DRAFT

Delineation of Waters of the United States

PG&E Line 407 Natural Gas Transmission Pipeline

Placer, Sacramento, Yolo, and Sutter Counties, CA

August 2007

Prepared for:

TRC
Attention: Benjamin Hart
80 Stone Pine Road, Suite 200
Half Moon Bay, CA. 94019

Prepared by:

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Introduction and Project Location

Gallaway Consulting, Inc. conducted a delineation of Waters of the U.S. for an approximately 26-mile (3524-acre) survey area located in Placer, Sacramento, Yolo, and Sutter Counties, California (**Figure 1**). The PG&E Line 407 project (Project) is located in portions of the Woodland, Grays Bend, EL Dorado Bend, Knights Landing, Verona, Rio Linda, Roseville, Citrus Heights, Pleasant Grove, and Taylor Monument U.S. Geological Survey (USGS) 7.5 minute quadrangle maps (refer to **Figure 1** for sections, townships, and ranges). Surveys were conducted on July 21 and 24-28, and August 10 and 25, 2006, May 3, 8, and 14, June 21, and July 31, 2007 by biologists Brooks Taylor, Chelsea Kramer, Jody Gallaway, and Breanna Owens and botanists Shirley Innecken and Elena Alfieri. The surveys 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); the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (2006); and, the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (2007).

The PG&E Line 407 is part of a project to provide natural gas to communities in the Sacramento River Valley, which is an area of rapid growth. The survey area is composed of a 500-foot buffer on either side of the Project alignment. Due to the large size of the project, it will be distinguished as PG&E Line 407 West (approximately 14 miles in length) and PG&E Line 407 East (approximately 12 miles in length). The PG&E Line 407 West (West Project) will run from a tie-in point with proposed PG&E Line 406 and existing PG&E Line 172A near Highway 5 north of the City of Woodland to a tie-in point with proposed PG&E Line 407 East (East Project) at the corner of Powerline and Riego roads. The East Project then splits, running south along Powerline Road to West Elverta Road, and east along Riego Road/Baseline Road to Fiddyment Avenue. From the western tie-in, the line will run along the edges of fields and parallel a series of county roads and irrigation canals, crossing Knights Landing Ridge Cut, the Yolo Bypass, and the Sacramento River before reaching the eastern tie-in (**Figure 1**).

This report addresses the nature, jurisdictional status, and landscape position of the wetlands in the survey area; it does not provide information suitable for structural analysis of soils for construction purposes, flood plain delineation, or other purposes not expressly stated. Wetland acreages presented in this report should be considered preliminary, and subject to review and modification by the U.S. Army Corps of Engineers (USACE) during the wetland delineation verification process.

Site Conditions

The survey area encompasses an approximately 3524-acre (26-mile) corridor of rural, urban, developed, and open land in portions of the Woodland, Grays Bend, EL Dorado Bend, Knights Landing, Verona, Rio Linda, Roseville, Citrus Heights, Pleasant Grove, and Taylor Monument USGS quadrangles. Residential structures, agricultural structures, and agricultural fields occupy the extent of the survey area. The agricultural fields within the survey area consist of planted row crops including alfalfa, wheat, sunflowers, corn, and tomatoes in addition to orchards and rice fields. Topography in the area is flat to gently sloping and portions continue to be graded for agriculture, with project elevation ranging from 15 to125 feet above sea level. Water used for agriculture within the survey area is pumped from the Sacramento River via the Tule Canal, the Knights Landing Ridge Cut, and the Natomas Cross Canal, as well as a matrix of unnamed irrigation canals and ditches.

Survey Methodology

Many of the terms used throughout this report have specific meanings relating to the federal wetland delineation process. Term definitions are based on the *USACE Wetlands Delineation Manual* (1987), the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (1989) and the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (2006). The terms defined below have specific meaning relating to the delineation of Waters of the U.S. as prescribed by §404 of the Clean Water Act (CWA).

Terminology

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 as used in "Adjacent to a traditional navigable water," is defined in USACE and EPA regulations as "bordering, contiguous, or neighboring." Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes and the like are 'adjacent wetlands.'

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.

Ephemeral stream: An ephemeral stream has flowing water only during and for a short duration after, 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.

Growing season: The growing season is the portion of the year when soil temperatures are above biologic zero (41° F) as defined by soil taxonomy.

PG&E Line 407

Location

Within the Rio Jesus Maria Land Grant and
Sect. 1 of T10N & R1E, Sect. 1 of T10N & R2E,
Sects. 9, 10, 11, 12 of T10N & R2E, Sects. 5, 6 of T10N & R4E
Sect. 36 of T11N & R3E, and Sect. 31 of T11N & R4E
Sects. 1-8 & 17-20 of T10N, R4E, Sects. 31-36 of T11N, R4E,
Sects. 1-6 of T10N & R5E, Sects. 31-36 of T11N & R5E,
Sect. 6 of T10N & R6E, Sect. 31 of T11N & R6E.

On Pleasant Grove, Rio Linda, Roseville & Citrus Heights,
El Dorado Bend, Knights Landing, Verona, Woodland, Grays Bend,
and Taylor Monument 7.5' USGS Quads.

Location map shown on Sacramento 15' USGS Quad.
Yolo, Placer, Sutter & Sacramento Counties, CA
Map Date: 8/16/07

Survey Area (3523.79 ac.)

Miles
0 1 2

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Figure 1

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).

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Jurisdictional wetland: Sites that meet the definition of wetland provided below and that fall under USACE regulations pursuant to §404 of the CWA are considered jurisdictional wetlands.

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.

Other Waters of the United States: Other Waters of the U.S. are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other 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).

Perennial stream: A perennial stream has flowing water year-round during a typical 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.

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.

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%) occur 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.

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.

Relatively permanent: As defined in the *Rapanos* guidance document, a water body is "relatively permanent" if its flow is year round or its flow is continuous at least "seasonally," (e.g., typically 3 months). Wetlands adjacent to a "relatively permanent" tributary are also jurisdictional if those wetlands directly abut such a tributary.

Significant nexus: A water body is considered to have a "significant nexus" with a traditional navigable water if its flow characteristics and functions in combination with the ecologic and hydrologic functions preformed by all wetlands adjacent to such a tributary, affect the chemical, physical, and biological integrity of a downstream traditional navigable water.

Traditional navigable water: Includes all of the "navigable water of the United States," defined in 33 C.F.R. § 329, and by numerous decisions of the Federal courts, plus all other waters that are navigable-in-fact. As defined in 33 C.F.R. § 329, "Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity."

Tributary: A tributary as defined in the *Rapanos* guidance document, means a natural, man-altered, or man-made water body that carries flow directly or indirectly into traditional navigable waters. For purposes of determining "significant nexus" with a traditional navigable water, a "tributary" is the entire reach of the stream that is of the same order (i.e., from the point of confluence, where two lower order streams meet to from the tributary, downstream to the point such tributary enters a higher order stream).

Waters of the United States: This is the encompassing term for areas under federal jurisdiction pursuant to Section 404 of the CWA. Waters of the U.S. are divided into "wetlands" and "Other Waters of the U.S."

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 federal jurisdiction, a wetland must support positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology.

Determination of Hydrophytic Vegetation

The presence of hydrophytic vegetation was determined using the methods outlined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (1989) and the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (2006), which are approved by the USACE for use in conjunction with the *Wetlands Delineation Manual* (1987). Areas are considered to have positive indicators of hydrophytic vegetation if they pass the dominance test, meaning more than 50 percent of the dominant species are OBL, FACW, FAC (Reed 1988). Plant species were identified to the lowest taxonomy possible.

Determination of Hydric Soils

Soil survey information was reviewed for the survey area and the Natural Resources Conservation Service (NRCS) database was consulted on the local soil conditions. The use of hydric soil indicators, as outlined in the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (2006), was applied to all soil samples. Official soil series descriptions are provided in **Appendix A** and the distribution of soil map units for the site is shown in **Figure 2**.

Determination of Wetland Hydrology

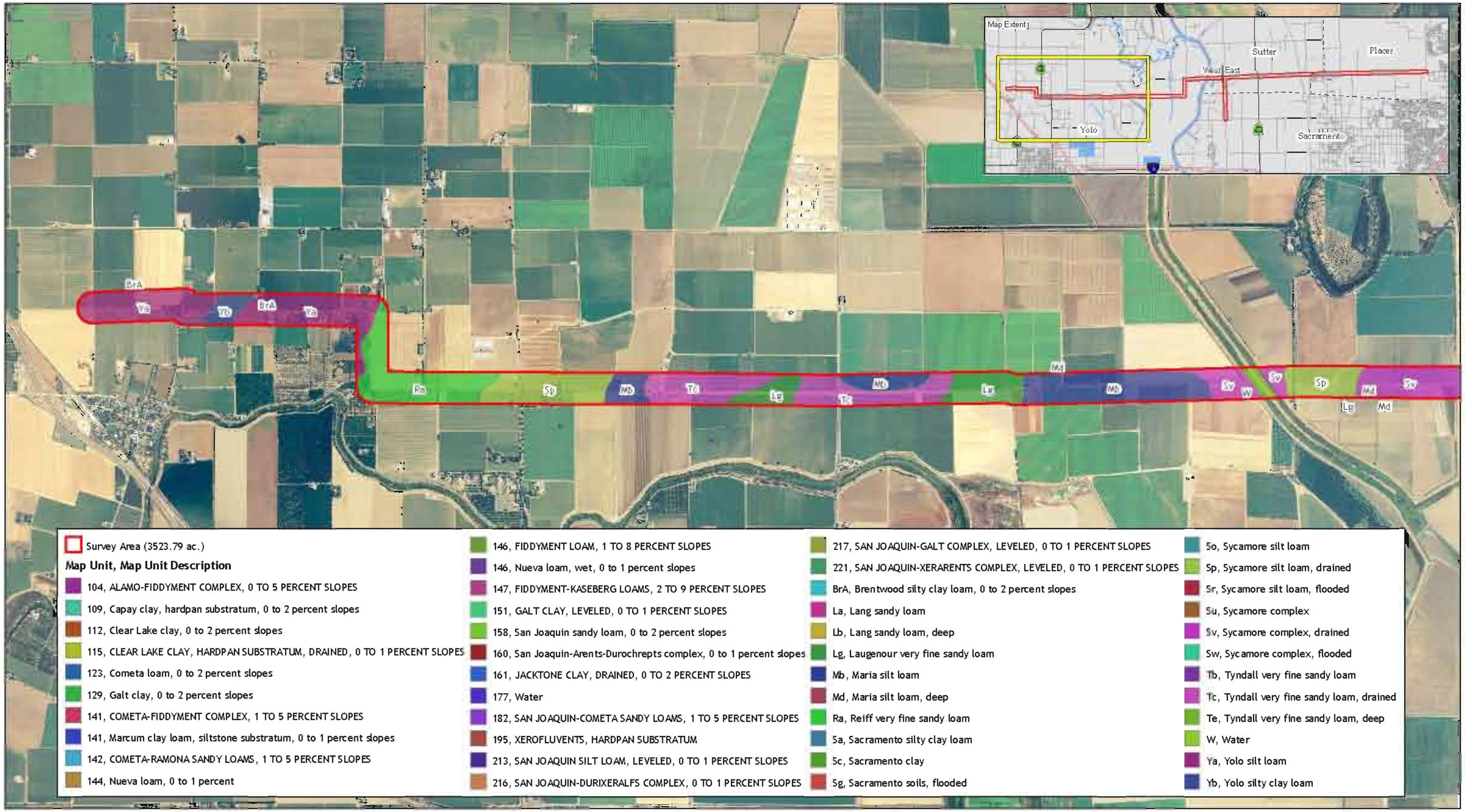
Wetland hydrology was determined to be present if a site supported one or more of the following characteristics:

- 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, and drift lines.

The presence of water or saturated soil for approximately 5 to 12.5 percent of 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 (Environmental Laboratory 1987).

Determination of Ordinary High Water Mark

The lateral extent of non-tidal water bodies (e.g. intermittent streams) were based on the ordinary high water mark (OHWM), which is "the line on the shore established by the fluctuations of water" (USACE 2005). The OHWM was determined based on physical characteristics of the area, including scour, multiple observed flow events (from current and historical aerial photos), shelving, changes in the character of soil, presence of mature vegetation, deposition, and topography. Due to the wide extent of some floodplains, adjacent riparian areas characterized by hydric soils, hydrophytic vegetation, and hydrology may be included within the OHWM of a non-tidal water body.



Soils Characterization derived from NRCS
Aerial Feb 2005 (NAIP)
Map Date August 17, 2007

Miles
0 1 2

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Figure 2.

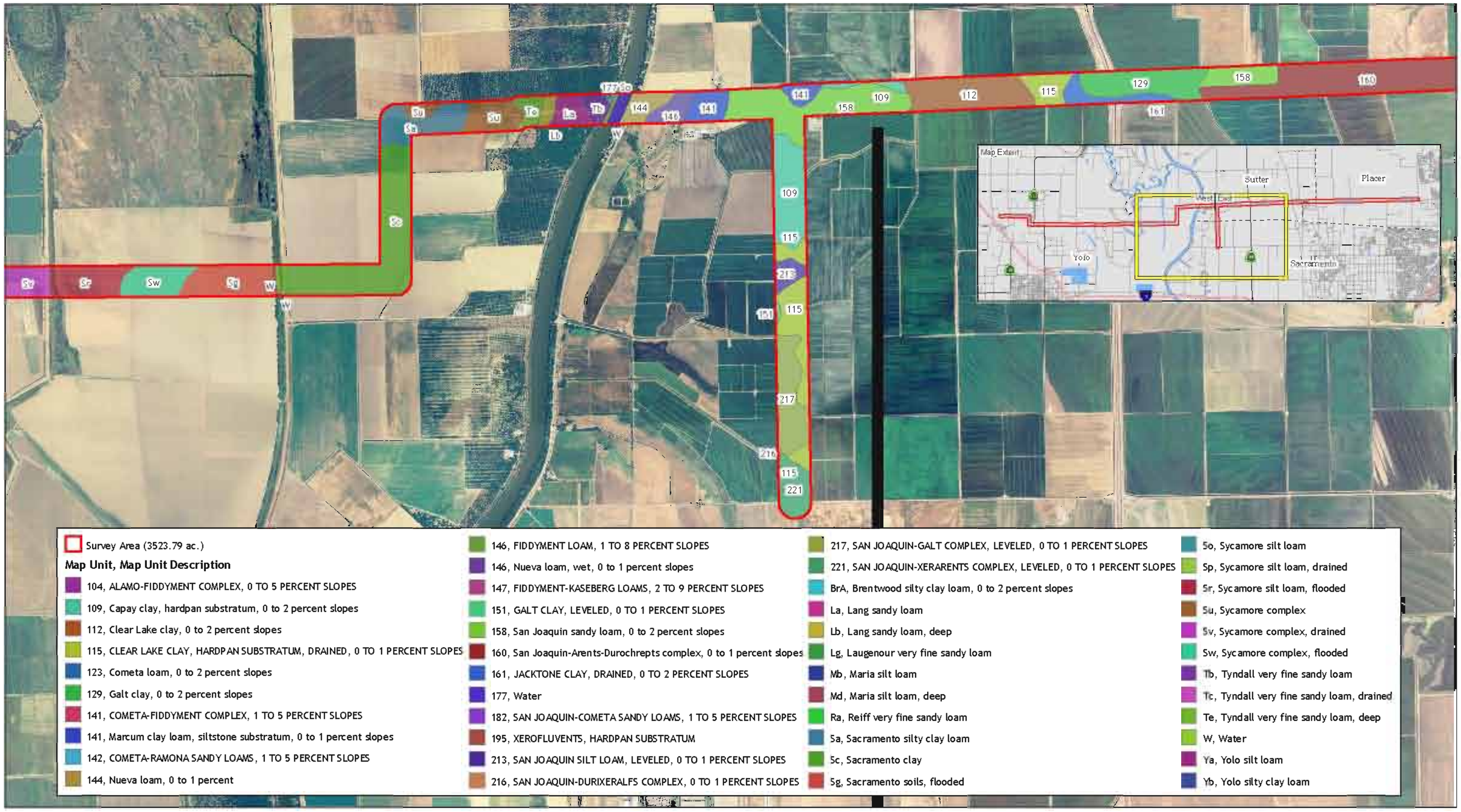
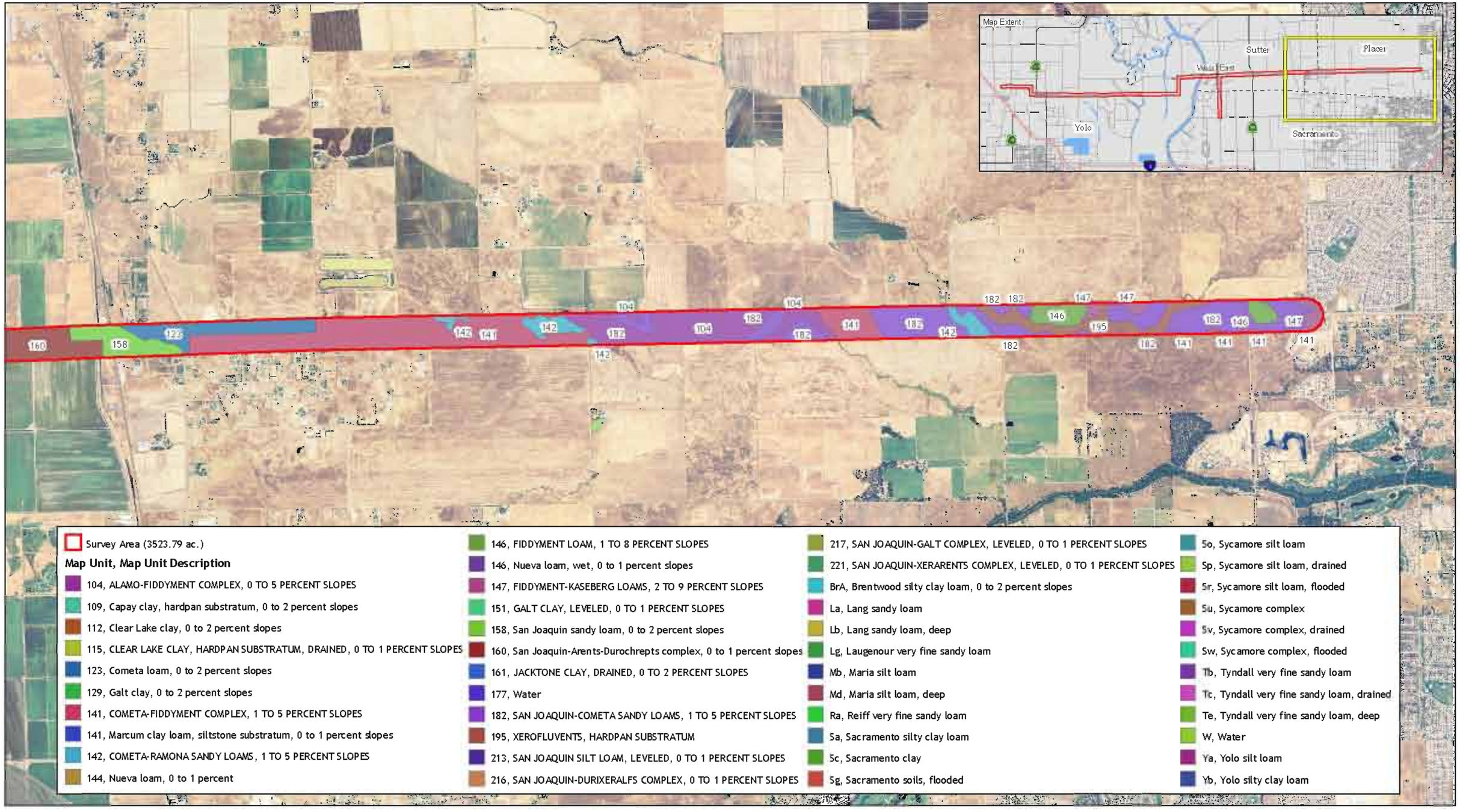

Map Extent
Sutter
Placer
Yolo
Sacramento
West Sac
Survey Area (3523.79 ac.)
Map Unit, Map Unit Description
104, ALAMO-FIDDYMENT COMPLEX, 0 TO 5 PERCENT SLOPES
109, Capay clay, hardpan substratum, 0 to 2 percent slopes
112, Clear Lake clay, 0 to 2 percent slopes
115, CLEAR LAKE CLAY, HARDPAN SUBSTRATUM, DRAINED, 0 TO 1 PERCENT SLOPES
123, Cometa loam, 0 to 2 percent slopes
129, Galt clay, 0 to 2 percent slopes
141, COMETA-FIDDYMENT COMPLEX, 1 TO 5 PERCENT SLOPES
141, Marcum clay loam, siltstone substratum, 0 to 1 percent slopes
142, COMETA-RAMONA SANDY LOAMS, 1 TO 5 PERCENT SLOPES
144, Nueva loam, 0 to 1 percent
146, FIDDYMENT LOAM, 1 TO 8 PERCENT SLOPES
146, Nueva loam, wet, 0 to 1 percent slopes
147, FIDDYMENT-KASEBERG LOAMS, 2 TO 9 PERCENT SLOPES
151, GALT CLAY, LEVELED, 0 TO 1 PERCENT SLOPES
158, San Joaquin sandy loam, 0 to 2 percent slopes
160, San Joaquin-Arents-Durochrepts complex, 0 to 1 percent slopes
161, JACKTONE CLAY, DRAINED, 0 TO 2 PERCENT SLOPES
177, Water
182, SAN JOAQUIN-COMETA SANDY LOAMS, 1 TO 5 PERCENT SLOPES
195, XEROFLUVENTS, HARDPAN SUBSTRATUM
213, SAN JOAQUIN SILT LOAM, LEVELED, 0 TO 1 PERCENT SLOPES
216, SAN JOAQUIN-DURIXERALFS COMPLEX, 0 TO 1 PERCENT SLOPES
217, SAN JOAQUIN-GALT COMPLEX, LEVELED, 0 TO 1 PERCENT SLOPES
221, SAN JOAQUIN-XERARENTS COMPLEX, LEVELED, 0 TO 1 PERCENT SLOPES
BrA, Brentwood silty clay loam, 0 to 2 percent slopes
La, Lang sandy loam
Lb, Lang sandy loam, deep
Lg, Laugenour very fine sandy loam
Mb, Maria silt loam
Md, Maria silt loam, deep
Ra, Reiff very fine sandy loam
Sa, Sacramento silty clay loam
Sc, Sacramento clay
Sg, Sacramento soils, flooded
So, Sycamore silt loam
Sp, Sycamore silt loam, drained
Sr, Sycamore silt loam, flooded
Su, Sycamore complex
Sv, Sycamore complex, drained
Sw, Sycamore complex, flooded
Tb, Tyndall very fine sandy loam
Tc, Tyndall very fine sandy loam, drained
Te, Tyndall very fine sandy loam, deep
W, Water
Ya, Yolo silt loam
Yb, Yolo silty clay loam
N
Soils Characterization derived from NRCS
Aerial Feb 2005 (NAIP)
Map Date August 17, 2007
Miles
0
1
2
GALLAWAY CONSULTING, INC

Figure 2.

PG&E Line 407 **Soils Characterization Map (3 of 3)**



Soils Characterization derived from NRCS
Aerial Feb 2005 (NAIP)
Map Date August 17, 2007

Miles
0 1 2

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Figure 2.

Determination of Jurisdiction of Artificially Irrigated Wetlands

Based on the Memorandum 2003-04, from the Regulatory Branch of the Corps, "any area exhibiting wetland characteristics sustained solely by the application of irrigation water is not regulated under Section 404 of the CWA," the review of recently verified delineations wherein rice fields were not considered jurisdictional, and because the rice fields are not being converted for non agricultural purposes, rice fields within the survey area were not delineated as jurisdictional features. The canals within the survey area are nearly entirely supported by irrigation water; however, because of the potential for canals to convey water at times when no irrigation was taking place we delineated them as jurisdictional intermittent streams.

Determination of Isolated Wetlands

On January 9, 2001, the U.S. Supreme Court issued a decision in the case of *Solid Waste Agency of Northern Cook County* v. *United States Army Corps of Engineers* (the *SWANCC* decision), 531 U.S. 159 (2001). The Court determined that the Corps' authority under Section 404 of the CWA did not extend to isolated wetlands if they are not "adjacent" to navigable waters. It held that the Corps exceeded its statutory authority by asserting CWA Section 404 jurisdiction over the ponds that SWANCC wanted to fill based solely on the use of those "non-navigable, isolated, intrastate" waters by migratory birds. The parameters defined in the SWANCC case were used to identify "non-navigable, isolated, intrastate" wetlands within the survey area. These features will still be subject to regulation under the Regional Water Quality Control Board (RWQCB) and Section 401 of the Clean Water Act.

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. The site was traversed on foot to identify wetlands. Standard data sheets were used to describe plants, soils, and hydrological characteristics of wetland features and jurisdictional forms were prepared to show a significant nexus for all of the jurisdictional features onsite (**Appendix B**). Gallaway Consulting, Inc. conducted the field delineation and prepared the map and acreage calculations (**Attachment A**). A table with the acreage totals for all the features delineated within the survey area is presented in **Appendix C**. The spatial data obtained during the preparation of this delineation was collected using a Trimble GeoXT Global Positioning System (GPS) Receiver on July 21 and 24-28 and August 10 and 25, 2006, May 3, 8, and 14, June 21, and July 31, 2007. The maximum position dilution of precision (PDOP) during data collection was 7.5. No readings were taken with fewer than 5 satellites. Point data locations were recorded for 25 seconds at a rate of 1 position per second. Area and line data was recorded at a rate of 1 position per second while walking at a slow pace. All GPS data was differentially corrected for maximum accuracy using the nearest National Geodetic Survey's Continuously Operating Reference Station (CORS).

Results

A total of 108.112 acres of pre-jurisdictional Waters of the U.S. were delineated within the survey area. The types of Waters of the U.S. identified within the survey area are distinguished as willow and mixed riparian wetlands, fresh emergent wetlands, seasonal wetlands, seasonal swales, vernal pools, vernal swales, and Other Waters including culverts, ponds, relatively permanent irrigation canals and perennial streams, traditional navigable waters, and non-relatively permanent drainages (**Table 1**). These features are mapped at a 1" = 100' scale and are presented in **Attachment A**. Waters of the U.S. acreages presented in this report should be considered preliminary, subject to review and modification by the USACE during the wetland delineation verification process. The wetlands, and the data of interpretation used to delineate their jurisdictional boundaries are described below.

Table 1. Waters of the U.S. Totals Delineated within the PG&E Line 407 Survey Area.

Wetland Features			
Type	**Length (ft.)**	**Area (ft.2)**	**Acres**
Fresh Emergent Wetland Total =	n/a	155798.956	3.577
Riparian Total =	n/a	716664.529	16.452
Seasonal Swale =	n/a	91891.626	2.110
Seasonal Wetland =	n/a	942009.073	21.626
Vernal Pool =	n/a	189878.033	4.359
Vernal Swale =	n/a	58319.269	1.339
Willow Riparian =	n/a	82877.480	1.903
Wetland Features Total =	**n/a**	**2237438.967**	**51.365**
Other Waters of the U.S.			
Type	**Length (ft.)**	**Area (ft.2)**	**Acres**
Culvert Total =	5425.646	12836.605	0.295
NRPW Total =	51913.385	94843.838	2.177
RPW Total =	78208.919	1826085.369	41.921
TNW Total =	1116.699	535358.639	12.290
Pond Total =	n/a	2786.430	0.064
OWOTUS Total =	**136664.649**	**2471910.881**	**56.747**
Total WF and OWOTUS =	**136664.649**	**4709349.848**	**108.112**

Jurisdictional Features

Riparian

Riparian wetlands exist within Other Water features in the irrigation ditch on the west side of the Sacramento River and along the banks of the Sacramento River, Tule Canal, Knights Landing Ridge Cut, and other large irrigation canals and ditches onsite. There is a total of 16.452 acres of riparian wetlands and 1.903 acres of willow dominated riparian wetlands within the survey area. Vegetation within the riparian areas is dominated by an overstory of *Populus fremontii* (FACW), *Salix gooddingii* (OBL), *Salix exigua* (OBL), *Salix* ssp., and *Sambucus mexicanus* (FAC) with an

understory of *Cyperus esculentus* (FACW) and *Rubus discolor* (FACW). Hydric soils were assumed due to complete inundation of the features. All features classified as riparian wetlands display positive indicators for wetland hydrology including inundation or saturation in the upper twelve inches and distinct drainage patterns.

Fresh Emergent Wetland

Fresh emergent wetlands are those that can be defined as containing emergent vegetation such as *Typha* and *Eleocharis*. Emergent vegetation consists of rooted plants that have parts extending above the water surface for at least part of the year, and are intolerant of complete inundation over prolonged periods. Water depths vary but rarely exceed 2 meters (6.6 feet) for long periods. 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. The survey area supports 3.577 acres of fresh emergent wetlands including Natomas East Main Drainage and Curry Creek which are completely inundated with fresh emergent species. Hydric soils were assumed due to complete inundation. Vegetation present within the fresh emergent wetlands delineated in the survey area includes *Rumex crispus* (FACW-), *Typha sp.* (OBL), *Scirpus acutus* (OBL), *Salix sp.* (FACW), *Cyperus eragrostis* (OBL), and *Polygonum hydropiper* (OBL). All features classified as fresh emergent wetlands display positive indicators for wetland hydrology including inundation, saturation in the upper twelve inches and distinct drainage patterns.

Vernal Pools and Swales

Vernal pools are defined by the positive indication of three wetland parameters: hydrophytic vegetation specific to vernal pools, hydric soils, and hydrology (*i.e.,* ponding). All three parameters must be present to satisfy the vernal pool definition, which was applied while delineating all vernal pools present on-site. In addition to supporting positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology, vernal pools exhibit unique characteristics. Vernal pools form where there is a soil layer below or at the surface that is impermeable or nearly impermeable. Precipitation and surface runoff become trapped or "perched" above this layer. Hardpans are formed by leaching, re-deposition, and cementing of silica materials from high in the soil horizon to a lower ("B") horizon. In addition, vernal pools typically occur in landscapes that, at a broad scale, are shallowly sloping or nearly level, but on a finer scale may be quite bumpy or uneven. Since appropriate combinations of climate, soil, and topography often occur over continuous areas rather than in isolated spots, vernal pools in the Central Valley tend to occur in clusters called "complexes." Within these complexes, pools may be fed or connected by low drainage pathways called "swales," which were detected throughout the site. Swales are often themselves seasonal wetlands that remain inundated with water for much of the wet season, but not long enough to support strong vernal pool characteristics. Vernal pools may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. Vernal pools gradually dry down during the spring, often forming a unique "bathtub ring" of flowers from endemic vernal pool plants blooming successively at the pool margins.

Grasslands in the eastern portion of the survey area support 52 vernal pools (4.359 acres) and 9 vernal swales (1.339 acres) for a total of 5.698 acres of vernal features (**Attachment A**).

Vegetation in these vernal pools and swales was mostly dominated by *Blennosperma nanum* (OBL), *Juncus bufonius* (FACW+), *Plagiobothrys stipitatus* (OBL), *Eryngium castrense* (OBL), *Lythrum sp.* (FACW), *Polygonum arenastrum* (NL), *Polypogon monspeliensis* (FACW) and *Gratiola ebracteata* (OBL).

Seasonal Wetlands and Swales

Seasonal wetlands and swales are defined by the positive indication of three wetland parameters: hydrophytic vegetation, hydric soils, and hydrology (*i.e.*, ponding). All three parameters must be present to satisfy the wetland definition, which was applied while delineating all seasonal wetlands/swales present on-site. These features allow water to pond for a long enough period of time to support hydrophytic vegetation and hydric soils. Seasonal wetlands tend to lack standing water during the late summer months, or during prolonged dry periods. They support hydrophytic species, such as *Eleocharis* that require longer and typically deeper inundation periods than those of vernal species. These features show positive indicators for hydric soils including mottling, an organic stratum, concretions, and oxidized root channels. All features classified as seasonal wetlands display positive indicators for wetland hydrology including sediment deposits and drainage patterns.

Within the survey area 21.626 acres of seasonal wetlands and 2.110 acres of seasonal swales were delineated. Vegetation in the seasonal wetlands delineated in the survey area was dominated by *Juncus xiphioides* (OBL), *Lolium multiflorum* (FAC), *Cyperus esculentus* (FACW) *Eremocarpus setigerus* (NL), and *Polypogon monspeliensis* (FACW).

Other Waters of the United States

Other Waters of the U.S. are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features that exhibit an ordinary high-water mark but lack positive indicators for one or more of the three wetland parameters (*i.e.*, hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4). The above definition was applied while delineating all Other Waters of the U.S. Drainages exhibited an ordinary high water mark and contained bed, bank, and/or scour morphology. A total of 136664.649 linear feet (56.747 acres) of Other Waters of the U.S. were delineated within the survey area including 0.295 acre of culverts and 0.064 acre of ponds.

Traditional Navigable Waters

The one traditional navigable water (TNW) found within the survey area is the Sacramento River (OW 22). It cuts through the western portion of the survey area flowing north to south towards the San Francisco Bay. The Sacramento River encompasses approximately 12.290 acres of the survey area.

Relatively Permanent Waters

Relatively permanent waters (RPW) within the survey area include Tule Canal (OW 05), Knights Landing Ridge Cut (OW 07 and 08), the main tributary to Knights Landing Ridge Cut (OW 06),

Natomas East Main Drainage (WF 112e), Curry Creek (OW 54-55, 124, and WF 117e and 018e), and a few of the larger irrigation canals which hold water for more than 3 months out of the year (OW 01, 03, 04, 11, 13, 14, 15, 18, 19, 29-31, 37-38, 41-46, 64, 87-88, 90-118, 120-124, 127-134, 136, 138, 154). These irrigation canals transfer and deliver water to and from farmers for irrigating their agricultural fields.

Due to the constant presence of water in some of the irrigation canals, hydrophytic vegetation has begun to grow in the canals, forming fresh emergent wetlands and riparian habitats. Dominant vegetation present in the vegetated irrigation canals includes *Rubus discolor* (FACW), *Typha* ssp. (OBL), *Scirpus acutus* (OBL), *Cyperus esculentus* (FACW), *Polypogon monspeliensis* (FACW), *Eleocharis* ssp. (OBL), and *Polygonum hydropiperoides* (OBL). These canals are under the management of the farmers and the local water district, however, and are subject to occasional maintenance and clearing of the vegetation to prevent the choking-up of the canals.

The Knights Landing Ridge Cut flows into Tule Canal, which in turn flows directly into the Sacramento River. The other larger unnamed irrigation canals in the West Project flow directly into either Tule Canal, Knights Landing Ridge Cut, or the Sacramento River. In the East Project, Natomas East Main Drainage flows directly into the American River further south of the survey area and Curry Creek flows into Natomas East Main Drainage north of the survey area. The other larger unnamed irrigation canals in the East Project flow either into East Drainage Canal or West Drainage Canal which merge further south of the project area to form the Natomas Main Drainage Canal which then flows directly into the Sacramento River. There are a total of 41.921 acres of RPWs within the survey area.

Non-Relatively Permanent Waters

Approximately 2.177 acres of non-relatively permanent waters (NRPW) were delineated within the survey area. These NRPWs include ephemeral drainages and smaller irrigation ditches used to irrigate the row crop fields between OW 05 and OW 06 which don't hold water for more than 3 months out of the year. Water is pumped into the irrigation ditches from both OW 05 and OW 06 to irrigate the fields and appear to flow back into OW05 through a culvert (OW32). The NRPWs onsite include OW 33, 34, 36, 37, and 39.

Non-Jurisdictional Features

Non-jurisdictional waters within the survey area are Other Waters including irrigation ditches and seasonal wetlands which are under the control and manipulation of farmers, roadside ditches which were created in upland areas to provide runoff from the roadway, and their associated culverts. These non-jurisdictional waters are not directly or indirectly connected to a TNW or a RPW.

Significant Nexus

Relatively Permanent Waters and Wetlands that Abut Them

Per the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (May 30, 2007) and the *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision Rapanos v. United States and Carabell v. United States* a significant nexus determination is not required due to the fact that the jurisdictional irrigation canals within the survey area, including Tule Canal and the Knights Landing Ridge Cut, East Drainage Canal, West Drainage Canal, and Natomas Main Drainage Canal are non-navigable tributaries of the Sacramento River and are considered RPWs. These RPWs flow year round and flow directly/indirectly into the Sacramento River. Also, Natomas East Main Drainage and Curry Creek are RPWs which are tributaries of the American River and flow for more than 3 months out of the year. The riparian wetlands, vernal pools, seasonal wetlands and swales, and fresh emergent wetlands that occur within this project directly abut these RPW as illustrated in **Attachment A**.

Relatively Permanent Waters and Wetlands Adjacent to Them

A significant nexus determination will be required per the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (May 30, 2007) and the *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision Rapanos v. United States and Carabell v. United States.* Wetlands adjacent to but not directly abutting the RPWs (Curry Creek, Dry Creek, and Natomas East Main Drainage) within the survey area are located within hydric soils and lowland topography typical of wetlands and have all three wetland parameters. These wetlands have a significant affect on the chemical, physical, and biological integrity of the downstream TNW, the American River. Wetlands within the survey area hold floodwaters and intercept sheet flow from uplands releasing water in a more consistent manner. These wetlands collect and hold water during significant rain events acting as a biological filter collecting the first flush prior to filtering into the TNWs. In addition, they prevent erosion and sedimentation of more permanent systems by reducing flow, which in turn provides habitat for waterfowl, song birds, small mammals and federally threatened and endangered vernal pool invertebrates within the wetlands.

Isolated Waters and Non-Jurisdictional Waters

The water features within the survey area were determined to be non-jurisdictional based on the following:

1. All of the non-jurisdictional water features within the survey area occur within the California state boundaries. The water features do not cross any state lines and are not used for transportation or interstate commerce.

2. None of the non-jurisdictional water features within the survey area are tributaries to a jurisdictional TNW, RPW or non-RPW. Also, these water features do not abut nor are they adjacent to TNWs, RPWs, or non-RPWs.

3. The water features NJ 01 through 06 hold water for more than 3 months out of the year, but they flow into agricultural fields and do not have direct or indirect connectivity to a jurisdictional TNW, RPW, or non-RPW.

4. Water features NJ 20-23, 25-27, 29, 31, 33-36, 38, 40, 41, 51, 59, 61, and 68 do not hold water for more than 3 months out of the year, are under the management of farmers and are filled in every planting season, and flow only into crop fields with no connection to a jurisdictional TNW, RPW, or NRPW. This also applies to non-jurisdictional seasonal wetlands NJ 95e-105e which are under the management of a farmer and have no hydrologic connection to jurisdictional features.

5. Water features NJ 08, 09, 10, 12, 14, 15, 16, 18, 42, 43, 50, 56, 70, and 95-110 were created in upland areas by run-off from roadways and do not significantly affect the chemical, physical, or biological integrity of downstream TNWs, RPWs, or non-RPWs because they do not carry a significant amount of flow and they have no connectivity.

Soils

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) 2006 *Soil Survey of Sacramento Area, California Parts of Yolo and Sutter Counties* identified 45 different map unit descriptions within the survey area in addition to open water (**Table 2**, **Figure 2**). Soil series descriptions are presented in **Appendix A** and wetland data sheets are presented in **Appendix B**.

Table 2. Soils Found within the PG&E Line 407 Survey Area.

Map Unit Symbol	Map Unit Description	Hydric(Y or N)/ Landform
104	Alamo-Fiddyment Complex, 0 to 5 percent slopes	Y/Depressions
140	Cometa sandy loam, 1 to 5 percent slopes	Y/Depressions
141	Cometa - Fiddyment Complex, 1 to 5 percent slopes	Y/Depressions
142	Cometa -Ramona sandy loams, 1 to 5 percent slopes	Y/Depressions
146	Fiddyment loam, 1 to 8 percent slopes	Y/Depressions
147	Fiddyment -Kaseberg loams, 2 to 9 percent slopes	Y/Depressions
175	Ramona sandy loam, 2 to 9 percent slopes	Y/Drainageways
181	San Joaquin sandy loam, 1 to 5 percent slopes	Y/Depressions
182	San Joaquin -Cometa sandy loams, 1 to 5 percent slopes	Y/Depressions
194	Xerofluvents, Frequently Flooded	Y/Drainageways
195	Xerofluvents, Hardpan Substratum	Y/Depressions, Drainageways
141	Marcum clay loam, siltstone substratum, 0 to 1 percent slopes	Y/Basin Floors
144	Nueva loam, 0 to 1 percent	Y/Floodplains
146	Nueva loam, wet, 0 to 1 percent slopes	Y/Floodplains
158	San Joaquin sandy loam, 0 to 2 percent slopes	N
Ya	Yolo silt loam	Y/Alluvial Fans
Sv	Sycamore complex, drained	Y/Alluvial Fans
BrA	Brentwood silty clay loam, 0 to 2 percent slopes	N

Map Unit Symbol	Map Unit Description	Hydric(Y or N)/ Landform
Sr	Sycamore silt loam, flooded	Y/Alluvial Fans
Su	Sycamore complex	Y/Alluvial Fans, Basin Floors
Te	Tyndall very fine sandy loam, deep	Y/Alluvial Fans
La	Lang sandy loam	Y/Alluvial Fans
So	Sycamore silt loam	Y/Alluvial Fans
Sa	Sacramento silty clay loam	Y/Alluvial Fans
Tb	Tyndall very fine sandy loam	Y/Alluvial Fans
Lb	Lang sandy loam, deep	Y/Alluvial Fans
Sw	Sycamore complex, flooded	Y/Alluvial Fans, Basin Floors
Md	Maria silt loam, deep	Y/Alluvial Fans
Sc	Sacramento clay	Y/Alluvial Fans, Basin Floors
Ra	Reiff very fine sandy loam	Y/Alluvial Fans
Yb	Yolo silty clay loam	Y/Alluvial Fans
Mb	Maria silt loam	Y/Alluvial Fans
Tc	Tyndall very fine sandy loam, drained	Y/Alluvial Fans
Sg	Sacramento soils, flooded	Y/Alluvial Fans, Basin Floors
Sp	Sycamore silt loam, drained	Y/Alluvial Fans
Lg	Laugenour very fine sandy loam	Y/Alluvial Fans
W	Water	Y/Open Water
109	Capay clay, hardpan substratum, 0 to 2 percent slopes	Y/Basin Floors
112	Clear Lake clay, 0 to 2 percent slopes	Y/Basin Floors
114	Clear Lake clay, hardpan substratum, 0 to 2 percent slopes	Y/Basin Floors
123	Cometa loam, 0 to 2 percent slopes	No
129	Galt clay, 0 to 2 percent slopes	Y/Basin Floors
137	Jacktone clay, 0 to 2 percent slopes	Y/Basin Floors
141	Marcum clay loam, siltstone substratum, 0 to 1 percent slopes	Y/Basin Floors
160	San Joaquin-Arents-Durochrepts complex, 0 to 1 percent slopes	Y/Depressions

When pooled water and/or obligate plants were present, hydric soils were assumed. In areas with questionable upland/wetland distinction, soil pit samples were observed to determine the presence or absence of hydric soil indicators. We observed water in the canals and ditches onsite at depths ranging from 1-20 inches.

Vegetation

Vegetation within the survey area consisted primarily of a variety of planted agricultural crops including wheat, corn, tomato, alfalfa, sunflower, rice, and orchards producing walnuts, pecans, olives, and a variety of fruits. Disturbed annual grassland found along the roadsides and the periphery of the agricultural fields was dominated by *Brassica niger*, *Avena barbata*, *Centaurea solstitialis*, *Hordeum murinum*, *Erodium botrys*, *Bromus diandrus*, *Convulvulus arvensis*, and *Sonchus asper*. Vegetation in the wet areas within the survey area was dominated by *Typha* ssp., *Scirpus acutus*, *Polygonum hydropiperoides*, *Salix* ssp., *Cyperus eragrostis*, *Lolium multiflorum*, *Polypogon monspeliensis*, *Blennosperma nanum*, *Juncus bufonius*, *Plagiobothrys stipitatus*, *Eryngium castrense*, *Lythrum sp.*, *Gratiola ebracteata*, *Juncus xiphioides*, and *Eremocarpus setigerus*. The upland annual grassland habitat was dominated by *Aira caryophyllea, Avena*

barbata, Centaurea solstitialis, Convovulus arvensis, Bromus hordeaceous, Gastridium ventricosum, Grindelia hirsutula var. *davyi, Hemizonia fitchii, Lactuca serriola, Madia sp., Taeniatherum caput medusae,* and *Trichostema lanceolatum.*

Hydrology

Hydrology within the survey area was evident within the network of irrigation canals and ditches which contained flowing water during the dates surveyed. In the western survey area, the two main canals that run through the survey area are Tule Canal and the Knights Landing Ridge Cut. These irrigation canals are entirely dependent on the pumping of water from the Sacramento River and are heavily manipulated for agricultural and flood control purposes and are considered relatively permanent waters. Additionally, the water from these canals and ditches eventually are drained back into the Sacramento River further south of the survey area. In the eastern survey area the Natomas East Main Drainage conveys water from north to south and drains directly into the American River further south of the survey area. Additionally, Curry Creek conveys water from east to west, intersecting Baseline Road twice, before forming a confluence with Natomas East Main Drainage north of the survey area. Canals west of Natomas East Main Drainage are entirely dependent on the pumping of water from the Sacramento River via the Natomas Cross Canal and all drain into either the West Drainage Canal or the East Drainage Canal which merge to form the Natomas Main Drainage Canal, which then flows directly into the Sacramento River south of the survey area. Nearly all waterways within the project area, with the exception of Curry Creek, are heavily manipulated for agricultural and flood control purposes including Natomas East Main Drainage, formerly Steelhead Creek, which has been straightened and confined to levies. The Sacramento River, from which most water within the project area is obtained, and the American River, which nearly all water in the project area is drained into, both provide Interstate Commerce. Wetland features located in the eastern survey area all drain into either Curry Creek to the north or Dry Creek to the south, both of which form a confluence with Natomas East Main Drainage.

Impact Avoidance and Minimization Recommendations

To the most practicable extent, impacts to all wetland features and Other Waters should be avoided. When complete avoidance is not possible, impacts should be indirect and temporary, with no permanent damage to the integrity of any wetland feature or Other Water nor to the watershed that supports it. A project strategy of avoidance of indirect and temporary impacts will reduce the amount of time needed for the permitting process and will reduce or eliminate the need for off-site mitigation.

Copies of field data sheets and the jurisdictional forms are provided in **Appendix B**.

Site Photos

Non-jurisdictional irrigation canal (NJ 05) and culvert (NJ 48)

Non-jurisdictional irrigation ditch (bottom left NJ 27, top right NJ 33)

Fresh emergent wetland in vegetated irrigation canal (OW 18)

RPW (irrigation canal) – OW 11

Non-jurisdictional roadside ditch (NJ 50)

Pump pumping water from RPW (OW 06- unnamed tributary of Knights Landing Ridge Cut) into adjacent row crop field (OW 39).

Fresh emergent wetland within the vegetated irrigation canal (OW 03)

Non-jurisdictional irrigation ditch (NJ 22)

Non-jurisdictional cemented irrigation ditch (NJ 36)

Riparian wetland in irrigation ditch (WF 09w)

RPW (Tule Canal) – OW 05

Non-jurisdictional culvert (NJ 44)

Non-jurisdictional seasonal wetland (WF 97e) – a fallow rice field

Vernal pool – WF 82e

Vernal pool – WF 78e

Seasonal swale – WF 64e

Seasonal wetland – WF 80e

Vernal pool – WF 69e

Irrigation canal – OW 30

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