DRAFT DELINEATION OF JURISDICTIONAL WATERS OF THE UNITED STATES

Notre Dame Blvd Bridge Over Little Chico Creek Project

Chico, Butte County, California

April 2021

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DRAFT DELINEATION OF JURISDICTIONAL WATERS OF THE UNITED STATES,

Notre Dame Blvd Bridge Over Little Chico Creek Project, Chico, Butte County, California

Introduction and Project Location

Gallaway Enterprises conducted a delineation of Waters of the United States (WOTUS) and aquatic resources for the approximately 3-acre Notre Dame Blvd Bridge Over Little Chico Creek Project (Project) located in between the two ends of Notre Dame Blvd within the city limits of Chico, Butte County, California (**Figure 1 and 2**). The Project site is located within the US Geological Survey (USGS) Chico Quadrangle within Section 30, Township 22N, Range 2E. The Project currently proposed on the site is the construction of a new bridge to connect the two ends of Notre Dame Blvd.

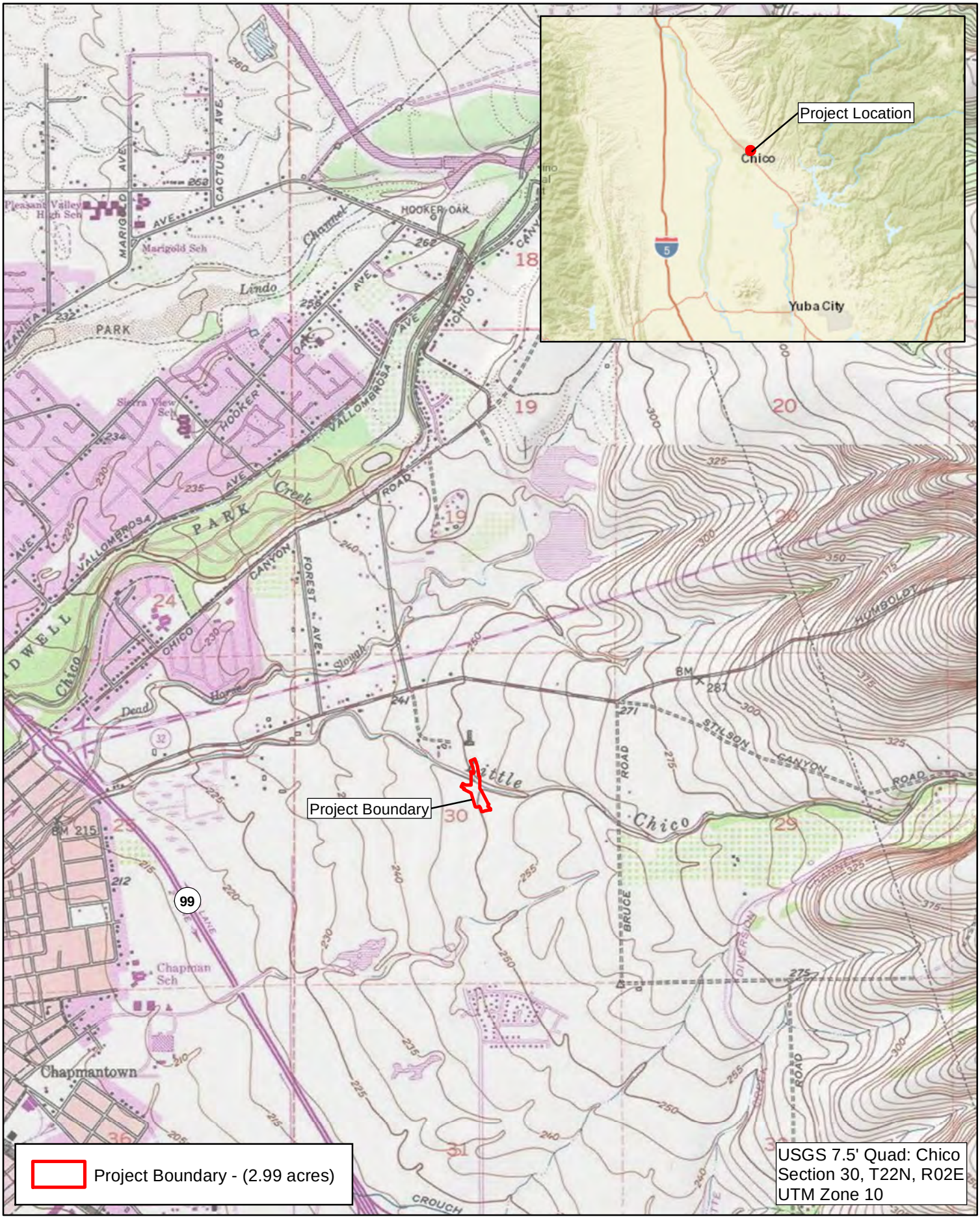
The Project site is accessible via Highway 99 by taking exit 383 for Park Avenue/Skyway Road, turning east onto Skyway Road and then turning left onto Notre Dame Blvd. Continue on Notre Dame Blvd for approximately 1.4 miles to where the road ends. The Project site starts where the road ends and continues on the north side of Little Chico Creek.

A survey of WOTUS was conducted on December 23, 2020 and April 14, 2021, by Senior Botanist Elena Gregg. Data regarding the location and extent of wetlands and other waters of the United States were collected using a Trimble Geo Explorer 6000 Series GPS Receiver. The survey involved an examination of botanical resources, soils, hydrological features, and determination of wetland characteristics based on the *United States Army Corps of Engineers Wetlands Delineation Manual* (1987) (1987 Delineation Manual); the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (2008) (Arid West Manual); the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (2007); the *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008), and the *State of California 2016 Wetland Plant List* and *2019 National Wetland Plant List updated information*; and the *Clean Water Act Final Rule, Federal Register Volume 85, No-77* (Final Rule), April 21, 2020. Gallaway Enterprises have prepared this report in compliance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (January 2016).

Environmental Setting and Site Conditions

The Project is located within Chico, California within the northeastern Central Valley. The Project site is composed primarily of disturbed annual grassland habitat. A small portion of a large wetland that continues offsite to the north occurs within the Project site. This wetland has been planned for removal as part of an adjacent project and mitigation for its removal has already been completed under permit number SPK-2005-01036. One creek, Little Chico Creek, flows east to west through the Project. A small strip of valley foothill riparian woodland occurs along the southern bank of this creek. Notre Dame Blvd and residential developments occur to the north and south of the Project site, a planned development occurs to the east of the Project site, and an elementary school occurs to the west of the Project site. A narrow paved bicycle path occurs within the Project site to the south of the creek. All of the annual grassland habitat present along the bicycle path and south of the bicycle path was mowed prior to the December field visit and is likely regularly mowed for fire prevention.

The average annual precipitation is 25.66 inches and the average annual temperature is 61.0° F (WRCC 2021) in the region where the Project is located. The Project site occurs at an average elevation of 247



1:24,000
0 0.25 0.5 Miles
NORTH

Data Sources: ESRI, Butte County, USGS

Notre Dame Bridge over Little Chico Creek Project
Regional Location
Figure 1

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GE: #20-120 Map Date: 03/12/2021

NORTH

1:1,200

0 50 100 Feet

Data Sources: ESRI, Butte County, Maxar 8/06/2019

Notre Dame Bridge over Little Chico Creek Project
Project Location
Figure 2

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GE: #20-120 Map Date: 03/12/2021

feet above sea level and is generally sloped between 0-2 percent. Soils within the survey area are loams or gravelly loams with a restrictive layer ranging from 4 to more than 80 inches deep.

Survey Methodology

The entire Project site was surveyed on-foot by Gallaway Enterprises staff on December 23, 2020 and April 14, 2021 to identify any potentially jurisdictional features. The survey, mapping efforts, and report production were performed according to the current valid legal definitions of WOTUS that became effect starting June 22, 2020. The boundaries of non-tidal, non-wetland waters, when present, were delineated at the ordinary high water mark (OHWM) as defined in 33 Code of Federal Regulations (CFR) 328.3. The OHWM represents the limit of United States Army Corps of Engineers (Corps) jurisdiction over non-tidal waters (e.g., streams and ponds) in the absence of adjacent wetlands (33 CFR 328.04) (Curtis, et. al. 2011). Historic aerial photographs available on Google Earth were analyzed prior to conducting the field visit. Areas identified as having potential wetland or unusual aerial signatures were assessed in the field to determine the current conditions.

Field data were entered onto data forms using the most current format (**Appendix A**). Wetland perimeters based on the 1987 Delineation Manual and the Arid West Manual were recorded and defined according to their topographic and hydrologic orientation. Sample points were established for each wetland and corresponding upland zone for all wetland features identified. At each sampling point data collected involved physical sampling of soils and vegetation, and investigation regarding hydrological connectivity. Only areas exhibiting the necessary wetland parameters according to the 1987 Delineation Manual and Arid West Manual on the date surveyed were mapped as wetlands. Photographs were taken to show the current site conditions. The locations of the photo points are depicted in **Figure 3** and the associated photographs are provided at the end of the report.

Many of the terms used throughout this report have specific meanings relating to the federal wetland delineation process. Term definitions are based on the Corps 1987 Delineation Manual; the Arid West Manual; *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, (*Lichvar and McColley 2008*)* and the Final Rule. The terms defined below have specific meaning relating to the delineation of WOTUS as prescribed by §404 of the Clean Water Act (CWA) and described in 33 CFR Part 328 and 40 CFR Parts 110, 112, and 116, and 122.

Determination of Hydrophytic Vegetation

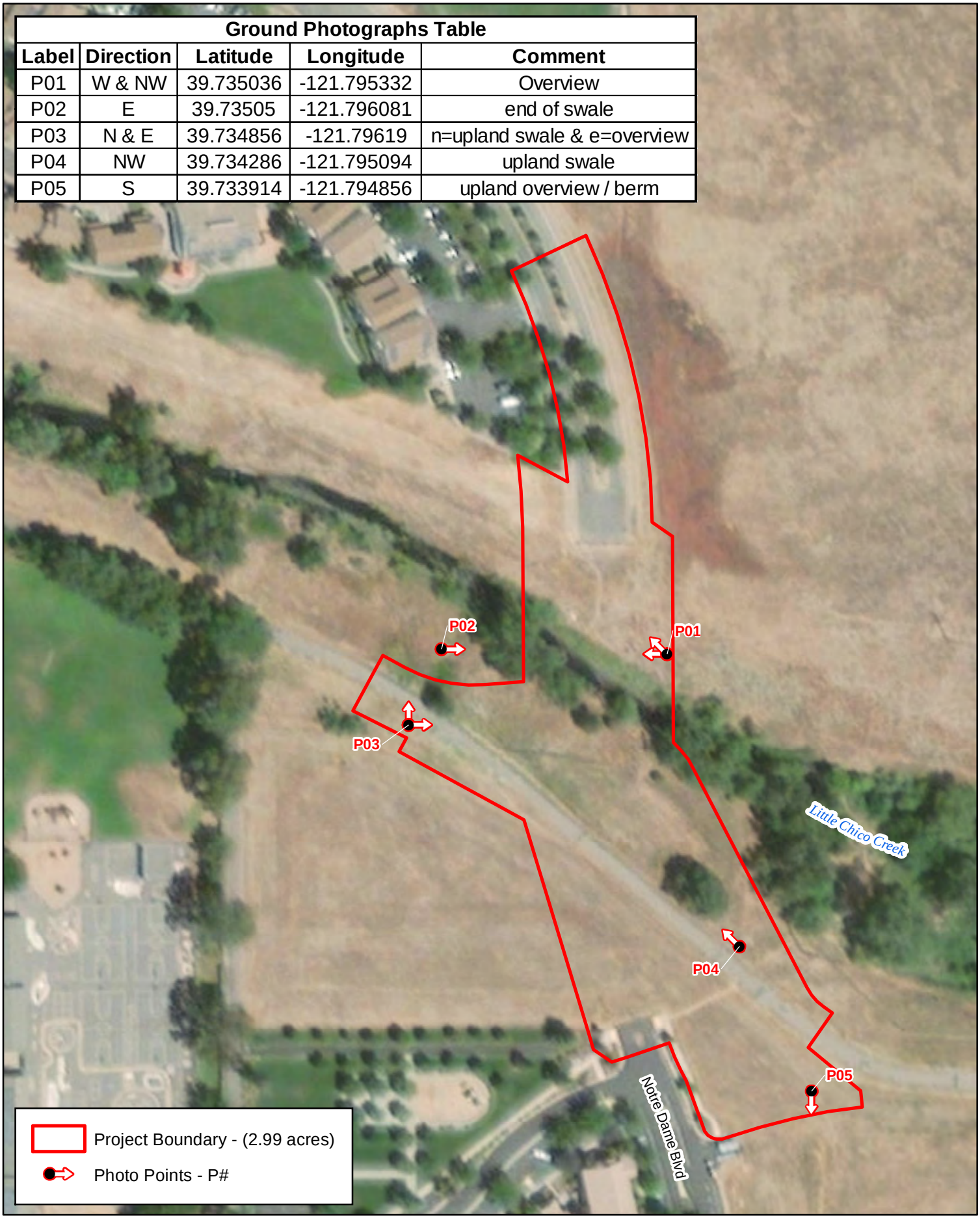
The presence of hydrophytic vegetation was determined using the methods outlined in the 1987 Delineation Manual and the Arid West Manual. Areas were considered to have positive indicators of hydrophytic vegetation if they pass the dominance test, meaning more than 50 percent of the dominant species are obligate wetland, facultative wetland and facultative plants. Plant species were identified to the lowest taxonomy possible. Plant indicator status was determined by reviewing the State of California 2016 Wetland Plant List for the Arid West Region and the National Wetland Plant List 2019 updated information. In situations where dominance can be misleading due to seasonality, the prevalence index will be used to determine hydrophytic status of the community surrounding sample sites.

Plant indicator status categories:

Obligate wetland plants (OBL) – plants that occur almost always (estimated probability 99%) in wetlands under normal conditions, but which may also occur rarely (estimated probability 1%) in non-wetlands.

Facultative wetland plants (FACW) - plants that usually occur (estimated probability 67% to 99%) in wetlands under normal conditions, but also occur (estimated probability 1% to 33%) in non-wetlands.

Ground Photographs Table				
Label	Direction	Latitude	Longitude	Comment
P01	W & NW	39.735036	-121.795332	Overview
P02	E	39.73505	-121.796081	end of swale
P03	N & E	39.734856	-121.79619	n=upland swale & e=overview
P04	NW	39.734286	-121.795094	upland swale
P05	S	39.733914	-121.794856	upland overview / berm



NORTH

1:1,400

0 50 100 Feet

Data Sources: ESRI, Butte County, Maxar 8/06/2019

Notre Dame Bridge over Little Chico Creek Project
Ground Photographs Map
Figure 3

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GE: #20-120 Map Date: 03/12/2021

Facultative plants (FAC) – Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.

Facultative upland plants (FACU) – Plants that occur sometimes (estimated probability1% to 33%) in wetlands, but occur more often (estimated probability 67% to 99%) in non-wetlands.

Obligate upland plants (UPL) – Plants that occur rarely (estimated probability 1%) in wetlands, but occur almost always (estimated probability 99%) in non-wetlands under natural conditions.

Determination of Hydric Soils

Soil survey information was reviewed for the current site condition. Information regarding local soil and series descriptions is provided in **Appendix B.** The current Natural Resources Conservation Service (NRCS) *Field Indicators of Hydric Soils in the United States, Version 8.2* (NRCS 2018) was used in conjunction with the Arid West Manual to determine the presence of hydric soil indicators.

Determination of Wetland Hydrology

Wetland hydrology was determined to be present if a site supported one or more of the following characteristics:

- Landscape position and surface topography (e.g. position of the site relative to an up-slope water source, location within a distinct wetland drainage pattern, and concave surface topography),
- Inundation or saturation for a long duration either inferred based on field indicators or observed during repeated site visits, and
- Residual evidence of ponding or flooding resulting in field indicators such as scour marks, sediment deposits, algal matting, surface soil cracks and drift lines.

The presence of water or saturated soil for approximately 12% or 14 consecutive days during the growing season typically creates anaerobic conditions in the soil, and these conditions affect the types of plants that can grow and the types of soils that develop (Wetland Training Institute 1995).

Historic aerial photographs were analyzed to look for primary and secondary wetland hydrology indicators of inundation or saturation. The historic aerial imagery reviewed was the public, readily available imagery provided on Google Earth. If aerial signatures demonstrated the presence of surface water on 5 or more of the historic aerial photographs viewed, inundation and a primary indicator of wetland hydrology was determined to be present. Saturation, a secondary indicator of wetland hydrology, was determined to be present if saturation, "darker patches within the field," were observed on 5 or more of the 9 historic aerial photographs viewed.

Determination of Ordinary High Water Mark

Gallaway utilized methods consistent with the Arid West Manual, the *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008), and the *Ordinary High Water Mark Identification RGL 05-05 (2005)* (RGL 05-05) to determine the OHWM. The lateral extents of non-tidal water bodies (e.g. intermittent and ephemeral streams) were based on the OHWM, which is "the line on the shore established by the fluctuations of water" (Corps 2005). The OHWM was determined based on multiple observed physical characteristics of the area, which can include scour, multiple observed flow events (from current and historical aerial photos), shelving, drift, exposed root hairs, changes in substrate/particle size, presence of mature vegetation, deposition, and topography. If any other physical indicators as described in the Arid West OHWM Field

Guide or RGL 05-05 are observed, these indicators are also utilized to help determine the location of the OHWM.

Representative OHWM widths measured in the field are shown as a transect line and measured in feet as required by the Corps *Final Map and Drawing Standards for the South Pacific Division Regulatory Program (2012)*. The transect line is used to ensure that the other waters of the United States identified within the Project site are mapped and calculated at the appropriate average width for each channel segment based on the Corps definition of OHWM as defined in the Arid West OHWM Field Guide and the *Ordinary High Water Mark Identification RGL 05-05 (2005)* (RGL 05-05). Field data gathered along the OHWM of Little Chico Creek within the Project boundary was entered onto Arid West OHWM Datasheets (Curtis and Lichvar 2010), which are provided as **Appendix C**. Along the portion of the banks surveyed, Gallaway used multiple observed physical indicators in determining the position of the OHWM. Benches, drift, exposed root hairs, sediment deposition, and changes in vegetation were observed in the Project site as specified in **Appendix C**.

Jurisdictional Boundary Determination and Acreage Calculation

The wetland-upland boundary was determined based on the presence or inference of positive indicators of all mandatory criteria. Soil samples were taken within wetland and upland areas. The site was traversed on foot to identify wetland features and boundaries. The spatial data obtained during the preparation of this wetland delineation was collected using a Trimble Geo Explorer 6000 Series GPS Receiver. No readings were taken with fewer than 5 satellites. Point data locations were recorded for at least 25 seconds at a rate of 1 position per second. Area and line data were recorded at a rate of 1 position per second. All GPS data were differentially corrected for maximum accuracy. In some cases, when visual errors and degrees of precision are identified due to environmental factors negatively influencing the precision of the GPS instrument (i.e. dense tree cover, steep topography, and other factors affecting satellite connection) mapping procedures utilized available topographic and aerial imagery datasets in order to improve accuracy in feature alignment and location.

Non-Wetland Boundary Determination

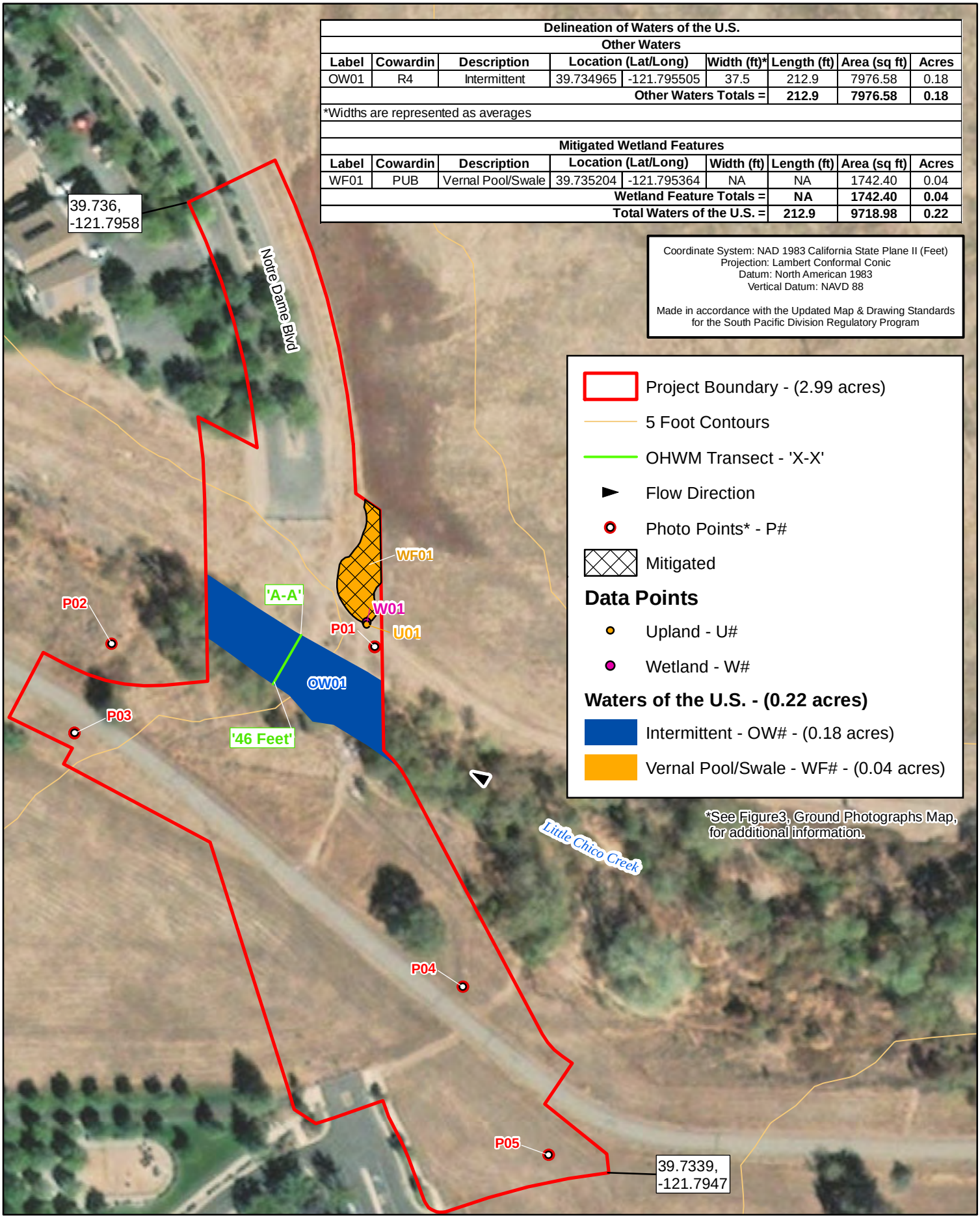
Areas were determined to be non-wetlands if they did not meet the necessary wetland test parameters (hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4).

Although some riparian vegetation is present, no riparian wetlands occur along the top of the banks of Little Chico Creek within the Project site due to the steep nature of the banks.

During the aerial photography review of the Project site conducted prior to the field visit, two areas were identified that exhibited potential swale-like aerial signatures. One is located in the western portion of the Project site immediately south of the creek (see photographs associated with P02 and P03 on **Figure 3**) and the other is located in the eastern portion of the Project immediately south of the creek (see the photograph associated with P04 on **Figure 3**). However, based on what was observed at these locations during the field visit these areas did not have any wetland hydrology indicators and did not meet the hydric vegetation requirements necessary to be considered a wetland. As such, these areas were determined to be non-wetlands.

Results

Table 1 summarizes the area calculations for the pre-jurisdictional features within the Project boundary. A complete Draft Delineation of Waters of the US map, utilizing a 1" to 100' scale, is included as **Figure 4**.



Delineation of Waters of the U.S.								
Other Waters								
Label	**Cowardin**	**Description**	**Location (Lat/Long)**		**Width (ft)***	**Length (ft)**	**Area (sq ft)**	**Acres**
OW01	R4	Intermittent	39.734965	-121.795505	37.5	212.9	7976.58	0.18
				Other Waters Totals =		**212.9**	**7976.58**	**0.18**
*Widths are represented as averages								
Mitigated Wetland Features								
Label	**Cowardin**	**Description**	**Location (Lat/Long)**		**Width (ft)**	**Length (ft)**	**Area (sq ft)**	**Acres**
WF01	PUB	Vernal Pool/Swale	39.735204	-121.795364	NA	NA	1742.40	0.04
				Wetland Feature Totals =		**NA**	**1742.40**	**0.04**
				Total Waters of the U.S. =		**212.9**	**9718.98**	**0.22**

Coordinate System: NAD 1983 California State Plane II (Feet)
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD 88

Made in accordance with the Updated Map & Drawing Standards for the South Pacific Division Regulatory Program

NORTH

1:1,200 1 inch = 100 feet

0 50 100 Feet

Data Sources: ESRI, Butte County, Maxar 8/06/2019,

Notre Dame Bridge over Little Chico Creek Project
Delineation of Waters of the U.S.

Delineation by: E. Gregg
Map by: T. Morgan

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GE: #20-120 Map Date: 04/19/2021

Table 1. Results from the Delineation of Waters of the United States for the Notre Dame Blvd Bridge Over Little Chico Creek Project, Chico, CA.

Other Waters						
Label	**Cowardin**	**Description**	**Width (ft)**	**Length (ft)**	**Area (sq ft)**	**Acres**
OW01	R4	Intermittent	37.5	212.9	7976.58	0.18
			Other Waters Totals =	**212.9**	**7976.58**	**0.18**
Mitigated Wetland Features						
Label	**Cowardin**	**Description**	**Width (ft)**	**Length (ft)**	**Area (sq ft)**	**Acres**
WF01	PUB	Vernal Pool/Swale	NA	NA	1742.40	0.04
			Wetland Feature Totals =	**NA**	**1742.40**	**0.04**
			Total Waters of the U.S. =	**212.9**	**9718.98**	**0.22**

Waters of the United States: Tributaries

There is one feature that is identified as a Tributary (Tributary) to a Traditional Navigable Water (TNW) per the Final Rule within the Project (**Figure 4**). Tributaries are intermittent or perennial water bodies in a typical year, including lakes, stream channels, and other similar surface water features that exhibit an ordinary high-water mark, but lack positive indicators for one or more of the three wetland parameters (hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4). The boundaries of all Tributaries identified within the Project site were delineated based on the observed OHWM, including physical characteristics such as natural lines impressed on the bank, shelving, changes in the character of the soil, the destruction of terrestrial vegetation, debris lines and other appropriate indicators.

The Tributary identified within the Project is Little Chico Creek (OW01). This Tributary is an intermittent drainage features that typically flow for more than 3 months of the year and has a documented hydrologic connection to a TNW. Flowing water was observed within Little Chico Creek during the December 2020 and April 2021 site visits. The Tributary feature identified within the Project site contained appropriate morphology of bed, bank and scour. See **Appendix C** for the Arid West OHWM Datasheets detailing the OHWM indicators observed for the Tributary.

Waters of the United States: Adjacent Waters

A portion of an already mitigated wetland feature occurs within the Project site (WF01) which is characterized as a vernal pool/swale (**Figure 4**). This feature has been characterized as a vernal pool/swale since the central portion of this feature that occurs outside the Project site functions as a pool but the portion of this wetland within the Project site functions more as a swale. Vernal pools are depressional features that stay ponded or saturated into late spring and are dominated by vernal pool endemic species. Swales are depressional features that function as low drainage pathways that typically help feed other wetland or drainage features. The wetland identified within the Project site exhibited all necessary wetland parameters (**Appendix A**).

Photo points were taken throughout the site to show current site conditions (**Figure 3**).

Soils

Field observations of soil characteristics included soil color, texture, structure, and the visual assessment of soil features (e.g. the presence, or absence of redoximorphic features and the depth of restrictive

layers such as hardpans). Soil texture evaluations conducted within the Project site rendered predominately gravelly loams. The geographic region in which the Project site is found is often characterized as having a naturally undulating restrictive layer found at a depth ranging from 4 to more than 80 inches. Field observations of soil characteristics at the sample points are included in the data sheet forms presented in **Appendix A**.

Gallaway queried the National Cooperative Soil Survey database to further evaluate the current soil conditions. Two soil map units occur within the Project site. The identified map units are listed below in **Table 2**. Based on Gallaway's review, only one of the soil map units identified within the Project site contains a minor amount of hydric components (8%) which are typically found within fan terraces. A copy of the soil survey map and a description of mapped soil units for the Project site are included as **Appendix B**.

Table 2. Soil Map Units, NRCS hydric soil designation, and approximate totals for the Notre Dame Blvd Bridge Over Little Chico Creek Project, Chico, CA.

Map Unit Symbol	Map Unit Name	% Hydric Component in Map Unit	Landform of Hydric Component	% Map Unit in Survey Area
302	Redtough-Redswale, 0 to 2 percent slopes	8	Fan terraces	26.1%
418	Almendra loam, 0 to 1 percent slopes	N/A	N/A	73.9%

Vegetation

The vegetated portions of the Project site were dominated by disturbed annual grassland habitat outside of the banks of the creek. The one wetland located in the annual grassland portion of the Project site was dominated by perennial ryegrass (*Festuca perennis*) (FAC), Mediterranean barley (*Hordeum marinum ssp. gussoneanum*) (FAC), popcorn flower (*Plagiobothrys stipitatus*) (FACW), goldfields (*Lasthenia fremontii*) (OBL), and common knotweed (*Polygonum aviculare*) (FAC). Valley foothill riparian vegetation occurs along the southern creek bank and within the OHWM of the creek, and riverine habitat occurs within the streambed. The dominant species present in the upland annual grassland habitat included soft chess (*Bromus hordeaceus*) (FACU), filaree (*Erodium botrys*) (FACU), perennial ryegrass, wild oats (*Avena spp.*) (UPL), yellow star-thistle (*Centaurea solstitialis*) (UPL) and medusahead (*Elymus caput-medusae*) (UPL). The dominant species present in the valley foothill riparian habitat included a tree canopy of valley oak (*Quercus lobata*) (FACU) and California sycamores (*Platanus racemosa*) (FAC), a sparse shrub canopy of mule's fat (*Baccharis salicifolia*) (FAC) and a few willows (*Salix* sp.) and an understory of Himalayan blackberry (*Rubus armeniacus*) (FAC), perennial ryegrass, rabbit's foot grass (*Polypogon monspeliensis*) (FACW) and cocklebur (*Xanthium strumarium*) (FAC). The streambed was largely void of vegetation and was dominated by a cobble substrate.

Hydrology

Precipitation and runoff are the main hydrological inputs for the WOTUS within the Project site. A portion of Little Chico Creek, OW01, occurs within the Project site and one wetland, WF01, occurs

adjacent to the creek. Little Chico Creek is a tributary of Angel Slough, which is a tributary of Butte Creek, which in turn is a tributary of the Sacramento River, a TNW. Water was observed flowing within Little Chico Creek during the field visits.

Site Photos – Taken December 23, 2020

P01 – Overview of OW01 looking west

P01 – Overview of upland looking northwest

P02 – End of a wetland swale (located just outside the Project boundary) and start of the upland swale looking east

P03 – Upland swale looking north

P03 – Overview of upland looking east

P05 – Overview of upland and berm looking south

P04 – Upland swale looking northwest

Glossary

Abutting: When referring to wetlands that are adjacent to a tributary, abutting defines those wetlands that are not separated from the tributary by an upland feature, such as a berm or dike.

Adjacent: Adjacent wetlands are defined in Corps and EPA regulations as wetlands that abut, or touch at least at one point or side, a tributary or other jurisdictional feature. Wetlands separated from other waters of the U.S. by man-made/artificial dikes or barriers, natural river berms, beach dunes and the like are 'adjacent wetlands' so long as the artificial structure allows for a direct hydrologic surface connection. The entirety of wetlands are considered adjacent if the wetland has a road or similar artificial structure dividing it as long as the road/structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

The regulations define "adjacent wetlands" as wetlands that meet at least one of following criteria:

(1) There is an unbroken surface hydrologic connection between the wetland and jurisdictional waters;
(2) The wetland is inundated by flooding from a jurisdictional sea, tributary or lake/pond;
(3) The wetlands are physically separated from jurisdictional sea, tributary or lake/pond only by a natural berm, bank, dune, or similar natural feature; or
(4) The wetlands are physically separated from jurisdictional sea, tributary or lake/pond only by an artificial dike, barrier or similar artificial structure and the artificial structure allows for a direct connection between the wetland and jurisdictional water in a typical year.

The agencies will also continue to assert jurisdiction over wetlands "adjacent" to traditional navigable waters as defined in the agencies' regulations. The Rapanos decision does not affect the scope of jurisdiction over wetlands that are adjacent to traditional navigable waters. The agencies will assert jurisdiction over those adjacent wetlands that have a continuous surface connection with a relatively permanent, non-navigable tributary, without the legal obligation to make a significant nexus finding.

Atypical situation (significantly disturbed): In an atypical (significantly disturbed) situation, recent human activities or natural events have created conditions where positive indicators for hydrophytic vegetation, hydric soil, or wetland hydrology are not present or observable.

Channel. "An open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960:5).

Channel bank. The sloping land bordering a channel. The bank has steeper slope than the bottom of the channel and is usually steeper than the land surrounding the channel.

Cobbles. Rock fragments 7.6 cm (3 inches) to 25 .4 cm (10 inches) in diameter.

Debris flow. A moving mass of rock fragments, soil, and mud where more than 50% of the particles are larger than sand-sized.

Ditch. A constructed or excavated channel used to convey water.

Drift. Organic debris oriented to flow direction(s) (larger than small twigs).

Ephemeral stream. An ephemeral stream has flowing water only in direct response to precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Facultative wetland (FACW). Wetland indicator category; species usually occurs in wetlands (estimated probability 67–99%) but occasionally found in non-wetlands.

Flat. A level landform composed of unconsolidated sediments usually mud or sand. Flats may be irregularly shaped or elongate and continuous with the shore, whereas bars are generally elongate, parallel to the shore, and separated from the shore by water.

Gravel. A mixture composed primarily of rock fragments 2mm (0 .08 inch) to 7.6 cm (3 inches) in diameter. Usually contains much sand.

Growing season The frost-free period of the year (see U.S. Department of Interior, National Atlas 1970:110-111 for generalized regional delineation).

Herbaceous. With the characteristics of an herb; a plant with no persistent woody stem above ground.

Hydric soil. Soil is hydric that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-depleted) conditions in its upper part (i.e., within the shallow rooting zone of herbaceous plants).

Hydrophyte, **hydrophytic.** Any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Intermittent stream. An intermittent stream has flowing water during certain times of the year and more than in direct response from precipitation, when elevated groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water.

Jurisdictional Waters. Features that meet the definition of waters of the Unites States provided below and that fall under Corps regulations pursuant to Section 404 of the CWA are considered jurisdictional features. These include territorial seas; tributaries; lakes and ponds and impoundments of jurisdictional waters; and adjacent wetlands.

Litter. Organic debris oriented to flow direction(s) (small twigs and leaves).

Man-induced wetlands. A man-induced wetland is an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities.

Normal circumstances. This term refers to the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed.

Obligate hydrophytes. Species that are found only in wetlands e.g., cattail (*Typha latifolia*) as opposed to ubiquitous species that grow either in wetland or on upland-e .g., red maple (*Acer rubrum*).

Obligate wetland (OBL). Wetland indicator category; species occurs almost always (estimated probability 99%) under natural conditions in wetlands.

Palustrine the Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 parts per thousand. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 m (6.6 feet) at low water; and (4) salinity due to ocean-derived salts is less than 0.5 parts per thousand.

Perennial stream. A perennial stream has flowing water year-round during atypical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Ponded. Ponding is a condition in which free water covers the soil surface (e.g., in a closed depression) and is removed only by percolation, evaporation, or transpiration.
Problem area. Problem areas are those where one or more wetland parameters may be lacking because of normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events**.**

Scour. Soil and debris movement.

Sheetflow. Overland flow occurring in a continuous sheet; a relatively high-frequency, low-magnitude event.

Shrub. A woody plant which at maturity is usually less than 6 m(20 feet) tall and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance ; e.g., speckled alder (*Alnus rugosa*) or buttonbush (*Cephalanthus occidentalis*).

Succession. Changes in the composition or structure of an ecological community.

Traditional Navigable Waters (TNWs)."[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." These waters are referred to in this guidance as traditional navigable waters. The traditional navigable waters include all of the "navigable waters of the United States," as defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact (for example, the Great Salt Lake, UT, and Lake Minnetonka, MN). Thus, the traditional navigable waters include, but are not limited to, the "navigable waters of the United States" within the meaning of Section 10 of the Rivers and Harbors Act of 1899 (also known as "Section 10 waters").

Tree. A woody plant which at maturity is usually 6 m (20 feet) or more in height and generally has a single trunk, unbranched for 1 m or more above the ground, and a more or less definite crown; e.g., red maple (*Acer rubrum*), northern white cedar (*Thuja occidentalis*).

Tributary. Tributaries are defined by regulation as a "river, stream or similar naturally occurring surface water channel that contributes surface water flow to a [jurisdictional water] in a typical year either directly or through one or more [jurisdictional water]. A tributary must be perennial or intermittent in a typical year." Tributaries include natural perennial or intermittent drainages that have been realigned or relocated.

Typical Year. Defined by the EPA and Corps as meaning when precipitation and other climactic variables are within the normal periodic range for the geographic area based on a rolling thirty-year period.

Water table. The upper surface of a zone of saturation. No water table exists where that surface is formed by an impermeable body.

Waters of the United States (WOTUS). This is the encompassing term for areas under federal jurisdiction pursuant to Section 404 of the CWA. Waters of the United States are divided into "adjacent wetlands" and "tributaries".

Watershed (drainage basin). An area of land that drains to a single outlet and is separated from other watersheds by a divide.

Wetland. Wetlands are defined as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 [b], 40 CFR

230.3). To be considered under potential federal jurisdiction, a wetland must support positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology.

Woody plant. A seed plant (gymnosperm or angiosperm) that develops persistent, hard, fibrous tissues, basically xylem; e.g., trees and shrubs.

Xeric. Relating or adapted to an extremely dry habitat.

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Appendix A: Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Notre Dame Blvd Bridge Over Little Chico Crk | City/County: Chico | Sampling Date: 4-14-21

Applicant/Owner: MPH CO, LLC | State: CA | Sampling Point: W01

Investigator(s): E. Gregg | Section, Township, Range: Section 30, Township 22N, Range 2E

Landform (hillslope, terrace, etc.): fan terrace | Local relief (concave, convex, none): slightly concave | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: 39.73509 | Long: -121.795353 | Datum: NAD 83

Soil Map Unit Name: Redtough-Redswale, 0 to 2 percent slopes | NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks: Low rainfall totals, but otherwise normal conditions. Area is minutely swale-like at the edge of a larger deep wetland.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Festuca perennis*	70	Yes	FAC
2. *Hordeum marinum ssp. gussoneanum*	10	No	FAC
3. *Plagiobothrys stipitatus*	5	No	FACW
4. *Bromus hordeaceus*	5	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	90 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 10 % | % Cover of Biotic Crust 15 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	5	x 2 =	10
FAC species	80	x 3 =	240
FACU species	5	x 4 =	20
UPL species		x 5 =	0
Column Totals:	90 (A)		270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: W01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/2	85	2.5YR 4/6	15	C	PL	cobbly loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. CS=Covered or Coated Sand Grains

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils: [3]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic

Restrictive Layer (if present):

Type: cobble

Depth (inches): 8

Hydric Soil Present? Yes ◉ No ○

Remarks: soil pit dug deep enough to determine the presence/absence of hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☒ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Notre Dame Blvd Bridge Over Little Chico Crk City/County: Chico Sampling Date: 4-14-21

Applicant/Owner: MPH CO, LLC State: CA Sampling Point: U01

Investigator(s): E. Gregg Section, Township, Range: Section 30, Township 22N, Range 2E

Landform (hillslope, terrace, etc.): fan terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): C - Mediterranean California Lat: 39.735086 Long: -121.795353 Datum: NAD 83

Soil Map Unit Name: Redtough-Redswale, 0 to 2 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks: Low rainfall totals, but otherwise normal conditions. Area is relatively flat and the soil has been compact due to historic use for vehicle access.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Bromus hordeaceus*	40	Yes	FACU
2. *Festuca perennis*	20	Yes	FAC
3. *Erodium brachycarpum*	20	Yes	Not Listed
4. *Lactuca serriola*	10	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	90 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 10 % % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	20	x 3 =	60
FACU species	50	x 4 =	200
UPL species	20	x 5 =	100
Column Totals:	90 (A)		360 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: U01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	97	2.5YR 4/6	3	C	PL	cobbly loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. CS=Covered or Coated Sand Grains

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils: [3]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present. unless distributed or problematic

Restrictive Layer (if present):

Type: compact soil/cobble

Depth (inches): 6

Hydric Soil Present? Yes ○ No ◉

Remarks: soil pit dug deep enough to determine the presence/absence of hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed.

Appendix B: NRCS Soils Map and Soil Series Descriptions

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 Butte Area, California, Parts of Butte and Plumas Counties

April 19, 2021

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

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

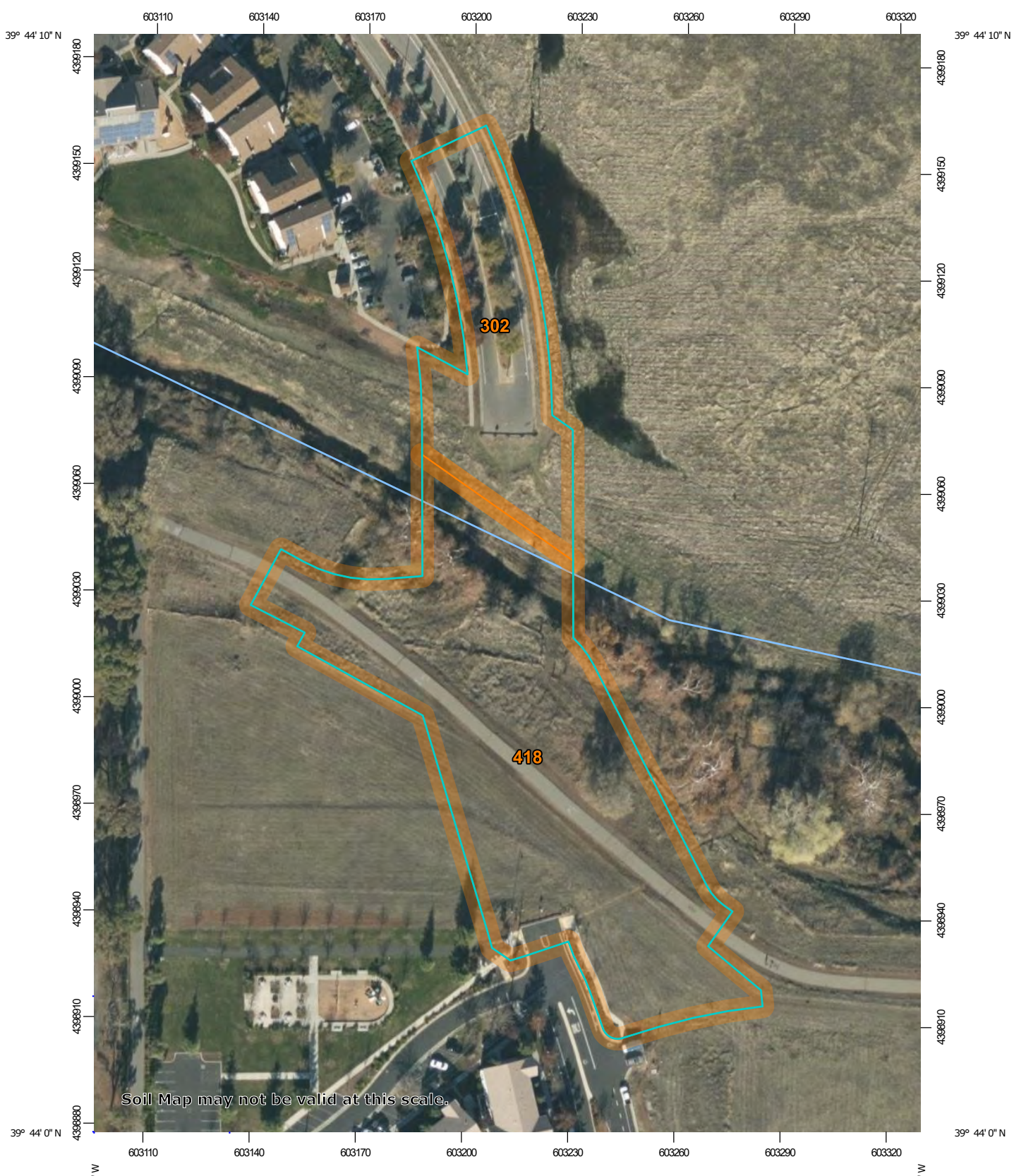
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,510 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Butte Area, California, Parts of Butte and Plumas Counties
Survey Area Data: Version 17, Jun 1, 2020

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

Date(s) aerial images were photographed: Dec 6, 2018—Dec 12, 2018

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

MAP LEGEND

MAP INFORMATION

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
302	Redtough-Redswale , 0 to 2 percent slopes	0.8	26.1%
418	Almendra loam, 0 to 1 percent slopes	2.2	73.9%
Totals for Area of Interest		**3.0**	**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.

Butte Area, California, Parts of Butte and Plumas Counties

302—Redtough-Redswale , 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hh0v
Elevation: 200 to 400 feet
Mean annual precipitation: 23 to 28 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 255 days
Farmland classification: Not prime farmland

Map Unit Composition

Redtough, loam, and similar soils: 50 percent
Redswale, cobbly loam, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Redtough, Loam

Setting

Landform: Fan terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Microfeatures of landform position: Mounds
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy alluvium over cemented cobbly and gravelly alluvium derived from volcanic rock

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 7 inches: gravelly loam
Bt2 - 7 to 13 inches: very cobbly loam
Bqm - 13 to 23 inches: cemented very gravelly material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 20 inches to duripan
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 2 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Redswale, Cobbly Loam

Setting

Landform: Fan terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Microfeatures of landform position: Swales
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Cobbly and loamy alluvium over cemented cobbly and gravelly alluvium derived from volcanic rock

Typical profile

A - 0 to 1 inches: cobbly loam
Bt - 1 to 7 inches: very cobbly loam
Bqm - 7 to 17 inches: cemented very gravelly material

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 4 to 10 inches to duripan
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Unnamed, frequent long ponding

Percent of map unit: 3 percent
Landform: Fan terraces
Microfeatures of landform position: Vernal pools
Hydric soil rating: Yes

Redswale, frequent long flooding

Percent of map unit: 3 percent
Landform: Fan terraces
Microfeatures of landform position: Swales
Hydric soil rating: Yes

Anita, gravelly duripan

Percent of map unit: 2 percent
Landform: Fan terraces
Microfeatures of landform position: Swales
Hydric soil rating: Yes

Tuscan

Percent of map unit: 2 percent
Landform: Fan terraces
Microfeatures of landform position: Mounds
Hydric soil rating: No

Munjar

Percent of map unit: 2 percent
Landform: Fan terraces
Microfeatures of landform position: Mounds
Hydric soil rating: No

Abruptic durixeralfs

Percent of map unit: 2 percent
Landform: Fan terraces
Microfeatures of landform position: Mounds
Hydric soil rating: No

Unnamed, riser slopes

Percent of map unit: 1 percent
Landform: Fan terraces
Hydric soil rating: No

418—Almendra loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hgwr
Elevation: 110 to 230 feet
Mean annual precipitation: 20 to 26 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 245 to 255 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Almendra, Loam

Setting

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

Typical profile

Ap1 - 0 to 4 inches: loam
Ap2 - 4 to 14 inches: loam
Bw1 - 14 to 29 inches: loam
Bw2 - 29 to 40 inches: loam
Bw3 - 40 to 52 inches: loam
Bw4 - 52 to 74 inches: fine sandy loam
Bw5 - 74 to 86 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.83 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Conejo, clay loam

Percent of map unit: 5 percent
Landform: Alluvial fans
Hydric soil rating: No

Unnamed, water table 30 to 72 inches

Percent of map unit: 3 percent
Landform: Alluvial fans
Hydric soil rating: No

Unnamed, weak cementation below 40 inches

Percent of map unit: 3 percent
Landform: Alluvial fans
Hydric soil rating: No

Vina, fine sandy loam

Percent of map unit: 2 percent
Landform: Alluvial fans
Hydric soil rating: No

Charger

Percent of map unit: 1 percent
Landform: Alluvial fans
Hydric soil rating: No

Chico

Percent of map unit: 1 percent

Landform: Fan terraces
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the

upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or

B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

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Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–CA612-Butte Area, California, Parts of Butte and Plumas Counties					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
302: Redtough-Redswale , 0 to 2 percent slopes	Redtough-Loam	50	Fan terraces	No	—
	Redswale-Cobbly loam	35	Fan terraces	No	—
	Unnamed-Frequent long ponding	3	Fan terraces	Yes	3
	Redswale-Frequent long flooding	3	Fan terraces	Yes	4
	Anita-Gravelly duripan	2	Fan terraces	Yes	2,3
	Tuscan	2	Fan terraces	No	—
	Munjar	2	Fan terraces	No	—
	Abruptic Durixeralfs	2	Fan terraces	No	—
	Unnamed-Riser slopes	1	Fan terraces	No	—
418: Almendra loam, 0 to 1 percent slopes	Almendra-Loam	85	Alluvial fans	No	—
	Conejo-Clay loam	5	Alluvial fans	No	—
	Unnamed-Water table 30 to 72 inches	3	Alluvial fans	No	—
	Unnamed-Weak cementation below 40 inches	3	Alluvial fans	No	—
	Vina-Fine sandy loam	2	Alluvial fans	No	—
	Charger	1	Alluvial fans	No	—
	Chico	1	Fan terraces	No	—

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American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

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National Research Council. 1995. Wetlands: Characteristics and boundaries.

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United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C: Arid West Ordinary High Water Mark Data Sheet

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Notre Dame
Project Number: 20-120
Stream: Little Chico Creek
Investigator(s): E. Gregg

Date: 12-23-20 **Time:** 2:30 pm
Town: Chico **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: Little Chico Creek between the terminus of Notre Dame Blvd.

Projection: Google Earth **Datum:** WGS 84
Coordinates: 39.734987°, -121.795603°

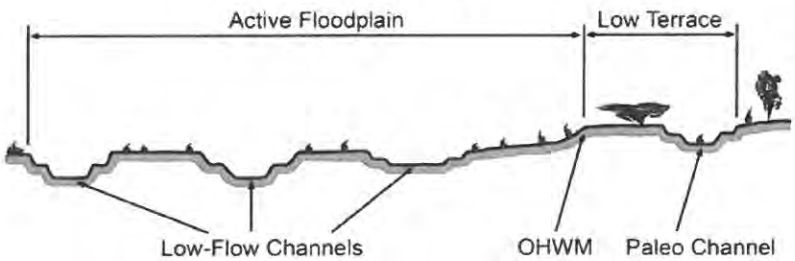
Potential anthropogenic influences on the channel system: Trash, old fences/wire from historic human use. Adjacent to residential developments + walking path

Brief site description: Stretch of creek widens out slightly. Sparse tree and shrub canopy. Dominated by ruderal annual species

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1998-2018
- ☒ 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: A 04280
  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

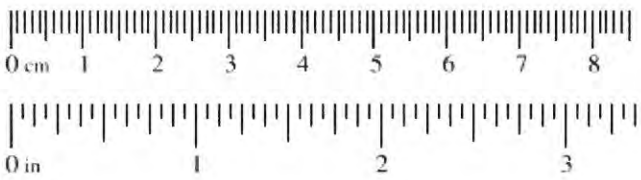


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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:

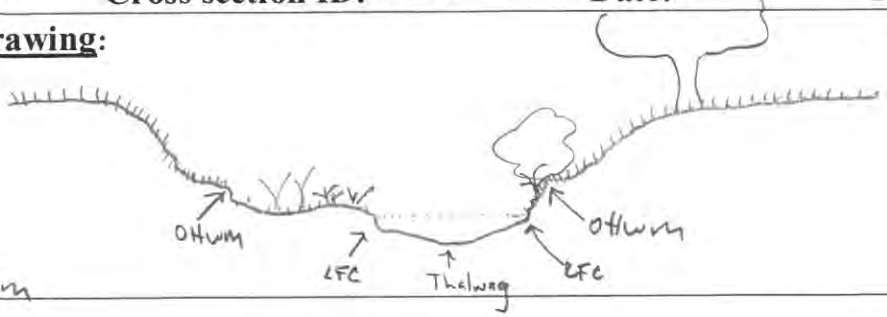
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
		Coarse sand	
0.020	0.50		Sand
1/2 0.0098	0.25	Medium sand	
1/4 0.005	0.125	Fine sand	
		Very fine sand	
1/8 0.0025	0.0625		
1/16 0.0012	0.031	Coarse silt	
		Medium silt	
1/32 0.00061	0.0156		Silt
1/64 0.00031	0.0078	Fine silt	
		Very fine silt	
1/128 0.00015	0.0039		
		Clay	Mud



Project ID: 20-120 **Cross section ID:** 'A-A' **Date:** 12-23-20 **Time:** 2:30pm

Cross section drawing:



OHWM

GPS point: see transect 'A-A' on delineation Map

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: debris
- [ ] Other: _____

Comments:

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: see transect 'A-A'

Characteristics of the floodplain unit:

Average sediment texture: cobble

Total veg cover: 10 % Tree: 0 % Shrub: 0 % Herb: 10 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: sediment deposits
- [x] Other: presence of flowing water
- [ ] Other: _____

Comments:

Project ID: 20-120 **Cross section ID:** A-A' **Date:** 12-23-20 **Time:** 2:30pm

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

GPS point: see transect A-A'

Characteristics of the floodplain unit:

Average sediment texture: gravel

Total veg cover: 105 % Tree: ~~0~~ % Shrub: 10 % Herb: 95 %

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: change in vegetation composition + cover
- ☒ Other: change in sediment texture
- ☒ Other: scour

Comments:

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

GPS point: see transect A-A'

Characteristics of the floodplain unit:

Average sediment texture: loam/silt

Total veg cover: 120 % Tree: 20 % Shrub: ____ % Herb: 100 %

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: change in vegetation composition
- ☐ Other: ____
- ☐ Other: ____

Comments: