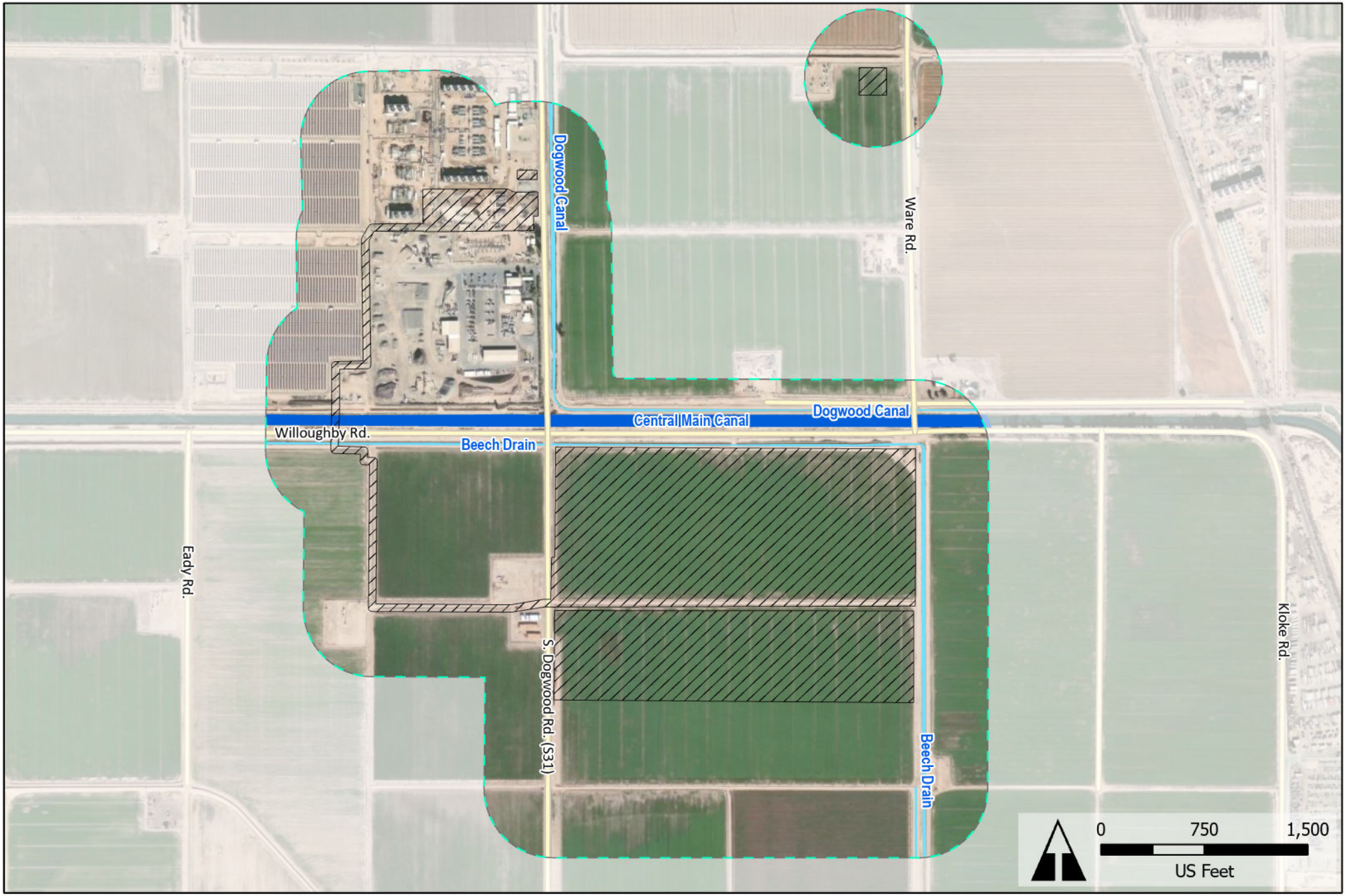
## 2.5 Soils

Soil data were obtained from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) using the Web Soil Survey. These data were used to determine potential soil types, including where hydric soils have historically occurred. **Figure 4** shows the mapped extent of soils and **Table 1** provides a summary of the characteristics of soils which occur within the survey area. The full NRCS report is provided as **Appendix C**.

Table 1. Soil Units within the Survey Area

| Map Unit Symbol | Map Unit Name | Description | Hydric Soil Rating |
|---|---|---|---|
| 110 | Holtville silty clay, wet | A moderately well-drained soil that occurs on basin floors at elevations between -230 to 200 feet; parent material consists of alluvium derived from mixed sources; low runoff; silty clay (0 to 17 inches), clay (17 to 24 inches), silt loam (24 to 35 inches), loamy very fine sand (35 to 60 inches) | No |
| 114 | Imperial silty clay, wet | A moderately well-drained soil that occurs on basin floors at elevations between -230 to 200 feet; parent material consists of clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed sources; silty clay (0 to 12 inches), silty clay loam (12 to 60 inches) | No |
| 115 | Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes | A moderately well-drained soil that occurs on basin floors at elevations between -230 to 200 feet; parent material consists of Clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed sources; low runoff; silty clay loam (0 to 60 inches) | No |
| 145 | Water | NA | NA |

Source: NRCS 2023




Legend

Wetland Classification

- R2UBHx
- R4SBCx

- Survey Area
- Area of Disturbance Buffer

FIGURE 3. NATIONAL WETLAND INVENTORY MAPPED FEATURES

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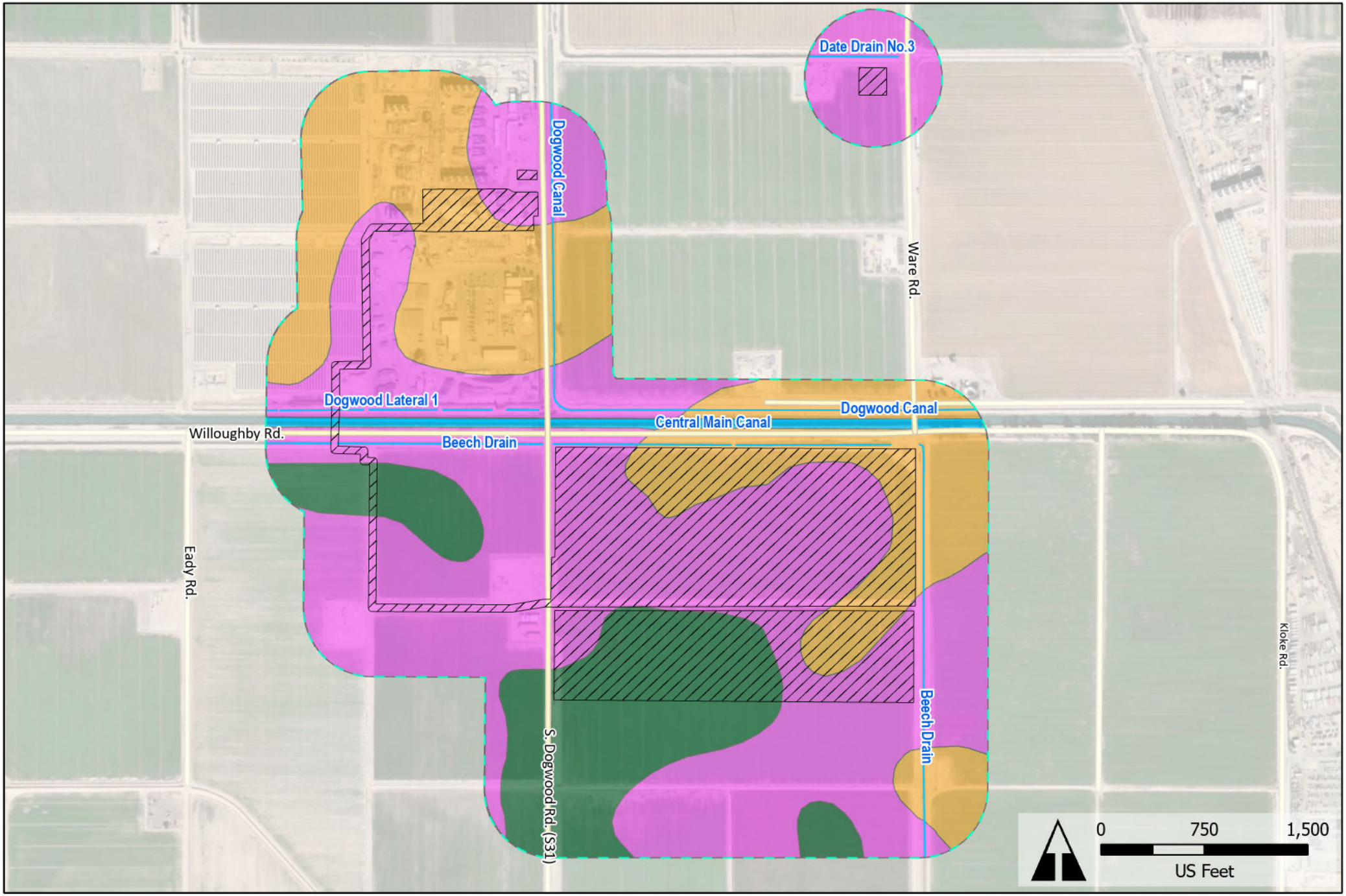


Legend

- Survey Area
- Area of Disturbance
- Web Soil Survey (Map Unity Name)
- Holtville silty clay, wet
- Imperial silty clay, wet
- Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes
- Water

FIGURE 4. NRCS WEB SOIL SURVEY MAP OF PROJECT VICINITY

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# SECTION 3 Regulatory Background

## 3.1 Federal

### 3.1.1 Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) establishes a regulatory program which regulates the discharge of dredged or fill material into “waters of the United States” (WoUS). Under this program, no discharge of dredged or fill material into WoUS can be permitted if a practicable alternative is less damaging to the aquatic environment or if the waters of the nation would be significantly degraded. The USACE is authorized to issue permits regulating the discharge of dredged or fill material into the WoUS, including wetlands. Permits can be issued for individual projects or general categories of projects. After reviewing permits issued by the USACE, the USEPA can veto a USACE decision to issue a permit. Also, the USEPA develops regulations with which the USACE must comply for USACE projects. The USACE does not issue itself a permit, but is required to ensure that the project complies with guidelines that the USEPA develops in accordance with Section 404(b)(1) of the CWA.

“Waters of the United States” is not defined by the CWA. Rather, the CWA provides authority for the USEPA and the USACE to define “waters of the United States” in regulations. Most recently, on December 30, 2022, the agencies announced the final "Revised Definition of 'Waters of the United States'" rule.

### 3.1.2 Section 401 of the Clean Water Act

Under Section 401 of the CWA, any person applying for a federal permit or license, which may discharge pollutants into WoUS, must obtain a State Water Quality Certification. This certification is required to ensure the activity complies with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until after Section 401 certification has been granted, and no license or permit may be issued if certification has been denied. Prior to the USACE issuing a Section 404 permit, applicants must apply for and receive a Section 401 Water Quality Certification from the RWQCB. Applications sent to the RWQCB must include a complete CEQA document.

## 3.2 State

### 3.2.1 Waters of the State

The California State Water Resources Control Board (SWRCB) and its RWQCBs regulate discharge of waste in any region that could affect the waters of the State (WoS) under the California Porter-Cologne Water Quality Act or waters of the US under Section 401 of the federal CWA. Under the Porter-Cologne Act, a Report of Waste Discharge must be submitted prior to discharging waste, or proposing to discharge waste, within any region that could affect the quality of the WoS (California Water Code § 13260). Waste Discharge Requirements (WDRs) or a waiver of WDRs will then be issued by the RWQCB. Waters of the State are defined as any surface water or groundwater, including saline waters that are

within the boundaries of the state (California Water Code § 13050). This differs from the CWA definition of WoUS by its inclusion of groundwater and waters outside the ordinary high-water mark in its jurisdiction.

Although all WoUS also fall under the category of WoS, some WoS may be identified beyond the delineation of WoUS, and the RWQCB may exert authority to regulate waste discharge into these waters even if the waters do not fall under USACE federal jurisdiction. All projects that have a federal component and may affect WoUS, including those that require a Section 404 Permit from the USACE, must also comply with Section 401 of the CWA. If discharge into WoUS is being proposed, a 401 Water Quality Certification from the RWQCB is required (23 California Code of Regulation §§ 3830–3869) in addition to obtaining WDRs for impacts to waters of the State.

### 3.2.2 Section 1600-1616 of the California Fish and Game Code

The CDFW asserts jurisdiction over the bed and bank of a stream and associated wildlife and habitats as established in California Fish and Game Code §§ 1600–1616. Fish and Game Code section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW prior to beginning any project that may "substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other materials containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake."

Generally, notification to CDFW is required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. In CDFW's definition, "any river, stream, or lake" includes those that are dry for periods of time (ephemeral or episodic) as well as those that flow year-round (perennial). This includes rivers or streams that flow at least periodically (e.g., may be dry for periods of time) or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses that have a surface or subsurface flow which supports or has supported riparian vegetation. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. Permits may also apply to work undertaken within the flood plain of a body of water.

If CDFW determines that a proposed project may substantially adversely affect existing fish or wildlife resources, a Lake or Streambed Alteration Agreement (SAA) will be required (§ 1603). Prior to issuance of an SAA, CEQA documentation must be submitted to CDFW.

# SECTION 4 Waters/Wetlands Delineation

## 4.1 Delineation Methodology

This section describes the methods employed by Catalyst during the survey conducted to determine the extent of potentially jurisdictional wetlands and/or waters that occur within the survey area. The survey area included the proposed project footprint for ground-disturbing activities and a 500-foot buffer.

Prior to conducting the field assessment, Catalyst reviewed current and historic aerial photographs, topographic maps, soil maps, and NWI maps to evaluate the potential active channels and wetland features that occur within the survey area.

Field work was conducted for most of the site on February 22, 2023 based on the project design footprint at the time. Additional data were collected during a subsequent visit to the site on October 12, 2023. During the field assessment, vegetation and hydrology were mapped using a Juniper Systems Geode External GNSS Receiver global positioning system (GPS) and data were collected in Arc Field Maps. Field data were processed using Global Information Technology (GIS) and total jurisdictional area for each survey area was calculated based on mapped data.

### 4.1.1 Federal Wetlands/Waters

Jurisdictional non-wetland "waters of the US." are delineated based on the limits of the ordinary high water mark (OHWM) as described in the USACE Field Guide to the Identification of the Ordinary High Water Mark in the Arid West (USACE 2008a). The OHWM is determined by changes in physical/biological features such as bank erosion, deposited vegetation/debris, and vegetative characteristics. The top of bank indicator and change in vegetation were the only OHWM indicators present within the survey area. Ordinary High Water Mark Data Forms are included in Appendix A.

Jurisdictional wetlands are delineated using a routine determination in accordance with the methods outlined in the USACE Wetland Delineation Manual (USACE 1987) and the Arid West Supplement (USACE 2008b) based on three wetland parameters: wetland hydrology, hydric soils, and dominant hydrophytic vegetation.

### 4.1.2 CDFW Jurisdictional Waters

CDFW jurisdiction is delineated to the top of the banks of the channel and/or to the edge of the associated riparian canopy/riparian habitat, whichever is wider. Within the survey area, the CDFW jurisdictional boundary of the IID canals is not wider than the OHWM; therefore, the total acreage of CDFW jurisdictional waters is the same as the total acreage for federal jurisdictional waters.

## 4.2 Wetland Soils

Soils data from the NRCS was referenced to determine if hydric soils have been previously documented and/or historically occurred in or near the survey area (**Appendix C**). Based on this review hydric soils were not expected to occur within the survey area. Hydric soil indicators for the Arid West are described in detail in USACE (2008a).

## 4.3 Wetland Vegetation

Vegetation percent cover is typically estimated for plant species in each of four strata: tree, sapling/shrub, herb, and woody vine. Plant species in each stratum are then ranked based on canopy dominance (USACE 2008a). Species that contribute to a cumulative coverage of at least 50 percent and any species that comprises at least 20 percent of the total coverage for each stratum are then recorded on wetland field data sheets. This is referred to as the "50/20 rule". Wetland indicator status is assigned to each dominant species using the Wetland Plants of Specialized Habitats in the Arid West (USACE

2007), and the Arid West Region of the National Wetland Plant List (USACE 2012; USACE 2020). If greater than 50 percent of the dominant plants from all strata are listed as obligate, facultative, or facultative-wetland species, the criteria for dominant hydrophytic vegetation is met. Sporadic vegetation was present in the survey area along the edges of disturbed areas and below the top of bank of canals. Species encountered and their indicator status are shown in **Table 2**.

Table 2. Plant Species Observed within the Survey Area and Wetland Indicator Status

| Scientific Name | Common Name | Wetland Indicator Status† |
|---|---|---|
| *Pluchea sericea* | Arrow weed | FACW |
| *Tamarix ramosissima* | Saltcedar | FAC |
| *Acacia salicina* | Willow acacia | NA |
| *Washingtonia robusta* | Washington fan palm | FACW |
| *Sphaeralcea ambigua* | Desert globemallow | NA |
| *Chenopodium murale* | Nettle-leaved goosefoot | FACU |
| *Prosopis spp.* | Mesquite spp. | FAC/FACU |
| *Medicago sativa* | Alfalfa | UPL |
| *Sonchus oleraceus* | Common sow-thistle | UPL |
| *Typha spp.* | Cattail | OBL |

† National Wetland Plant List (USACE 2020), FAC = Facultative, FACW = Facultative Wetland, OBL = Obligate Wetland, UPL = Upland, NA = no indicator status assigned.

## 4.4 Wetland Hydrology

Wetland hydrology is assessed by documenting the presence of primary and secondary hydrology indicators. These indicators are helpful in determining whether an area has a high probability of being inundated or saturated long enough during the growing season to develop anaerobic conditions in the surface soil environment (USACE 1987). The three primary (Group A) indicators are surface water, high water table, and saturation.

The Arid West Supplement includes two additional secondary indicator groups that can be utilized during dry conditions or in areas where surface water/saturated soils are not present; these are Group B (evidence of recent inundation) and Group C (evidence of recent soil saturation) (Table 11 in USACE 2008a). The presence of one primary indicator from any of the groups is considered evidence of wetland hydrology. If only secondary indicators are present, two or more must be observed to conclude presence of wetland hydrology. Indicators are intended to be one-time observations of site conditions representing evidence of wetland hydrology when hydrophytic vegetation and hydric soils are present (USACE 2008a). Hydrology in the survey area is highly regulated and controlled by IID and no natural floodplains are present.

## 4.5 Results

The following jurisdictional features were observed within the survey area: federal non-wetland waters and state waters. All features examined are man-made, constructed entirely within uplands, and used solely for agricultural irrigation. The earthen and concrete-lined head and tail ditches are typically dry and convey water only during periodic and infrequent irrigation events. They do not support riparian vegetation/habitat. These ditches do not meet the definition of a Relatively Permanent Water (RPW) and would not be considered federally or state jurisdictional. The larger, IID-administered canals (supply) and drains (drainage), however, generally do convey water all year and ultimately flow to the Salton Sea, which is considered a Traditionally Navigable Water, and would likely be considered federally and state jurisdictional. Dogwood Canal, Dogwood Lateral 1, Beech Drain, and Date Drain No. 3 would likely be classified as R4SBCx (Riverine, intermittent streambed, seasonally flooded, excavated) while Central Main Canal is classified R2UBHx (Riverine, lower perennial, unconsolidated bottom, permanently flooded, excavated). Representative photos are provided in **Appendix B**.

All waterbodies in the survey area were delineated; however only three would be intersected by the project based on final design. **Table 3** summarizes the jurisdictional features present within the disturbance area and their acreages and **Figure 5** depicts the locations of all paired points collected in the survey area. **Appendix A** contains the OHWM Data Forms completed for the waterbodies in the survey area. According to the NRCS Hydric Soils List (**Appendix C**), there are no mapped hydric soils within the survey area. **Table 2** above provides a list of plant species observed within the survey area and includes the wetland indicator status for each, if applicable. Land cover is shown in **Figure 6**. In the survey area, 59.3 percent of the land cover is agricultural (primarily alfalfa), 37.6 percent is developed/disturbed (including access roads), 0.2 percent is arrow weed thicket (along canals and drains below OHWM), and 2.8 percent is water (canals and drains).

### 4.5.1 Federal Wetlands

Based on Catalyst's professional opinion following an assessment of hydrology, vegetation, and soils, there are no federal wetlands within the survey area. IID irrigation canals and drains do, however, meet the requirements for jurisdictional waters (**Table 3**).

### 4.5.2 Federal Non-Wetland Waters

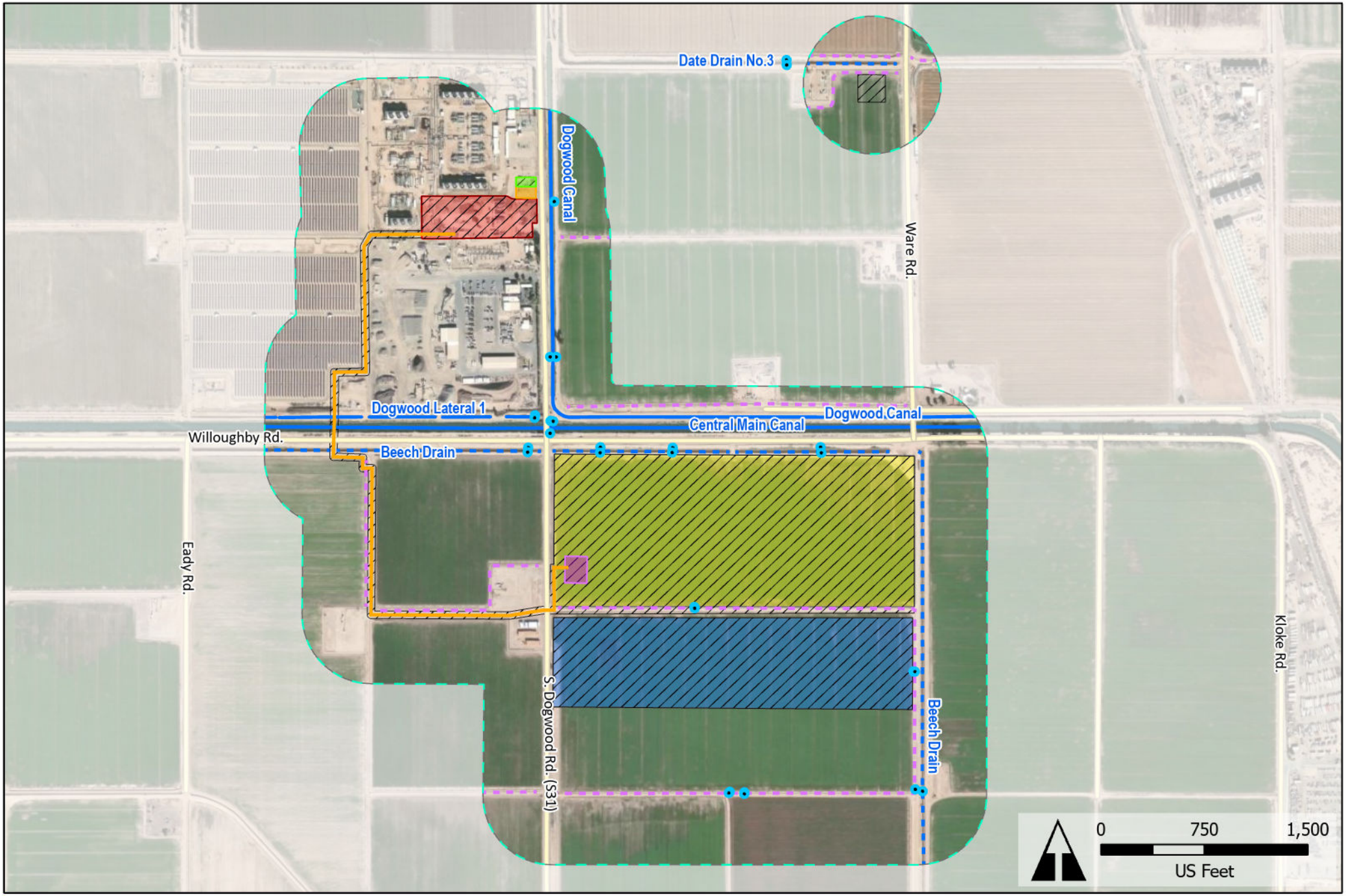
Approximately 0.11 acres of the disturbance area meet the definition of "waters of the United States" as outlined in 33 CFR Part 328. The potentially jurisdictional waters delineated within the survey area that are not intersected by the project disturbance footprint are not included in the calculation. This assessment is based on Catalyst's professional opinion following an assessment of hydrology and the limits of the OHWM. The potentially jurisdictional features in the survey area are man-made RPWs; therefore, the OHW zone was delineated using direct measures of OHWM indicators rather than the extent of the active floodplain as irrigation features with controlled flows do not support true active floodplains.

### 4.5.3 CDFW Waters

Based on Catalyst's professional opinion following an assessment of hydrology, presence of bed and bank, and extent of riparian vegetation, approximately 0.11 acres of the disturbance area also meet the definition of CDFW jurisdictional waters as outlined in Sections 1600-1616 of the CDFW Code.

Table 3. Acreage of Jurisdictional Waters within the Disturbance Area

| Feature ID | OHWM (feet) | Distance (feet) | USACE/RWQCB/CDFW Jurisdictional Waters (acres) |
|---|---|---|---|
| Dogwood Lateral 1 | 14 | 57.2 | 0.005 |
| Beech Drain | 40 | 54 | 0.01 |
| Central Main Canal | 89.5 | 56.2 | 0.09 |
| | **TOTAL** | **167.3** | **0.11** |




## Legend

- Dogwood Geothermal Plant Site
- Existing Heber Substation
- New Dogwood Substation
- XMR and Switch
- Heber 2 Parasitic Solar Facility
- Dogwood Parasitic Solar Facility
- Survey Area
- Area of Disturbance Buffer
- T-Line Connection to Dogwood
- Ordinary High Water Mark (OHWM) Field Points

### Jurisdictional Resources

- Canal
- Drain

### Non-jurisdictional Resources

- Ditch

FIGURE 5. ORDINARY HIGH WATER MARK DATA COLLECTION POINTS

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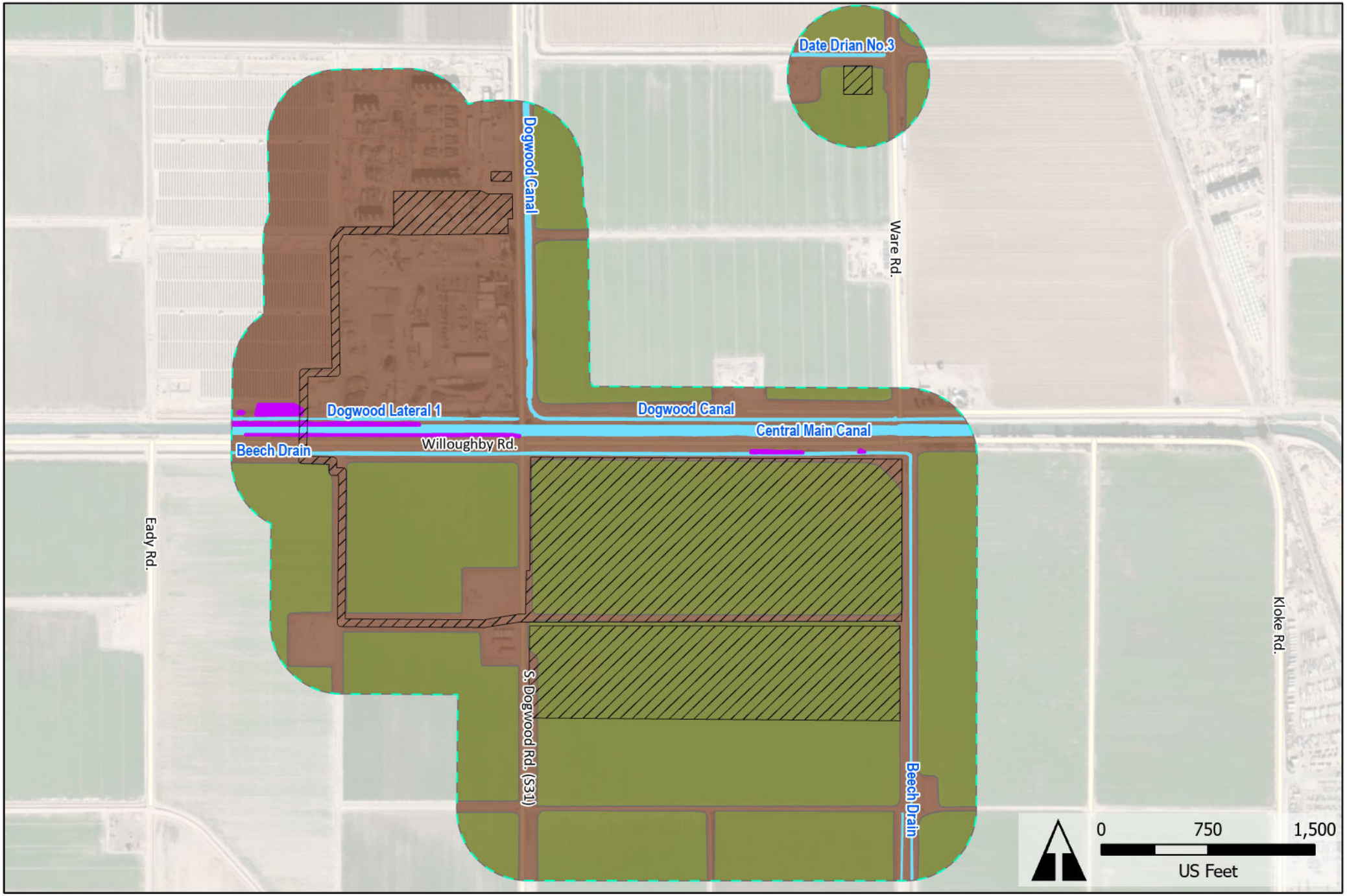


## Legend

- Agricultural
- Disturbed/Developed
- Arrow Weed Thicket
- Water
- Surevy Area
- Area of Disturbance

FIGURE 6.
LAND COVER IN THE SURVEY AREA

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ENVIRONMENTAL SOLUTIONS

# SECTION 5 Summary and Recommendations

The survey area supports CDFW jurisdictional waters and USACE non-wetland waters. The IID canals and drains shown in Figure 5 were actively flowing during the delineation and supported riparian vegetation sporadically. The potential impacts to waterbodies spanned by project components are quantified in **Table 3.** These channels exhibited evidence of hydrology and a discernable OHWM and were mapped as jurisdictional non-wetland waters of the US (0.11 acres). All riparian vegetation present was at or below the top of bank and therefore, the same delineation applies to CDFW jurisdictional waters (0.11 acres) within the survey area.

All potentially jurisdictional features present within 500 feet of the project footprint were delineated to allow for possible design changes as the project progresses. Catalyst recommends that ORMAT's project designers avoid ground disturbing work in areas that would cause temporary or permanent impacts to potentially jurisdictional features. If the project design changes, project temporary and permanent impact areas must be recalculated. Based on the current design, the impacts to potentially jurisdictional waters would occur only where the transmission line would span Beech Drain, Willoughby Road, Central Main Canal, and Dogwood Lateral 1 on the west side of the project area.

When establishing staging areas adjacent to potentially jurisdictional features, appropriate best management practices (BMPs) should be utilized to prevent erosion of work areas or stockpiles that could result in soil entering waterways. Additionally, BMPs to prevent and address minor leaks, drips, or spills of oils, lubricants, and fuels from construction equipment should be in place. No riparian vegetation should be removed. Arrow weed thickets are a sensitive vegetation type. Where canals must be crossed by project features, such as new transmission lines, Catalyst recommends spanning canals to avoid in-water work. Currently, other transmission line infrastructure spans Central Main Canal at the intersection of Dogwood Road and Willoughby Road in the survey area and existing pipelines cross under Beech Drain, Central Main Canal, and Dogwood Lateral 1 west of Dogwood Road. Based on the current project design, ORMAT intends to utilize the same or similar footprint as existing crossings to minimize disturbance.

If the final project design would have temporary or permanent impacts on WoUS or WoS, ORMAT would need to prepare permit applications for submission to the USACE, RWQCB, and CDFW quantifying those impacts as described previously in Section 3 (Regulatory Background).

The conclusions presented above represent Catalyst's professional opinion based on our knowledge and experience with USACE and CDFW, including their regulatory guidance documents and manuals. These acreages represent a calculated estimation of the jurisdictional area within the survey area; however, USACE and CDFW have final authority in determining the status and presence of jurisdictional wetlands and waters and the extent of their boundaries.

# SECTION 6 References

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SECTION 7

# Appendix A Ordinary High Water Mark Data Forms

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Heber 1 Parasitic Solar
**Project Number:**
**Stream:** Beech Drain West
**Investigator(s):** Emily Merickel, Hannah Donaghe

**Date:** 10/12/2023
**Town:** Heber
**Photo begin file#:**

**Time:**
**State:** CA
**Photo end file#:**

Y ☐ / N ■ Do normal circumstances exist on the site?

Y ■ / N ☐ Is the site significantly disturbed?

**Location Details:**
~130ft SE of Willoughby Rd junction with Dogwood Rd

**Projection:** Lambert Conformal Conic
**Datum:** NAD 1983 (2011)
**Coordinates:**

**Potential anthropogenic influences on the channel system:**
IID man-made earthen drain constructed in uplands. West of Dogwood Rd intersection with Willoughby Rd. South of Willoughby Parallels Willoughby Rd and unpaved agricultural road.

pt1 32.7082362, -115.5345359;
pt2 32.7083260 115.5345231°

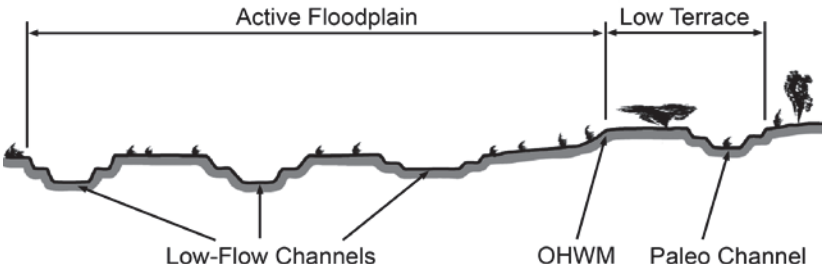
**Brief site description:**
Earthen drain operated by IID. OHWM = ~40'. SW of Dogwood Rd and intersection with Willoughby Rd. Vegetation below top of bank. West of Dogwood Rd and South of Willoughby Rd before Main Central Canal.

**Checklist of resources (if available):**

- ■ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ■ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ■ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

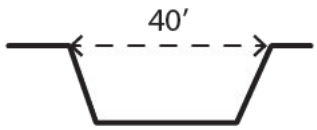



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ■ GPS
   - ☐ Digitized on computer
   - ☐ Other:

**Project ID:** Heber 1 **Cross section ID:** BD-02 **Date:** 10/12/2023 **Time:**

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ■ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural irrigation canal constructed in uplands. Vegetation below top of bank.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

No floodplain is present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Heber 1 Parasitic Solar
**Project Number:**
**Stream:** Date Drain 3 E-W section
**Investigator(s):** Emily Merickel, Hannah Donaghe

**Date:** 10/12/2023
**Town:** Heber
**Photo begin file#:**

**Time:**
**State:** CA
**Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:**
~ .6 miles south of Heber, CA. West .1 mi of Ware Rd between two ag fileds

**Projection:** Lambert Conformal Conic
**Datum:** NAD 1983 (2011)
**Coordinates:** pt2 32.7160511, -115.5284310; pt1 32.7159520, -115.5284270

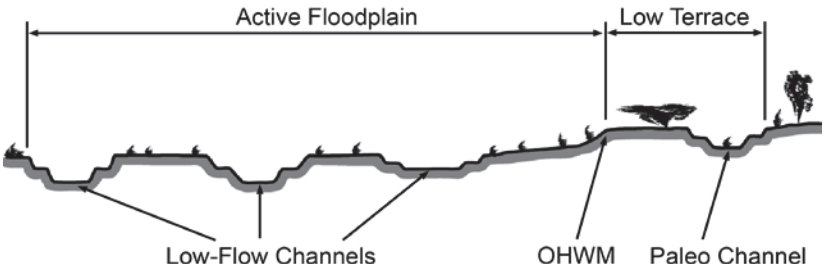
**Potential anthropogenic influences on the channel system:**
Man-made earthen irrigation supply drain constructed in uplands.

**Brief site description:**
Earthen drain operated by IID. OHWM = 43'

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

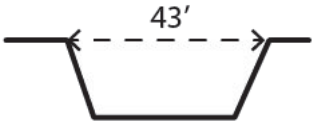



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS
   - ☐ Digitized on computer
   - ☐ Other:

**Project ID:** Heber 1 **Cross section ID:** DD-01 **Date:** 10/12/2023 **Time:**

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ■ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural irrigation canal constructed in uplands. Vegetated, mostly tamarisk below top of bank. Spare presence of arrow weed thickets. Water present.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

No floodplain is present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Heber 1 Parasitic Solar
**Project Number:**
**Stream:** Dogwood Lateral 1
**Investigator(s):** Emily Merickel, Hannah Donaghe

**Date:** 10/12/2023
**Town:** Heber
**Photo begin file#:**

**Time:**
**State:** CA
**Photo end file#:**

Y ☐ / N ■ Do normal circumstances exist on the site?

Y ■ / N ☐ Is the site significantly disturbed?

**Location Details:**
~230-ft NW of intersection of Dogwood Rd. and Willoughby Rd

**Projection:** Lambert Conformal Conic
**Datum:** NAD 1983 (2011)
**Coordinates:** pt1 32.7089199, -115.5343693;
pt2 32.7089700, -115.5343608

**Potential anthropogenic influences on the channel system:**
Man-made earthen irrigation supply canal.

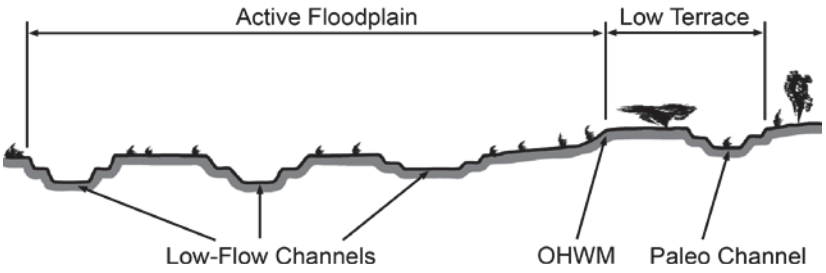
**Brief site description:**
Earthen canal operated by IID. OHWM = ~25'. Directly south of an aggregates company. North of the Central Main Canal near the Dogwood Rd Bridge before the intersection with Willoughby Rd.

**Checklist of resources (if available):**

- ■ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ■ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ■ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

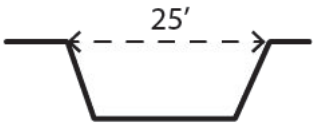



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ■ GPS
   - ☐ Digitized on computer
   - ☐ Other:

**Project ID:** Heber 1 **Cross section ID:** DWL1 **Date:** 10/12/2023 **Time:**

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ■ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural irrigation canal constructed in uplands. Tamarisk and arrowweed on banks and bass within the canal.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

No floodplain is present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Ormat Dogwood Geothermal Power Project
**Project Number:**
**Stream:** Dogwood Channel (IID)
**Investigator(s):** H. Donaghe, E. Merickel

**Date:** 2/21/2023 **Time:** 17:00
**Town:** Heber **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:** ~4 miles south of El Centro on S. Dogwood Rd

**Projection:** Lambert Conformal Conic **Datum:** NAD 1983 (2011)
**Coordinates:**

**Potential anthropogenic influences on the channel system:**

Man-made earthen drainage canal, adjacent agricultural activities, paved and unpaved roads. Located across S. Dogwood Road from the Ormat Nevada Heber Geothermal Facility and Pyramid Construction and Aggregates, Inc.

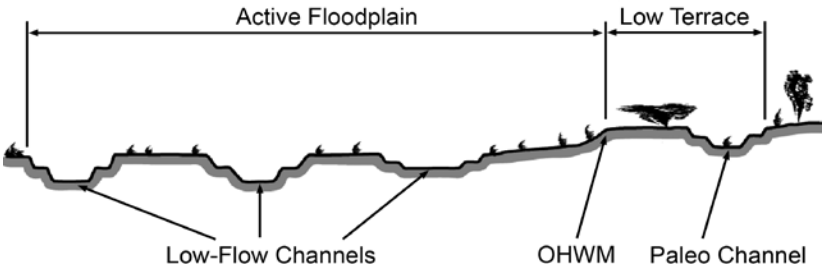
**Brief site description:**

Earthen canal, large agricultural ditch operated by Imperial Irrigation District. OHWM = 44'

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



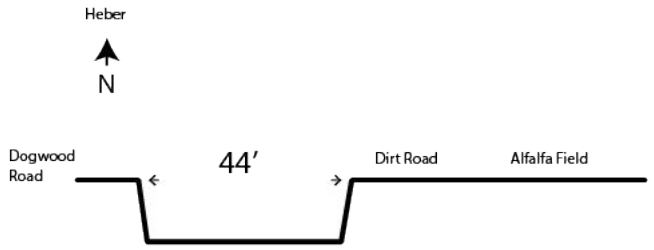

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   ☒ Mapping on aerial photograph ☒ GPS
   ☒ Digitized on computer ☐ Other:

Ormat

**Project ID:** Dogwood **Cross section ID:** **Date:** 2/21/23 **Time:** 17:00

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural drainage canal, constructed in uplands. Sparse bank vegetation, primarily arrow weed, all below top of bank. Paved or dirt roads maintained to either side of canal.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**No Floodplain**

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Ormat Dogwood Geothermal Power Project
**Project Number:**
**Stream:** Central Main Canal and Dogwood Lateral1 (IID)
**Investigator(s):** H. Donaghe, E. Merickel

**Date:** 2/22/2023 **Time:** 8:00
**Town:** Heber **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:** ~4 miles south of El Centro on S. Dogwood Rd

**Projection:** Lambert Conformal Conic **Datum:** NAD 1983 (2011)
**Coordinates:**

**Potential anthropogenic influences on the channel system:**

Man-made earthen irrigation supply canal, adjacent agricultural activities, paved and unpaved roads. Bridge crosses the canal via S. Dogwood Road. Parallels Willoughby Rd in survey area. Dogwood Lateral 1 canal parallel to CMC west of Dogwood Road and mapped at the same time

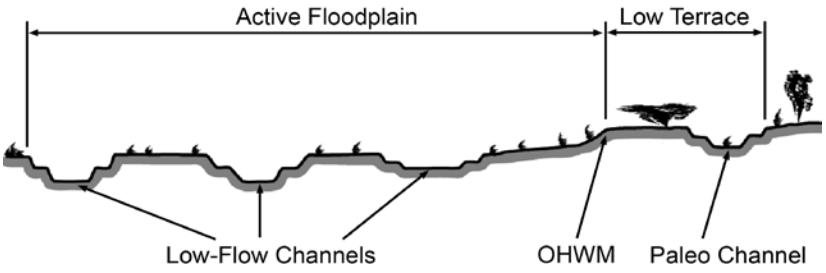
**Brief site description:**

Earthen canal, large agricultural ditch operated by Imperial Irrigation District. OHWM = 89.5'
Earthen lateral canal immediately parallel, also operated by IID. OHWM = 14'.

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



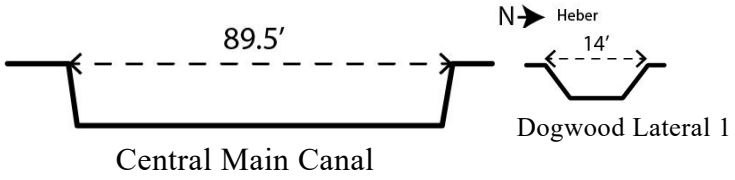

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☐ Other:

Ormat

**Project ID:** Dogwood **Cross section ID:** **Date:** 2/22/23 **Time:** 8:00

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural supply canal, constructed in uplands

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**No Floodplain**

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Ormat Dogwood Geothermal Power Project
**Project Number:**
**Stream:** Solar Field V-Ditches
**Investigator(s):** H. Donaghe, E. Merickel

**Date:** 2/22/2023 **Time:** 09:16-09:36
**Town:** Heber **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:** ~4 miles south of El Centro on S. Dogwood Rd

**Projection:** Lambert Conformal Conic **Datum:** NAD 1983 (2011)
**Coordinates:**

**Potential anthropogenic influences on the channel system:**

Man-made concrete and earthen v-ditches, adjacent agricultural activities, paved and unpaved roads. Provide irrigation water to alfalfa fields. Two run E-W through alfalfa fields and one runs N-S along east edge of southern alfalfa field.

**Brief site description:**

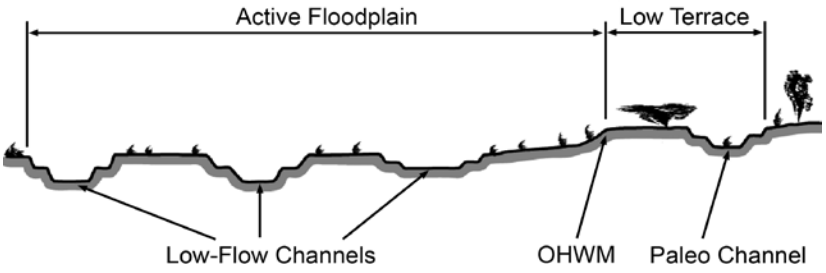
Primarily concrete lined v-ditches, 7.5' wide, approximately 3' deep. Unvegetated. One earthen v-ditch noted near Ware Rd. skirting edge of Heber 2 wellhead.

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



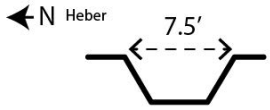

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☐ Other:

Ormat

**Project ID:** Dogwood **Cross section ID:** **Date:** 2/22/23 **Time:** 9:36

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural v-ditch, constructed in uplands. No vegetation. Dry.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**No Floodplain**

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Ormat Dogwood Geothermal Power Project
**Project Number:**
**Stream:** Beech Drain (IID)
**Investigator(s):** H. Donaghe, E. Merickel

**Date:** 2/22/2023 **Time:** 11:20
**Town:** Heber **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:** ~4 miles south of El Centro on S. Dogwood Rd

**Projection:** Lambert Conformal Conic **Datum:** NAD 1983 (2011)
**Coordinates:**

**Potential anthropogenic influences on the channel system:**

Man-made earthen drainage canal, adjacent agricultural activities, paved and unpaved roads. Parallels Willoughby Rd E-W in survey area. Turns and runs N-S on eastern edge of survey area.

**Brief site description:**

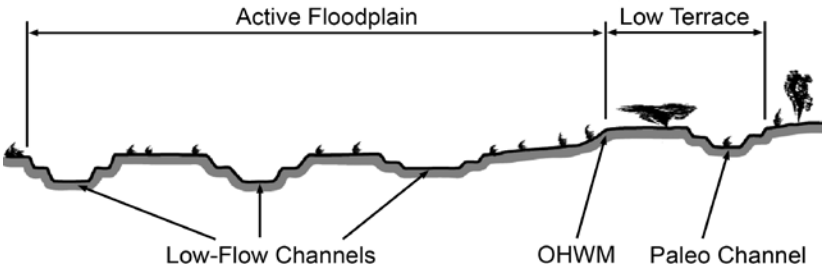
Earthen canal, large agricultural drain operated by Imperial Irrigation District. OHWM = 35' to 45'

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



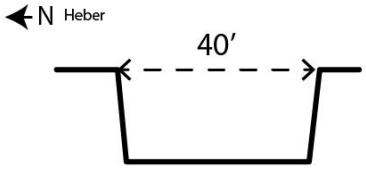

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☐ Other:

Ormat

**Project ID:** Dogwood **Cross section ID:** **Date:** 2/22/23 **Time:** 11:20

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural drainage canal, constructed in uplands. Arrow weed thickets along some stretches of drain. Steep banks. Cattails present in small patch. All vegetation at or below break in bank slope.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**No Floodplain**

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Ormat Dogwood Geothermal Power Project
**Project Number:**
**Stream:** Date Drain No. 3 (IID)
**Investigator(s):** H. Donaghe, E. Merickel

**Date:** 2/22/2023 **Time:** 12:00
**Town:** Heber **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:** Ware Rd. East of Heber 1.

**Projection:** **Datum:**
**Coordinates:**

**Potential anthropogenic influences on the channel system:**

Man-made earthen drainage canal, adjacent agricultural activities, paved and unpaved roads. Heber 1 Geothermal Wellhead and aboveground pipe across the unpaved road to the south.

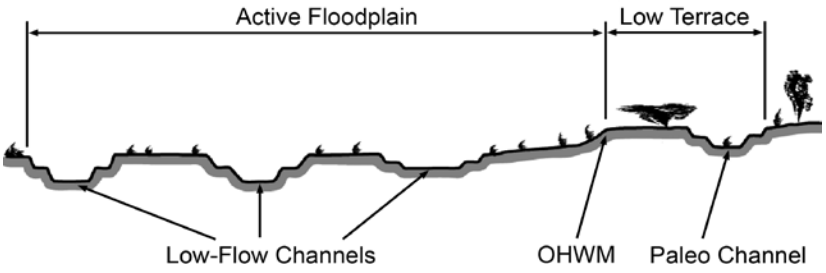
**Brief site description:**

Earthen canal, agricultural drain operated by Imperial Irrigation District. OHWM = 25'

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

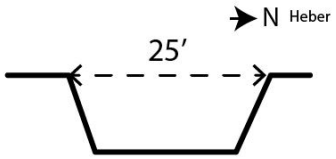



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☐ GPS
   - ☐ Other:

**Project ID:** Ormat Dogwood **Cross section ID:** **Date:** 2/22/23 **Time:** 12:00

**Cross section drawing:**




## OHWM

**GPS point:** See Report

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Agricultural drainage canal, constructed in uplands.

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

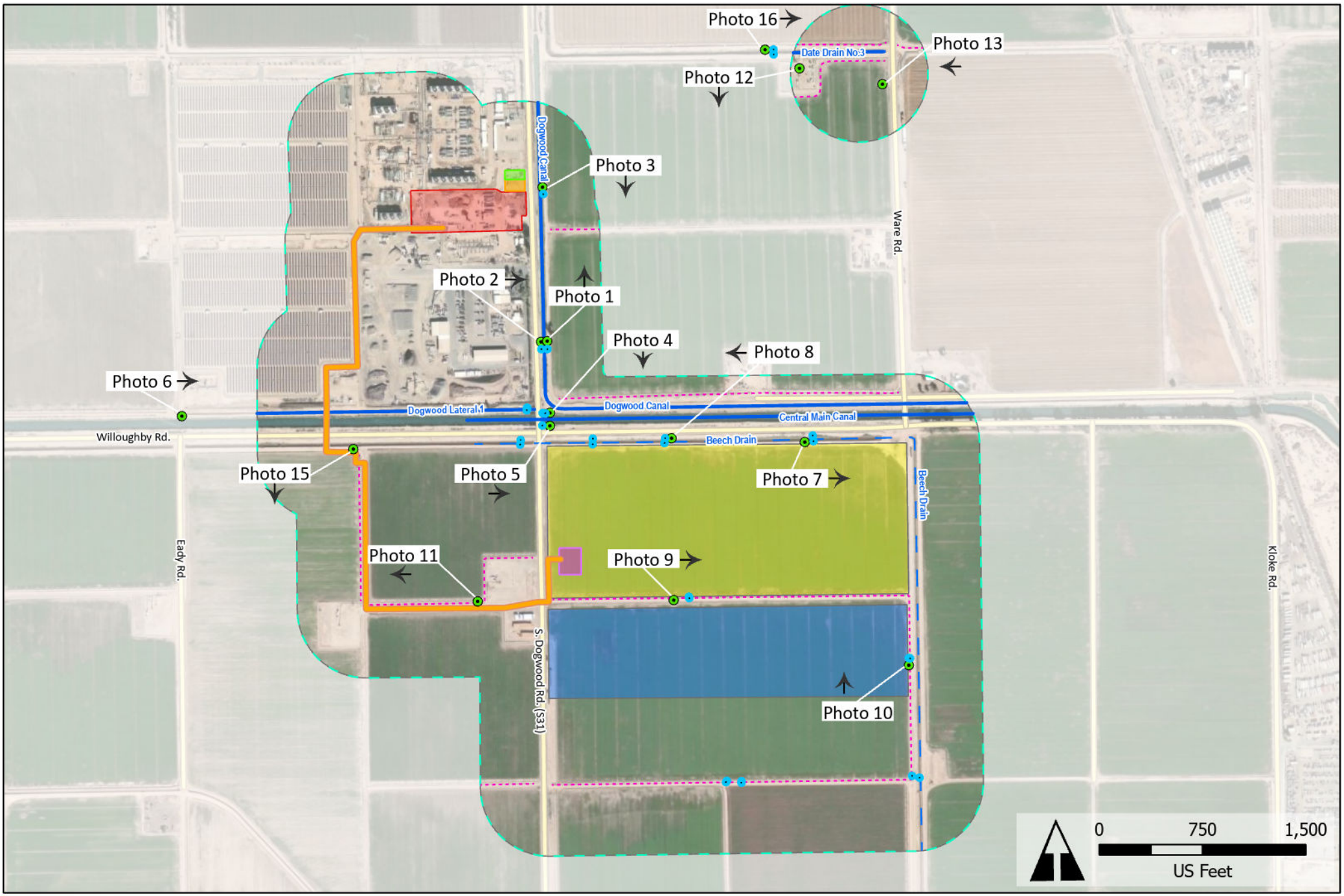
**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**No Floodplain**

# Appendix B Photo Log




Legend

- Photo Point
- Ordinary High Water Mark (OHWM) Field Points

Jurisdictional Resources

- Canal
- Drain

Non-jurisdictional Resources

- Ditches
- T-Line Connection to Dogwood
- Existing Heber Substation
- New Dogwood Substation
- XMR and Switch
- Dogwood Geothermal Plant
- Dogwood Parasitic Solar Energy Facilities
- Heber 2 Parasititc Solar Facilities

Viewing Direction

# PHOTO LOCATIONS AND VIEWING DIRECTION

Catalyst ENVIRONMENTAL SOLUTIONS

**Catalyst Environmental Solutions Photo Record for the Dogwood Geothermal Project Preliminary Wetlands and Waters Report**

**Client**: OrHeber2, LLC, a subsidiary of Ormat Nevada, Inc. (ORMAT)

| | |
|---|---|
|  | Photo 1: Dogwood Canal looking north |
|  | Photo 2: Dogwood Canal looking east toward agricultural field |

| | |
|---|---|
|  | Photo 3: Dogwood Canal and access road, looking south |
|   | Photo 4: CMC Canal looking south along Dogwood Rd. |

| | |
|---|---|
|  | Photo 5: CMC Canal looking east. |
|  | Photo 6: Dogwood Lateral 1, looking east. |

| | |
|---|---|
|  | Photo 7: Beech Drain looking northeast. Arrow weed thickets with occasional cattails and saltcedar densely vegetating the steep banks along some stretches of Beech Drain. |
|  | Photo 8: Beech Drain looking west. |

| | |
|---|---|
|  | Photo 9: Solar field canal looking east. |
|  | Photo 10: Solar field canal looking north. |

| | |
|---|---|
|  | Photo 11: Pipeline and existing canal west of proposed solar field and west of Dogwood Road, looking west. |
|  | Photo 12: Heber 1 Production Well at NE corner of survey area, looking south. Typical view of developed/disturbed landcover in the survey area. |

| | |
|---|---|
|  | Photo 13: NE corner of survey area, looking west towards Heber 1 Production Well. Typical view of flood-irrigated alfalfa fields in the survey area. |
|  | Photo 15: Concrete-lined v-ditch and existing pipeline, looking south. Proposed transmission line would be mounted to the green pipeline on the left side of the frame. |

Photo 16: Date Drain looking east.

# Appendix C NRCS Soils Information

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 Imperial County, California, Imperial Valley Area


March 1, 2023

# 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.

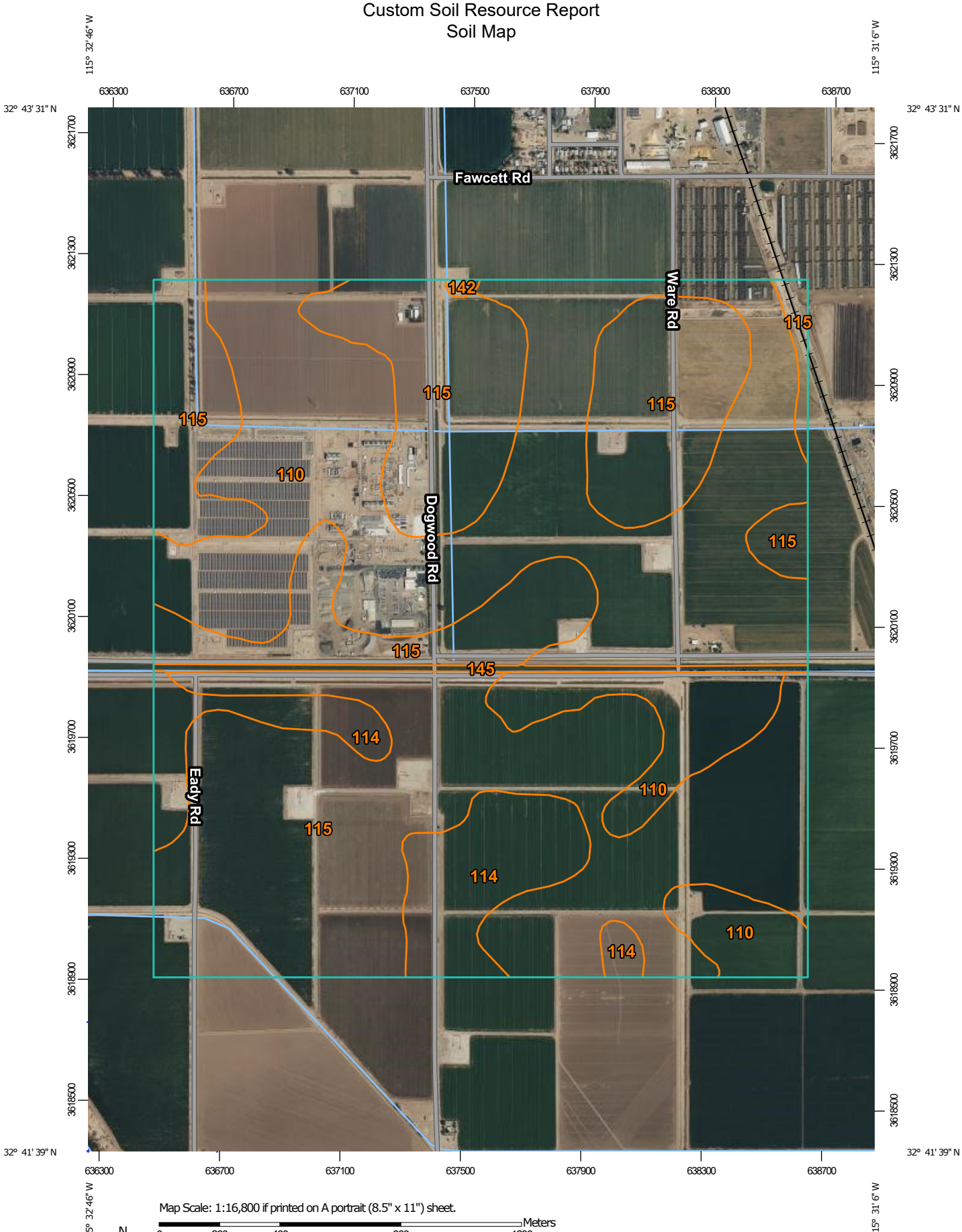
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.




Map Scale: 1:16,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N 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 1:24,000.

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: Imperial County, California, Imperial Valley Area
Survey Area Data: Version 14, Sep 1, 2022

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

Date(s) aerial images were photographed: Mar 17, 2021—May 22, 2021

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 |
|---|---|---|---|
| 110 | Holtville silty clay, wet | 453.5 | 36.5% |
| 114 | Imperial silty clay, wet | 98.2 | 7.9% |
| 115 | Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes | 678.4 | 54.6% |
| 142 | Vint loamy very fine sand, wet | 1.3 | 0.1% |
| 145 | Water | 12.0 | 1.0% |
| **Totals for Area of Interest** | | **1,243.4** | **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.

# Imperial County, California, Imperial Valley Area

## 110—Holtville silty clay, wet

### Map Unit Setting

*National map unit symbol:* h8zj
*Elevation:* -230 to 200 feet
*Mean annual precipitation:* 0 to 3 inches
*Mean annual air temperature:* 72 to 75 degrees F
*Frost-free period:* 300 to 350 days
*Farmland classification:* Prime farmland if irrigated and drained

### Map Unit Composition

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

### Description of Holtville, Wet

#### Setting

*Landform:* Basin floors
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed sources

#### Typical profile

*H1 - 0 to 17 inches:* silty clay
*H2 - 17 to 24 inches:* clay
*H3 - 24 to 35 inches:* silt loam
*H4 - 35 to 60 inches:* loamy very fine sand

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Low
*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
*Calcium carbonate, maximum content:* 5 percent
*Maximum salinity:* Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 10.0
*Available water supply, 0 to 60 inches:* Moderate (about 7.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2w
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* D
*Ecological site:* R040XD007CA - Lacustrine Basin and Large RIver Floodplain
*Hydric soil rating:* No

**Minor Components**

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

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

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

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

## 114—Imperial silty clay, wet

**Map Unit Setting**
*National map unit symbol:* h8zn
*Elevation:* -230 to 200 feet
*Mean annual precipitation:* 0 to 3 inches
*Mean annual air temperature:* 72 to 75 degrees F
*Frost-free period:* 300 to 350 days
*Farmland classification:* Farmland of statewide importance

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

**Description of Imperial, Wet**

**Setting**
*Landform:* Basin floors
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed

**Typical profile**
*H1 - 0 to 12 inches:* silty clay
*H2 - 12 to 60 inches:* silty clay loam

**Properties and qualities**
*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Maximum salinity:* Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 20.0
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

**Interpretive groups**
*Land capability classification (irrigated):* 3w
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* C
*Ecological site:* R040XD007CA - Lacustrine Basin and Large RIver Floodplain
*Hydric soil rating:* No

**Minor Components**

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

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

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

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

## 115—Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes

**Map Unit Setting**
*National map unit symbol:* h8zp
*Elevation:* -230 to 200 feet
*Mean annual precipitation:* 0 to 3 inches
*Mean annual air temperature:* 72 to 75 degrees F
*Frost-free period:* 300 to 350 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**
*Imperial, wet, and similar soils:* 41 percent
*Glenbar, wet, and similar soils:* 40 percent
*Minor components:* 19 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Imperial, Wet

#### Setting

*Landform:* Basin floors
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed

#### Typical profile

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

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Maximum salinity:* Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 20.0
*Available water supply, 0 to 60 inches:* Moderate (about 8.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 3w
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* C
*Ecological site:* R040XD007CA - Lacustrine Basin and Large RIver Floodplain
*Hydric soil rating:* No

### Description of Glenbar, Wet

#### Setting

*Landform:* Basin floors
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed

#### Typical profile

*H1 - 0 to 13 inches:* silty clay loam
*H2 - 13 to 60 inches:* clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches

*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Maximum salinity:* Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 15.0
*Available water supply, 0 to 60 inches:* High (about 10.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3w
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* C
*Ecological site:* R040XD007CA - Lacustrine Basin and Large RIver Floodplain
*Hydric soil rating:* No

**Minor Components**

**Meloland**

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

**Holtville**

*Percent of map unit:* 9 percent
*Hydric soil rating:* No

## 142—Vint loamy very fine sand, wet

**Map Unit Setting**

*National map unit symbol:* h90k
*Elevation:* -230 to 150 feet
*Mean annual precipitation:* 0 to 3 inches
*Mean annual air temperature:* 72 to 75 degrees F
*Frost-free period:* 300 to 350 days
*Farmland classification:* Prime farmland if irrigated and drained

**Map Unit Composition**

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

**Description of Vint, Wet**

**Setting**

*Landform:* Basin floors
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed and/or eolian deposits derived from mixed

**Typical profile**

*H1 - 0 to 10 inches:* loamy very fine sand
*H2 - 10 to 60 inches:* loamy fine sand

**Properties and qualities**

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Maximum salinity:* Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
*Available water supply, 0 to 60 inches:* Low (about 5.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2w
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* A
*Ecological site:* R040XD007CA - Lacustrine Basin and Large RIver Floodplain
*Hydric soil rating:* No

**Minor Components**

**Indio**

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

**Meloland**

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

## 145—Water

**Map Unit Composition**

*Water:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

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