Appendix E
Biological Resources Reports

Appendix E1
Cambria Emergency Water Supply Project San Simeon Creek Basin Groundwater Modeling Report

Cambria Community Services District

Cambria Emergency Water Supply Project
San Simeon Creek Basin Groundwater Modeling Report

Cambria, California
May 2014

CDM Smith

The information contained in the document titled "Cambria Emergency Water Supply Project San Simeon Creek Basin Groundwater Modeling Report" dated May 2014 has received appropriate technical review and approval. The conclusions and recommendations presented represent professional judgments and are based upon findings from the investigations and sampling identified in the report and the interpretation of such data based on our experience and background. This acknowledgement is made in lieu of all warranties, either expressed or implied. The activities outlined in this report were performed under the supervision of a California Registered Professional Engineer.

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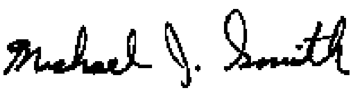

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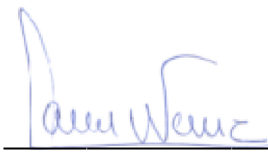

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Acronyms/Abbreviations

AF	acre-feet
CCSD	Cambria Community Services District
MGD	million gallons per day
MSL	mean sea level
NAVD 1988	North American Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
TDS	total dissolved solids
USGS	Unites States Geological Survey
VDF	Variable-Density Flow Process
WRIR	Water Resources investigation Report

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Section 1
Introduction

1.1 General Setting

This investigation is being conducted for the Cambria Community Services District (CCSD), which provides water, and collects and treats wastewater for the town of Cambria and adjacent service areas. The area of specific interest in this investigation is the lower portion of the San Simeon Creek valley, extending about 3.5 miles upstream from the Pacific Ocean. The study area and major features are shown on **Figure 1-1**.

The study area includes areas underlain by a significant alluvial aquifer along San Simeon Creek, including the Van Gordon Creek tributary. Near the headwaters, the creek valley forms a steep, narrow canyon. Along the final three to five miles before reaching the ocean, the valley widens to a floodplain that is up to approximately one thousand feet wide. The floodplain is underlain by the groundwater basin and is flanked by steep hillsides that rise 200 to 800 feet above the valley floor. A fresh water lagoon is present in the lower portion of the valley that serves as an important ecological resource. This lagoon forms behind an ocean beach berm and is supported by groundwater discharge and surface water inflows.

CCSD and agricultural water users along San Simeon Creek use wells in the alluvial aquifer. Groundwater occurs in the alluvial deposits beneath the creek, which drains the western flanks of the Santa Lucia Range in San Luis Obispo County and discharges into the Pacific Ocean. The alluvial deposits form flat valley floors, which are used for irrigated agriculture. The alluvial aquifer is recharged primarily by seepage from San Simeon Creek, which typically flows during the winter and spring rainy season.

The CCSD has a well field consisting of four potable water supply wells located approximately one mile inland from the ocean. They also utilize a series of percolation ponds between the well field and the ocean where secondary treated waste water is recharged back to the aquifer. Pumping during the dry season results in seasonal declines in groundwater levels since production is supported by removal of water from storage in the aquifer when the stream is not flowing.

Numerous private wells are present that irrigate farmlands on flat areas adjacent to the creek bottoms. Native vegetation consists of trees, grass, and shrubs that grow along the creeks and field borders. Grassy hillsides along the sides of the valleys are used for grazing. San Simeon State Park occupies the western extent of the basin and includes a large campground, which obtains its water supply from the CCSD.

1.2 Study Objectives

Extended drought conditions in the central coastal area of California have persisted over the past year, which have resulted in a limited water supply for the CCSD well field. Studies have been ongoing to identify additional water sources for the CCSD including indirect potable reuse of the percolated secondary effluent. However, the persistent drought conditions have elevated concern on availability of a reliable water supply since water levels continue to decline as aquifer storage is depleted. This groundwater modeling study has been developed to support evaluation of the basin water management alternatives to develop additional water supplies for CCSD to meet the emergency conditions. The specific objectives of this San Simeon Basin Groundwater Modeling study are provided below.

1. Develop a groundwater model that is consistent with data from the United States Geological Survey (USGS) WRIR 98-4061 model (Yates and Van Konyenburg, 1998) and the 2007 modeling analysis (Yates, 2007) to allow assessment of potential emergency water supply alternatives focusing on recovery of brackish basin water near the current percolation ponds.

2. The evaluation will consider the impacts of vertical flow and density driven flow in the evaluation of alternatives.

3. The evaluation will assess residence times prior to recovery of treated wastewater effluent as part of the alternatives evaluation.

4. The model will evaluate impacts of emergency water supply alternatives on San Simeon Creek, and the fresh water lagoon area.

The evaluation will be based on available existing data, as supplemented by stream elevation survey and select water quality data that are currently being collected.

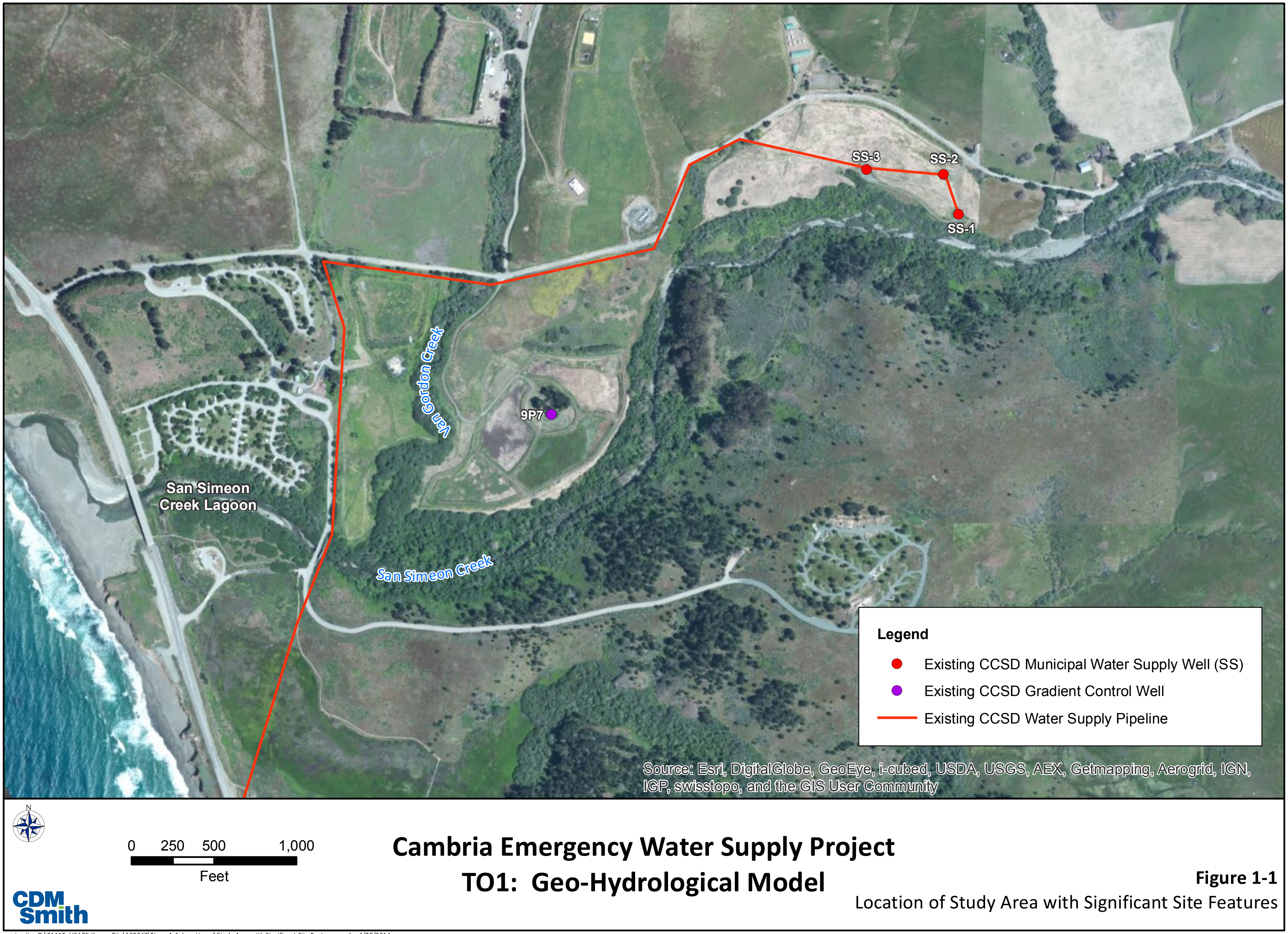

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Figure 1-1
Location of Study Area with Significant Site Features

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Section 2
Conceptual Model

The basin conceptual model documents the current understanding of the aquifer system at the site and includes the data that are available to support this interpretation. This site conceptual model is based on the 1998 USGS report (Yates and Van Konynenburg, 1998), supplemented by additional data that have been collected since the late 1980s. This conceptual model is used to support development of the groundwater model that will be used for assessment of emergency water supply alternatives. Subsequent sections describe the nature and extent of the aquifer system, sources of recharge and discharge, current aquifer use and a water budget.

2.1 Aquifer System Framework

The aquifer system framework describes the physical configuration of the alluvial aquifer, including its areal extent, thickness and the lithology of the aquifer materials. The alluvial aquifer in the San Simeon valley consists of sands and gravels with interbedded finer grain lithologies filling the bedrock valley of San Simeon Creek and the lower portion of Van Gordon Creek. This alluvial aquifer extends to approximately elevation -120 feet or deeper in its western extent, and likely extends to the off-shore area, since the extent of the bedrock valley was influenced by lower sea level elevations in the geologic past.

Figure 2-1 shows the location of wells and borings for which geologic information is available, with the path of the cross-section provided on **Figure 2-2**, which show information based on boring logs, with generalized interpretation of lithology between the boring locations. The alluvium west of the confluence with Van Gordon Creek contains a larger percentage of fine grain material interbedded with more permeable zones and may act as a confining to semi-confining unit for the deeper zones.

Figure 2-3 provides a geologic map produced by the US Geological Survey (Hall, et. al., 1979). This map shows the extent of alluvial deposits in the San Simeon valley and adjacent areas, along with the bedrock geology. Several faults have been mapped or inferred in the bedrock units, however, the USGS concluded that they do not impact the alluvial deposits, so they are not expected to impact the hydrogeology of the alluvial aquifer (Yates and Van Konynenburg, 1998).

The Hosgri fault zone is located sub-parallel to the coastline is this area and is about two miles off-shore. This zone was identified as seismically active (Yates and Van Konynenburg, 1998). However, due to its distance from the San Simeon valley alluvial aquifer, it is not anticipated to impact the hydrology of the basin.

Bedrock units consist of highly fractured Franciscan rocks that are hydraulically connected to the alluvial basin, however, their permeability is much lower than the alluvial aquifer and the bedrock has a limited role in the hydrology of the basin, providing a limited amount of recharge to the alluvium that is described in a later section.

Figure 2-4 shows the elevation of the bedrock surface that was interpreted from borings in the basin in the 1998 USGS report (Yates and Van Konynenburg, 1998). This bedrock surface forms the lower boundary of the alluvial groundwater system.

2.2 Groundwater Occurance and Flow

The alluvium in the San Simeon basin is saturated, with groundwater near the ground surface at its western extent. During the periods when water is present in San Simeon Creek, groundwater levels are similar to those observed in the creek. The depth to groundwater increases away from the creek, since in many areas of the valley the creek is incised below the adjacent terrace areas.

Groundwater levels decline during the dry periods of the year and in response to pumping. Water levels are mounded in the vicinity of the percolation ponds that are operated by the CCSD. A generalized water table configuration for the winter of 1989 is provided on **Figure 2-5**, showing the down valley flow direction.

The average hydraulic gradient down the valley is about 0.006 ft/ft, with increased gradients in areas where the width of the bedrock valley narrows (Yates and Van Konynenburg, 1998). Water level elevations monitored at wells range from about 52 feet (NAVD 1988) to slightly above sea level at the western extent. Vertical head differences can be observed at two locations, near the shoreline at well 8R3, and at adjacent shallow and deep piezometers at 9N2 and 9N3.

The 8R3 well has one interval screened in bedrock at depth of 130 to 140 feet, and a shallower zone screened in the deep portion of the alluvial aquifer from 92 to 102 feet. Water levels in the two intervals at 8R3 were very similar and do not suggest the presence of a significant gradient between the fractured bedrock and the alluvial aquifer.

Water levels at the 9N2/9N3 location showed a significant downward gradient present, with the shallow well showing an elevation of 18.37 feet, while the deep well had a water level elevation of 8.29 feet (NAVD 1988). The water table elevation at the shallow well is considerably higher than other wells, suggesting that this is a perched interval that is affected by the nearby percolation pond or Van Gordon Creek and not representative of the principal aquifer system. This is consistent with the inter-bedded lithology logged in the adjacent well in the upper 20 feet, where well 9N3 is screened.

A fresh water lagoon is present at the western extent of the valley that appears to be in hydraulic communication with groundwater, since it has water present through most years and has a water level similar to the adjacent well 8R3.

2.3 Hydraulic Properties

Hydraulic characteristics of interest include the hydraulic conductivity, storage coefficient, specific yield and effective porosity. Limited characterization has been conducted in past studies, primarily quantifying hydraulic conductivity using pumping tests at seven wells located along the length of the valley. **Figure 2-6** shows the location of aquifer tests and the hydraulic conductivity that was reported in the 1998 USGS report (Yates and Van Konynenburg, 1998).

Responses of water levels in wells to stream stage changes were also used to estimate hydraulic properties, however, these estimates yield a composite of storage coefficient and transmissivity, so it is difficult to estimate hydraulic conductivity due to the highly variable storage coefficient, which could range from the specific yield to a confined or semi-confined range.

The results of the stream interaction estimates did indicate that the aquifer is highly permeable. The horizontal hydraulic conductivity estimated from pumping tests ranged from 99 to 413 ft/day. The geometric mean of the hydraulic conductivity is 220 ft/day. **Figure 2-7** shows the statistical distribution of hydraulic conductivity values.

The reported storage coefficients in the USGS Study were low compared to typical estimates for an unconfined sand and gravel aquifer. This is likely due to the short term nature of the aquifer tests, use of the pumping well response for analysis and the presence of finer grain interbeds, which would lead to a confined to semi-confined response rather than physical drainage of pore space in the aquifer. Based on the lithology of the aquifer, an estimate of 0.1 to 0.2 is estimated for the specific yield and the effective porosity of the aquifer at the site, based on typical values estimated for this type of aquifer.

Estimating the effective porosity from the specific yield is a conservative approach, since the effective porosity is likely to be higher than specific yield, which is the drainable portion of the pore space. Some moisture will be retained under gravity drainage that will contribute to groundwater flow. A lower effective porosity will result in a higher groundwater velocity, which is conservative for this analysis.

2.4 Boundary Conditions

Boundary conditions describe sources of water inflow and outflow to the basin, and include recharge, subsurface inflow from surrounding bedrock areas, pumping, stream inflows, outflows and seepage, evapotranspiration from groundwater, interaction with the ocean and percolation from wastewater treatment plant effluent disposal ponds. This section describes each of these elements, while the following section presents estimates of each of the water budget components.

2.4.1 Recharge

2.4.1.1 Recharge from Precipitation

Precipitation is estimated using the data from the San Luis Obispo–Poly Station, which was selected for use in the 1998 USGS report (Yates and Van Konynenburg, 1998). Mean annual precipitation for the period 1870–2013 was 21.93 inches. Rainfall increases with distance from the shoreline in this area, estimates increasing to 40 to 50 inches in headwater areas east of the basin of interest.

Figure 2-8 shows the long term precipitation trend near the site, indicating that precipitation has been significantly lower than the long term average for the last decade. The majority of the annual rainfall occurs between November and April. Deep percolation of precipitation past the root zone will recharge the aquifer and only occurs during significant precipitation events when soil moisture is above field capacity and available moisture exceeds evapotranspiration demands.

Most recharge from precipitation occurs in irrigated areas, since the native vegetation areas only meet these conditions during periods of average or greater precipitation. Evaluations during the USGS study period for the 1998 report, using data from 1988 and 1989, indicated no significant recharge occurred in the native vegetation areas (Yates and Van Konynenburg, 1998). This report estimated that the quantity of recharge under average conditions originating from precipitation within the basin at 50 acre-feet (AF)/year, which corresponds to 0.75 inches of recharge, or 3.4 percent of the precipitation.

2.4.1.2 Recharge from Irrigation Return Flows

Irrigated agriculture is practiced within a significant portion of the basin. The 1998 USGS report estimated that 37 percent of the applied water returned to the groundwater system as deep percolation, which is reasonable for the flood irrigation practices in the late 1980s. Since that period, irrigation practices have changed and more efficient sprinkler and drip systems are now used. A return flow percentage of 15 percent of the applied water for current irrigation practices is estimated, based on professional judgment.

2.4.1.3 Lateral Boundary Inflow

An additional source of water entering the system originates as discharge from surrounding fractured bedrock. This term is difficult to determine from field measurements, but was estimated in the 1998 USGS report at 150 AF/year (Yates and Van Konynenburg, 1998). This term was estimated from the contributing tributary areas of bedrock adjacent to the study area and modified downward based on the calibration conducted by the USGS.

2.4.1.4 Stream Channel Seepage

The most significant source of recharge to the aquifer system is seepage from the San Simeon Creek channel during runoff periods. Water levels in the basin recover rapidly with the onset of stream flow in the fall and winter and decline when stream flow ceases in the spring. Stream flows during the 2009 to 2013 time period are shown on **Figure 2-9.** The quantity of recharge from the stream is a function of the period of time that the stream is flowing and the amount of pumping that is occurring in the aquifer.

2.4.1.5 Waste Water Percolation Pond Recharge

Much of the water that is produced by the CCSD is returned after receiving secondary treatment to the lower part of the basin by discharging to a series of four percolation ponds. The quantity of water discharged to the percolation ponds during the period 2009–2013 is shown on **Figure 2-10**. This water infiltrates to the alluvial aquifer except for a small percentage that is lost to evaporation. The average discharge during the 2009 to 2013 period was 0.56 million gallons per day (MGD).

2.4.2 Discharge

2.4.2.1 Municipal Pumping

The CCSD maintains a potable water supply well field in the San Simeon basin that provides a significant portion of the water to the Cambria community. Additional water for the CCSD system is obtained from the Santa Rosa basin. In addition to the water supply pumping, a gradient control well is periodically pumped as needed to maintain an adequate westerly gradient from the CCSD well field toward the percolation ponds to avoid inducing flow of treated wastewater back toward the well field. **Figure 2-11** shows the average monthly pumping rates from the CCSD well field during 2009–2013. The average production rate from the San Simeon well field over this period was 0.51 MGD.

2.4.2.2 Agricultural Pumping

The alluvial aquifer is used for irrigation within the valley. The agricultural pumping during the late 1980s was estimated in the USGS report at 450 AF/year (Yates and Van Konynenburg, 1998). During an update to this analysis in 2007, this production was estimated at 180 AF/year, based on changes in irrigation practices and interviews with water users. (Yates, 2007)

2.4.2.3 Evapotranspiration from Groundwater

Limited evapotranspiration from groundwater occurs in areas where groundwater levels are near the surface in riparian areas near the channel of San Simeon Creek. This term was estimated at 30 AF/year in the USGS report (Yates and Van Konynenburg, 1998).

2.4.2.4 Discharge to Surface Water

Water in the aquifer will discharge to the surface water system during periods when the groundwater levels are higher than adjacent stream levels. This occurs primarily in the lower extent of the basin extending from the location of the percolation ponds to the ocean. **Figure 2-12** shows the locations where water was present in the San Simeon Creek channel during February 2014, indicating that groundwater discharge was occurring in these reaches. Elevations of the water surface (NAVD 1988) are shown on the figure.

These observations were made during a period when there had been no precipitation for multiple months. In addition, there is significant subsurface outflow to the ocean that occurs from the basin. This quantity was estimated by the USGS at 320 AF/year by calibration of their model (Yates and Van Konynenburg, 1998). Mean sea level in this area is 2.82 feet referenced to the NAVD 1988 datum used in this report. Mean seawater level was interpolated between the primary NOAA tidal stations at Port San Luis and Monterey (Yates, 2014 personal communication).

2.5 Water Budget

A basin water budget summarizes the components of inflow and outflow to the aquifer at the project site. The water budget from the 1998 WRIR report is summarized on **Table 2-1** and represents averages for the late 1980s period that was used in the USGS analysis.

Current practices have decreased agricultural pumping and return flows, and the CCSD now uses percolation ponds rather than the spray irrigation that was used in the late 1980s. The net inflows and outflows were balanced using estimates of the uncertain terms, primarily ocean outflow, resulting in an overall net inflow to the basin of 1760 AF/year with an equivalent outflow of the same quantity. The USGS estimates of areal recharge and lateral boundary inflow were retained for the current study, the remaining components were based on updates from the 2007 study (Yates, 2007), and flow records maintained by the CCSD. Components that cannot be measured with available field data, such as the ocean outflow and stream gains and losses were calculated in the model.

Table 2-1 Alluvial Aquifer Annual Water Budget Estimates from 1988 USGS Study

Budget Item	Inflow (AF)	Outflow (AF)	Net flow (AF)
Rainfall recharge	50		50
Stream Seepage	950	-410	540
Subsurface Inflow and Outflow			
Lateral Boundary Inflow	150		150
Ocean Boundary Outflow		-320	-320
Agricultural Water Use			
Pumping		-450	-450
Irrigation Return Flow	170		170
Nonagricultural Water Use			
CCSD Pumping		-550	-550
Rural Pumping		<-10	<-10
CCSD Percolation	440		440
Septic Tanks	<10		<10
Evapotranspiration		-30	-30
Change in Storage			0
Totals:	**1760**	**-1760**	**0**

Note: From Yates(1998)

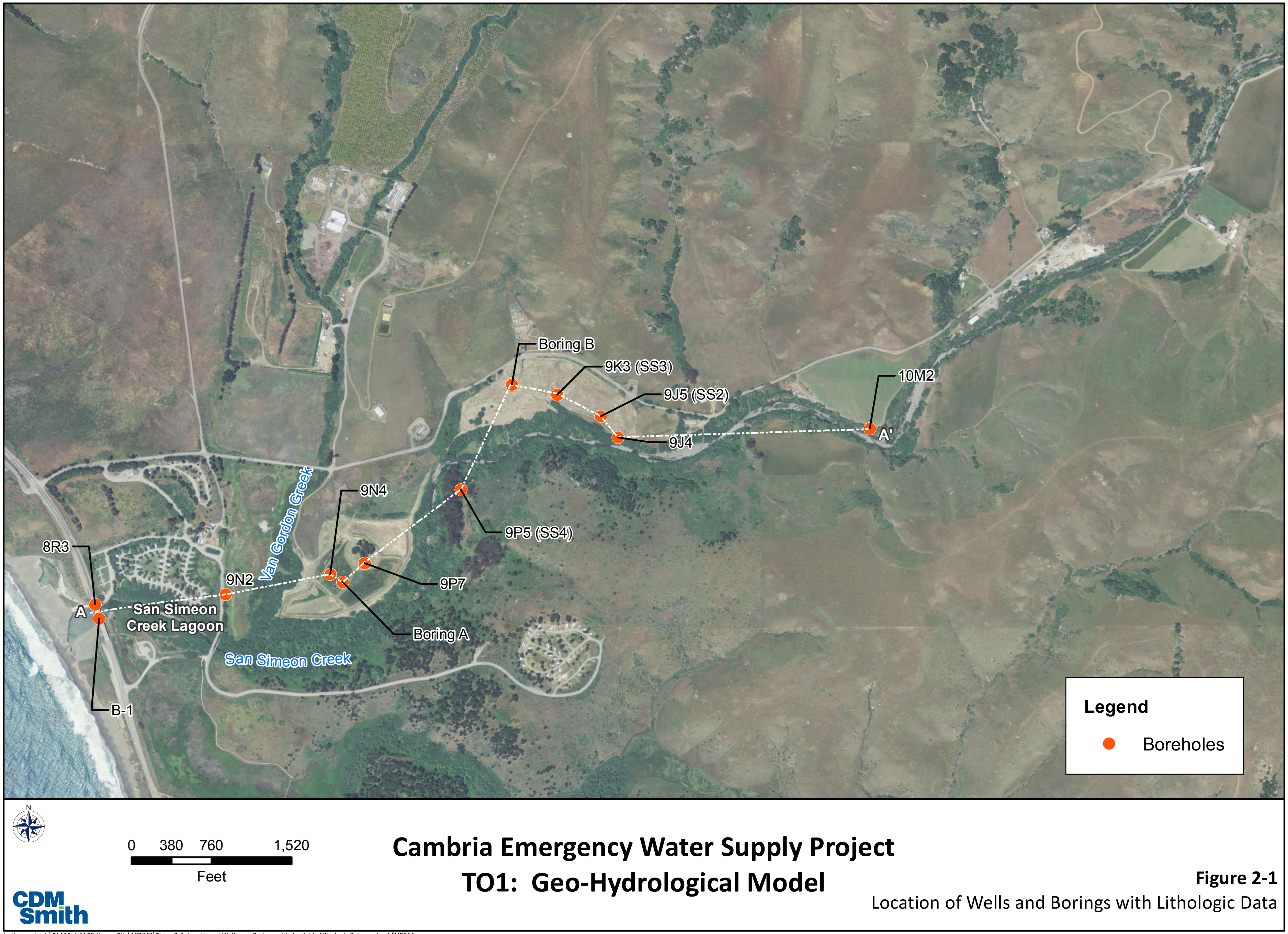

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Figure 2-1
Location of Wells and Borings with Lithologic Data

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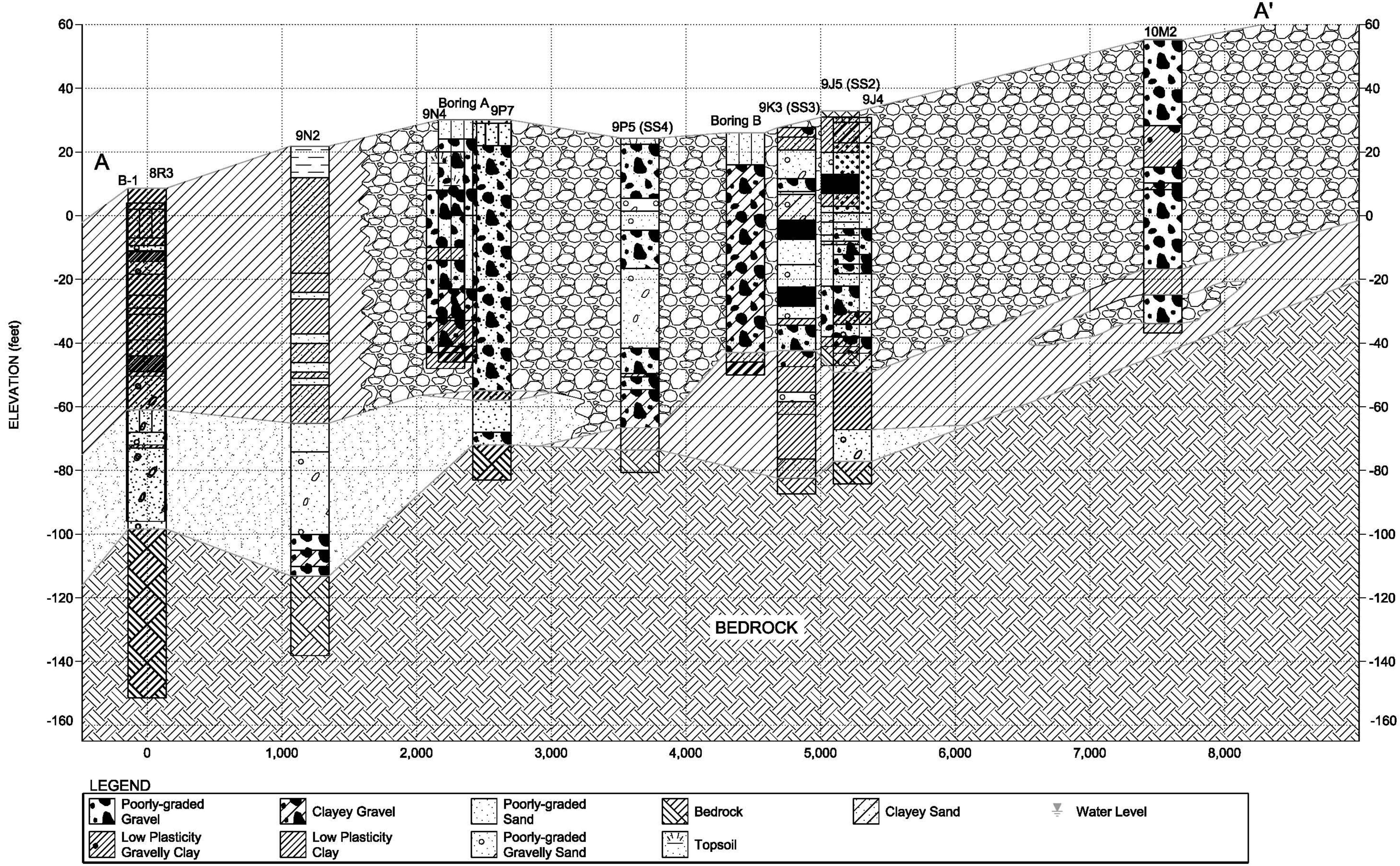

Note: Geologic interpretation based on boring logs developed by the USGS and from Drillers logs.

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Figure 2-2
Geologic Cross-Section of San Simeon Valley Alluvium

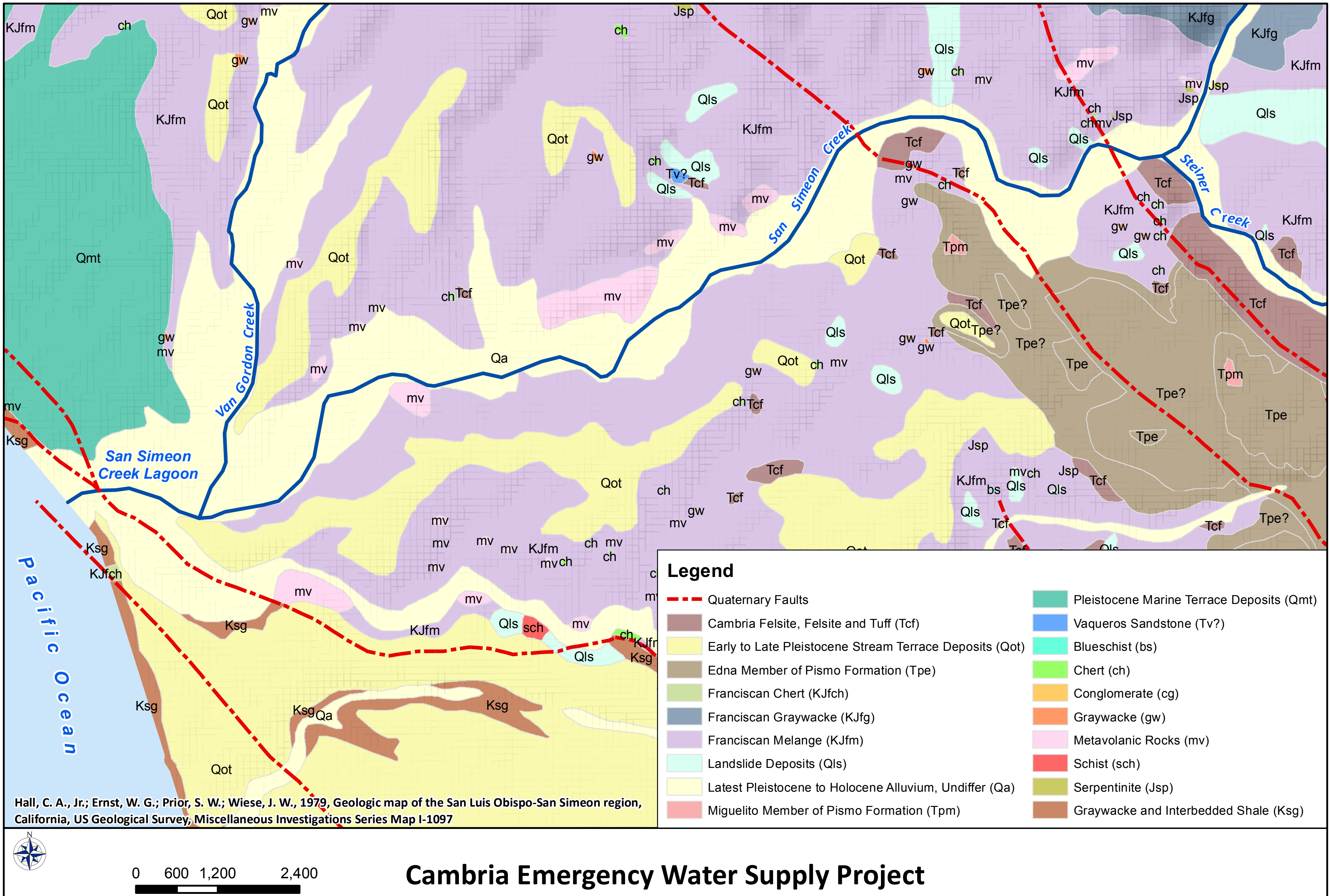

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Figure 2-3
Geologic Map of the San Simeon Creek Area

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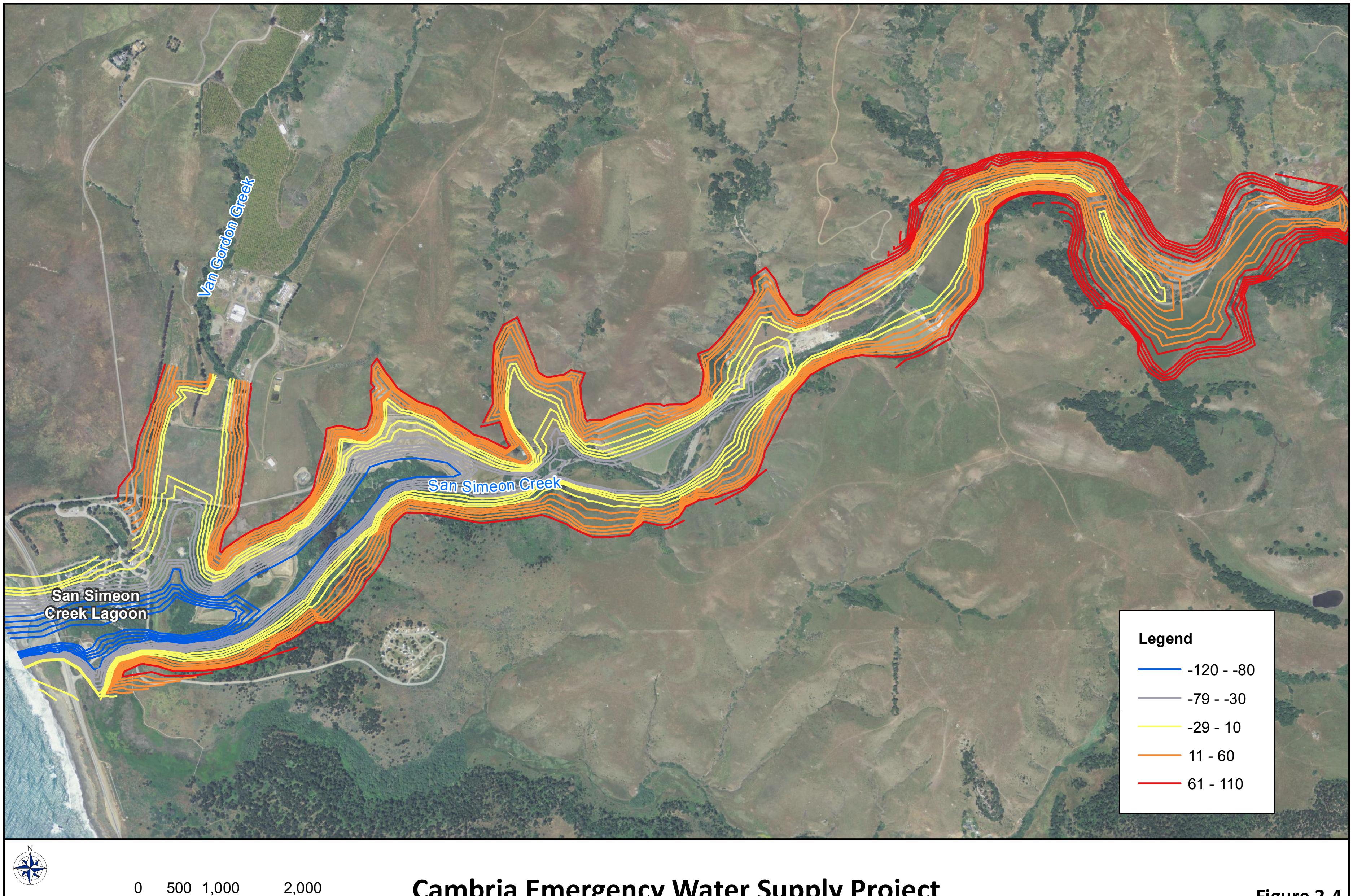

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Figure 2-4
Interpreted Bedrock Surface Elevation
below the San Simeon Basin Alluvial Aquifer

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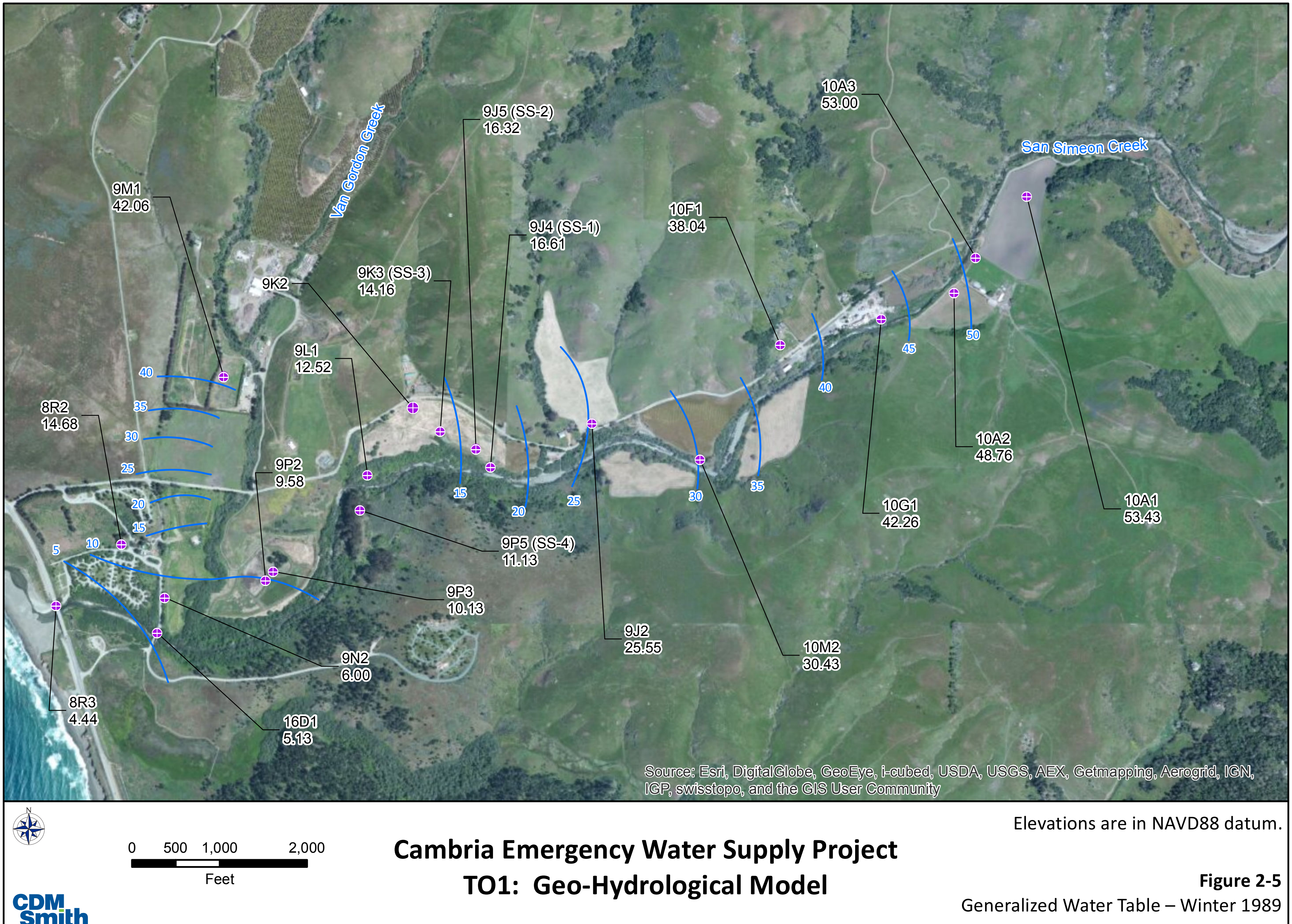

Elevations are in NAVD88 datum.

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Figure 2-5
Generalized Water Table – Winter 1989

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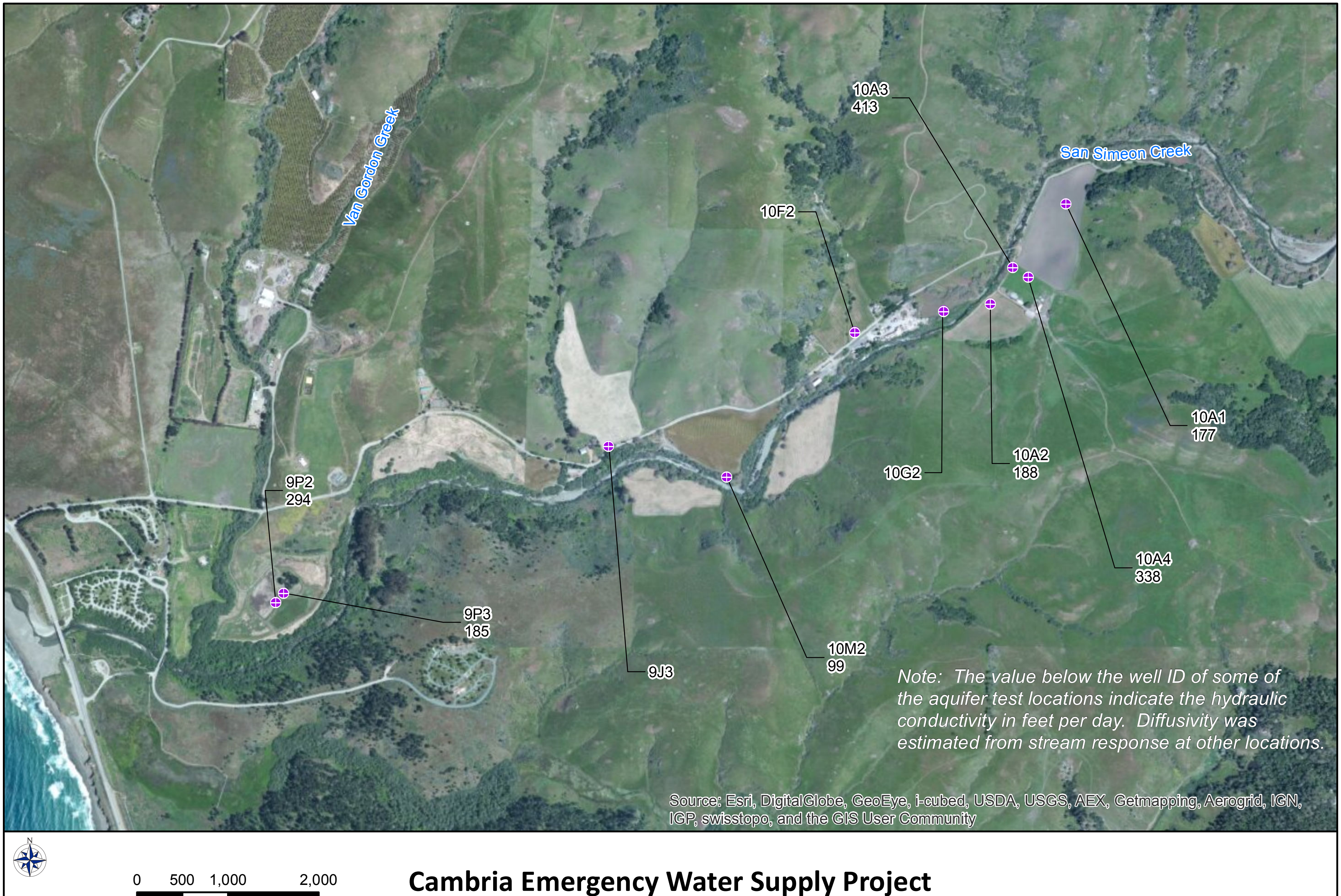

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Figure 2-6

Location of Aquifer Tests

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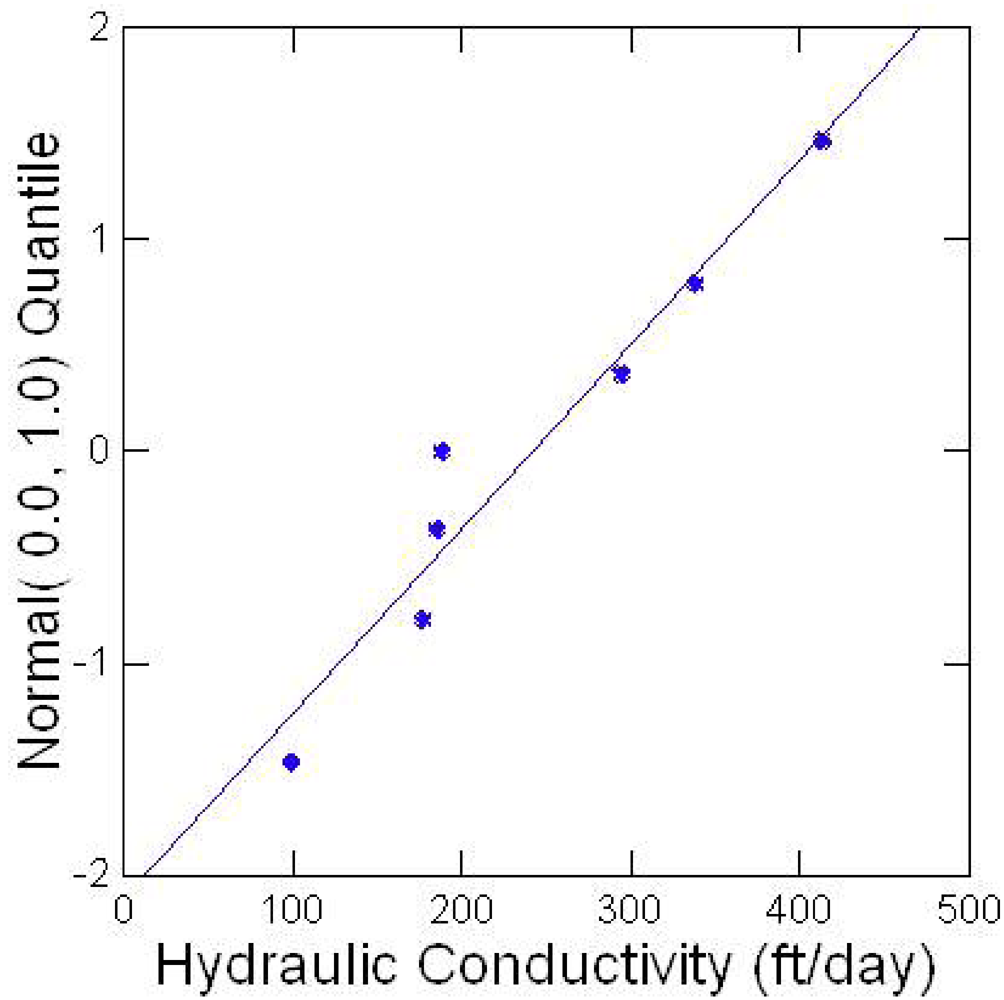

Note: Blue dots represent conductivity value from the 1998 USGS Report.

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Figure 2-7
Hydraulic Conductivity Statistical Distribution

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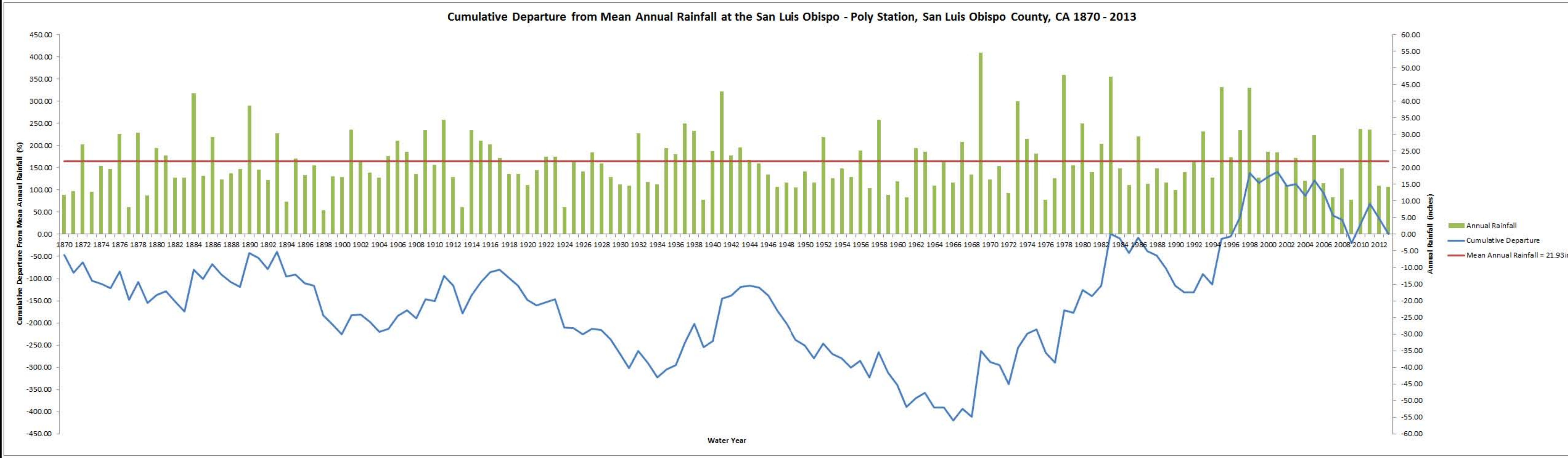

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Figure 2-8
Precipitation and Cumulative Departure
from the Long Term Average at San Luis Obispo - Poly Station

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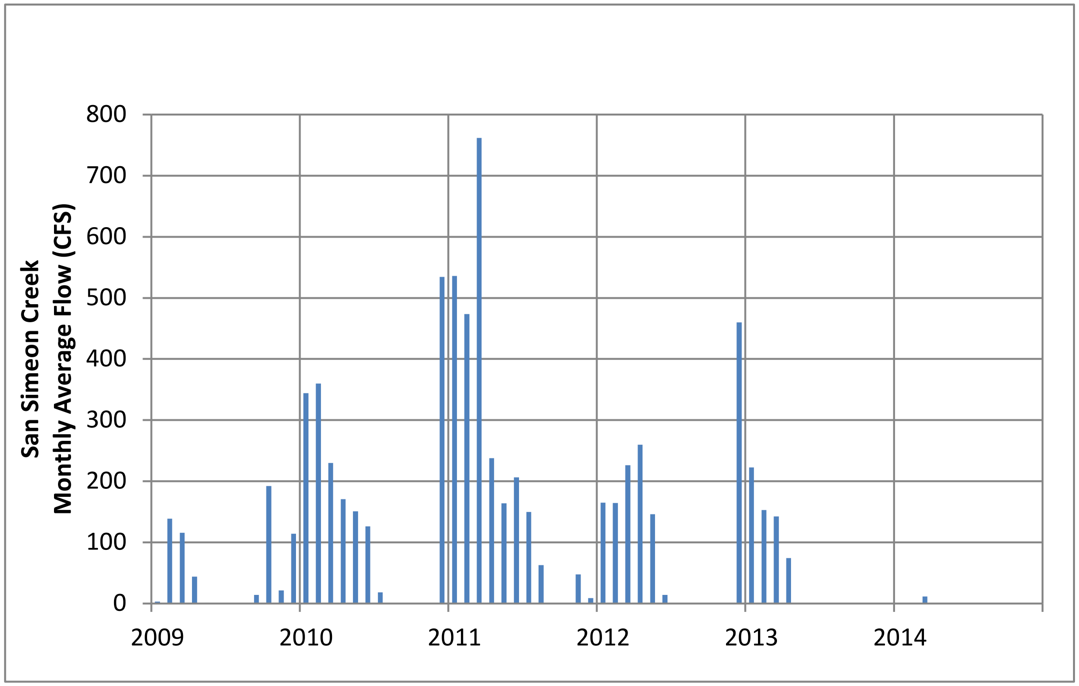

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Figure 2-9

Streamflow in San Simeon Creek and Groundwater Level Hydrographs in the 2009 - 2013 Period

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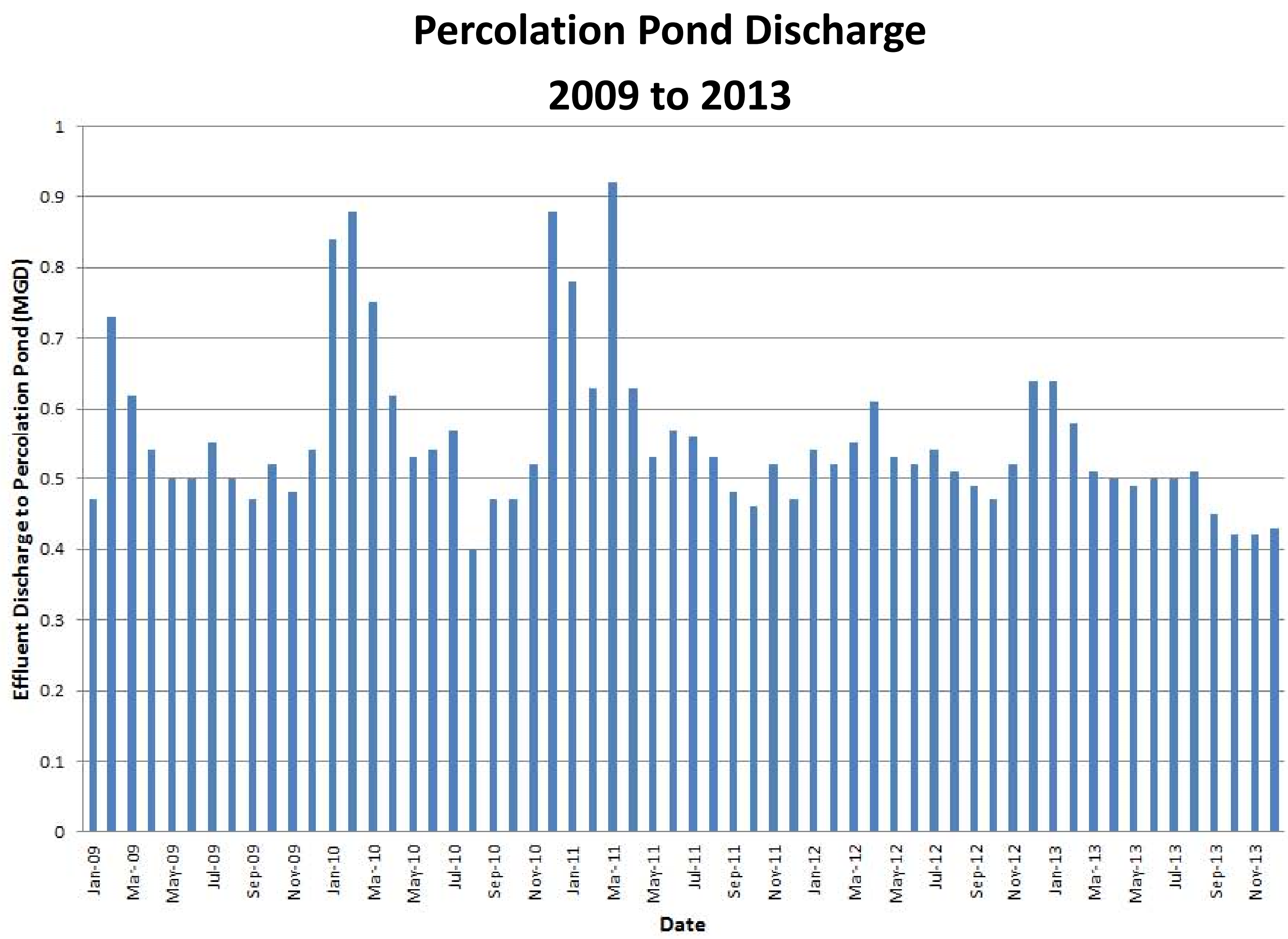

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Figure 2-10
Pecolation Pond Secondary Effluent Discharge 2009 to 2013

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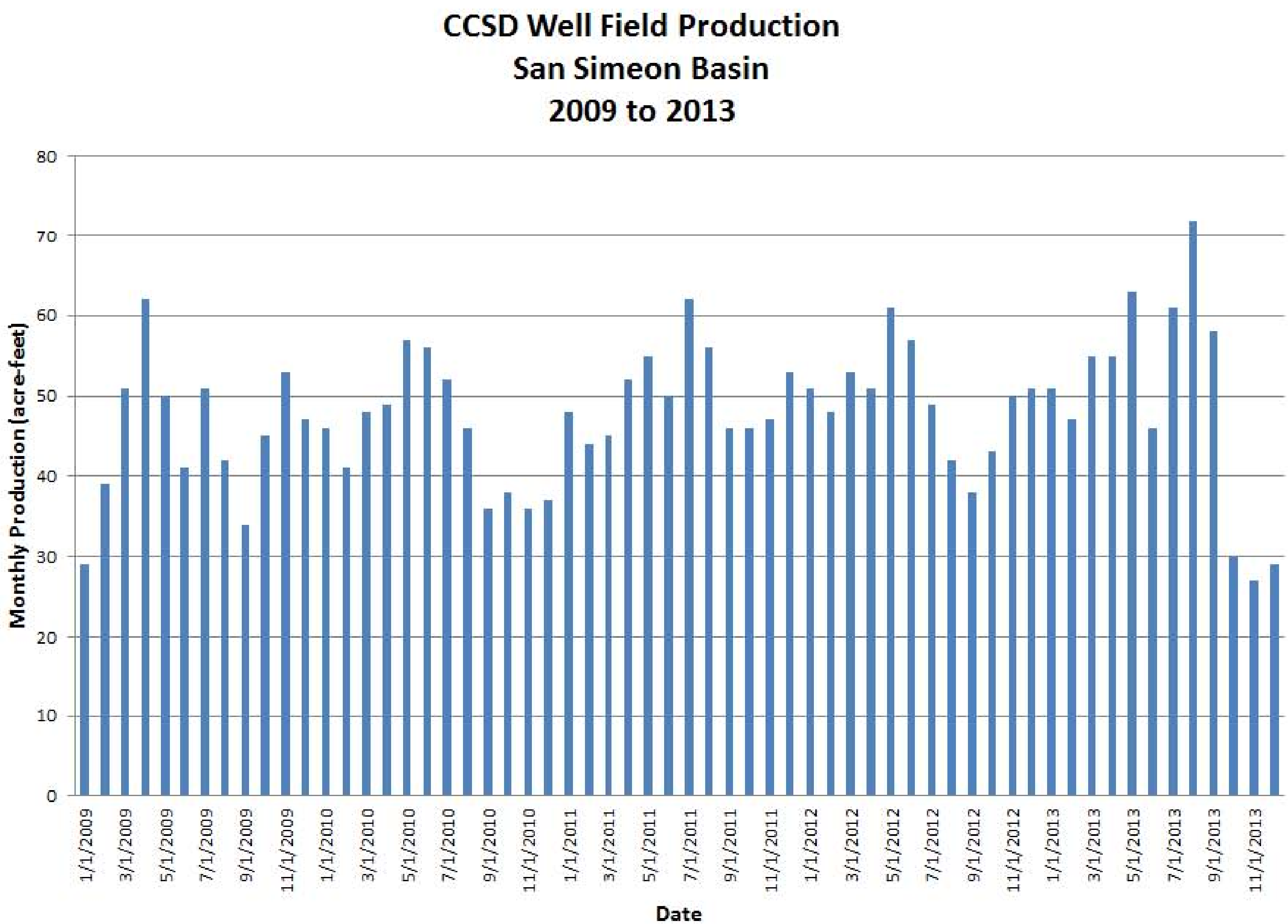

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Figure 2-11

CCSD San Simeon Basin Well Field Production 2009 to 2013

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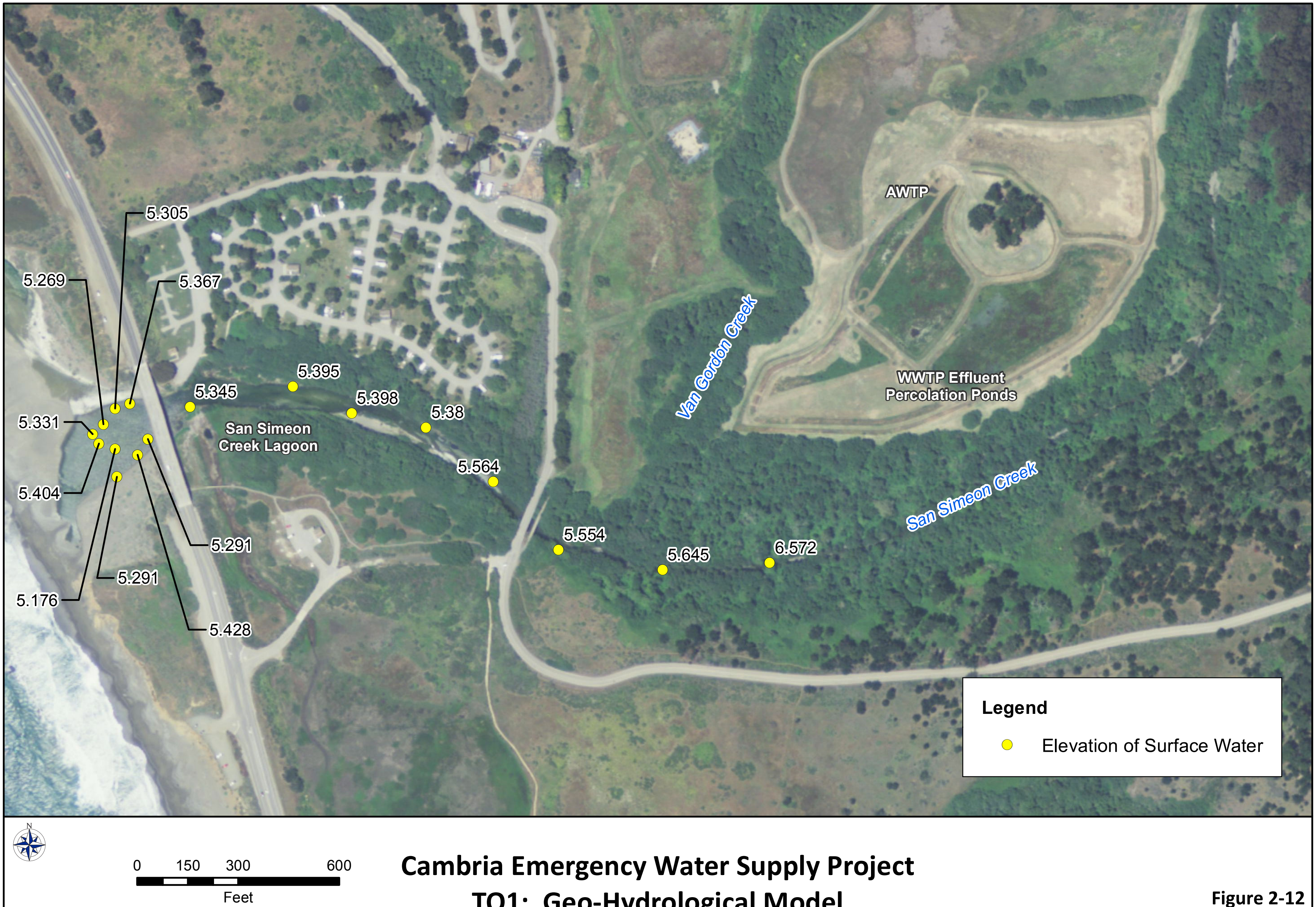

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Figure 2-12
Location of Surface Water - February 2012

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Section 3
Computer Model Code Selection

This modeling evaluation has been conducted using industry standard, open source, government developed computer programs that are able to mathematically represent the processes of interest. Detailed descriptions of these modeling programs are provided in the cited references and will not be repeated. The specific elements that are used in this application are described in the model development section. In addition, preparation of model data sets and post processing of model output was facilitated through use of a commercial graphical user interface. The selected programs are listed below.

MODFLOW-2000 (Harbaugh, 2000), this finite difference model is the most widely used program for modeling of groundwater flow and serves as the basis for flow calculations in the additional programs that are used in the analysis. This program was developed by the US Geological Survey and includes capabilities for simulation of all of the components of interest in this investigation, except for density driven flow, which is handled in the companion program SEAWAT. MODFLOW-2000 is well documented by the USGS.

MT3DMS. (Zheng, 1999), this code was developed under contract from the US Environmental Protection Agency and the US Army Corps of Engineers. This model is an industry standard model used for simulation of transport of dissolved constituents in groundwater. This code is incorporated into the SEAWAT model.

SEAWAT. (Langevin, 2003), SEAWAT is a modification of MODFLOW-2000 and MT2DMS that allow simulation of groundwater flow, including the effects of variable density and transport of solutes. This industry standard model was developed by the USGS. This model was used to assess the importance of density driven flow for comparison with the primary simulations in MODFLOW and MT3DMS.

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Section 4
Ground-Water Flow Model Construction

The basin conceptual model described in Section 2 was used to configure a numerical flow model in MODFLOW-2000 and to set up transport capabilities in MT3DMS and SEAWAT. This section describes the configuration of the model framework, selection of simulation packages to represent the site processes and parameter selection.

4.1 Model Grid

A very fine computational grid was defined to represent the aquifer system at the site, since a major concern is the simulation of transport and consideration of vertical movement of recharge or injected water. The alluvial aquifer is represented by 18 vertical layers at the western limit of the site, decreasing to 8 active layers in the eastern portion of the site where the aquifer is thinner and more distant from the area of interest. The horizontal spacing for grid cells was maintained at a uniform size of 40 by 40 feet, resulting in a grid with 120 rows and 460 columns.

The grid was rotated to approximately parallel the trend of the San Simeon basin. Cells outside of the aquifer footprint and in deeper portions of the grid in the eastern part of the model were inactivated. **Figure 4-1** shows the extent of the model, while **Figure 4-2** shows the model grid in the area of primary concern between the CCSD well field and the wastewater percolation ponds.

4.2 Hydraulic Parameters

A groundwater model must define hydraulic characteristics for each active cell in the grid in order to evaluate flow and transport. These hydraulic characteristics include horizontal and vertical hydraulic conductivity and storage characteristics of the aquifer material. A detailed calibration of hydraulic characteristics was done for a model of the basin in 2007 (Yates, 2007) that was used as the basis for initial configuration of hydraulic characteristics for the alluvial aquifer.

This model was configured in a similar manner to leverage the calibration that was done at that time. Minor refinements were incorporated in some areas, however, variation in hydraulic conductivity during the evaluation of calibration did not result in significant improvements, so the hydraulic conductivity distribution remained very similar to the 2007 configuration. A detailed calibration for development of specific yield, which is important in assessing the volume of water in storage, for assessment of groundwater velocities and estimation of residence time of injected fluids was done.

The hydraulic properties were grouped vertically for definition of hydraulic properties, with an upper zone incorporating layers 1–8, and intermediate zone represented by layers 9–12, and a deep zone for layers 13–18. Properties within each of the layer groupings were uniform. The base of the upper zone was set at an elevation-20, or the bedrock elevation for cases where bedrock was above this elevation. The intermediate zone extended from elevation -20 to elevation -60, again truncating at the bedrock contact if it was shallower. The deep zone extended from -60 to the bedrock contact. In cases where the bedrock contact was above the noted elevations, then underlying layers were inactivated in the model. The active extent of the model grid therefore extended from the water table to the bedrock contact.

Figure 4-3, thru **Figure 4-5** show the distribution of horizontal hydraulic conductivity for the upper, middle and deep zones respectively. The distribution of hydraulic conductivity incorporates the conceptual model characteristic of a lower permeability zone in shallow materials in the western extent of the model down-gradient of the confluence of Van Gordon Creek. A constant ratio of horizontal to vertical hydraulic conductivity of 10:1 was used throughout the model domain. The initial specific yield was set to 0.12, with changes that were incorporated during calibration described in subsequent sections.

4.3 Boundary Conditions

Boundary conditions describe characteristics that control inflow and outflows of water to and from the aquifer system. As described in the conceptual model, the primary sources of water entering the system are recharge from stream seepage, infiltration of precipitation and irrigation return flows, waste water percolation and lateral boundary inflow.

The primary discharge from the aquifer includes stream seepage in the western portion of San Simeon Creek, municipal and agricultural pumping and subsurface discharge to the ocean. These boundary conditions are configured in standard packages within MODFLOW-2000, as described below.

Boundary conditions are specified for individual stress periods, which are a duration over which a given stress is assumed to be constant. For this model, the stress periods for both calibration and assessment of alternatives was specified as a calendar month. These stress periods are subdivided during computations into smaller time increments to facilitate the calculations.

4.3.1 Recharge Package

The recharge package in MODFLOW-2000 allows specification of a time variant rate of flow, expressed as a depth of water per unit of time that is applied to the model at the highest active layer. This model package was used to represent the following sources of recharge:

- Recharge from native precipitation,
- Recharge from irrigation return flows,
- Recharge from lateral boundary inflows, and
- Waste water percolation.

Waste water percolation was the only parameter in the recharge package that incorporated time variation, annual averages for the other parameters were used, since transport time through the unsaturated zone will tend to even out the small surface recharge sources. The recharge from native precipitation and irrigation return flows was evenly allocated through the basin, with an estimated 50 AF of recharge from precipitation, and the irrigation return flows estimated at 15 percent of the applied water. This recharge quantity was set to a constant value of 2.05 inches/year. The lateral boundary inflow component, representing subsurface inflows from surrounding bedrock areas was estimated at 150 AF/year (Yates and Van Konynenburg, 1998), and this quantity was distributed to the outermost cells in the model. During drought simulations, described in later sections, these recharge quantities were reduced.

The CCSD maintains records of discharge to the waste water percolation ponds, see **Figure 4-6**, that were used to determine the recharge quantity infiltrating to the aquifer. These recorded quantities were applied to the entire footprint of the ponds. Some consumptive use of this water would occur due to evaporation, however, it is a relatively small percentage of the applied water, so this was not included. Previously presented Figure 2-10 shows the quantity of wastewater that was discharged to the ponds during the 2009 to 2013 period. This quantity of flow was converted to a depth for use in the model, allocating the flow over the entire area of the pond. Actual operations tend to use only a single pond, moving the discharge to different ponds to maintain infiltration capacity.

4.3.2 Stream Flow Routing Package

The stream flow routing package in MODFLOW-2000 is used to simulate the surface water component in the model. This package maintains a mass balance between the stream flow and gains and losses to groundwater. When the groundwater level is below the stream stage, as occurs during the beginning of the runoff season, water will infiltrate from the stream into groundwater. Conversely, during times when the groundwater level is above the stream stage, groundwater will discharge to the stream. This occurs in the lower reaches of San Simeon Creek as a result of operations at the percolation pond.

Water level observations show that groundwater is rapidly replenished when runoff begins in San Simeon Creek. **Figure 4-7** shows the groundwater elevations at wells 9K2 and 9L1 compared with flows in San Simeon Creek demonstrating this rapid recharge. The stream flow routing package is configured to provide little resistance to flow between groundwater and surface water. **Figure 4-8** shows the location of the stream boundary conditions. Channel and water surface elevations were surveyed to obtain accurate information for the model. Flow rates for San Simeon Creek were obtained from a stream gage maintained by San Luis Obispo County located near the CCSD well field. This flow was assumed to be representative of inflow at the upper reach of the model, since during times when the stream is flowing the discharge rates are significantly higher than potential seepage rates. The stream conductance term was set to a high value based on the observed rapid response of water levels to stream flow. No calibration was done for this parameter.

4.3.3 Lake (Fresh Water Lagoon) Package

The fresh water lagoon is highly connected with the groundwater and surface water systems at the site. Flow in San Simeon Creek discharges to the upper extent of the lagoon. When groundwater is higher than the lagoon stage, discharge will occur from the aquifer to the lagoon. Since the berm impounding the lagoon is periodically breached during higher flow periods or storms, low permeability sediment is potentially eroded from the base of the lagoon, resulting in probable high connectivity between the lagoon and groundwater in some areas.

The lake package was configured to reflect a high degree of connection between the lake and groundwater. Figure 4-8 shows the location of the fresh water lagoon and associated streams. An outlet stream was used to simulate conditions when the lagoon discharges to the ocean. The water surface and lagoon bottom was surveyed to obtain accurate location and elevation information. No data were available to allow calibration of leakage parameters for the lagoon. During transport and variable density simulations the stream package was used to represent this feature to maintain compatibility with the model codes.

4.3.4 Constant Head Package

The hydraulic connection with the ocean is simulated using constant head boundary conditions in the off-shore area. The boundary associated with the ocean was simulated using the equivalent fresh water head to account for the density difference with sea water. For the SEAWAT simulations, the density is internally accounted for in the program. **Figure 4-9** shows the location of the constant head boundaries. The constant head in layer 1 was set over the off-shore portion of the model, while deeper zones were represented as line sources at the western extent of the model. Since sea water is denser than fresh water, the pressure in deeper zones is greater than would be present if the overlying water were fresh. For example, the equivalent fresh water head in the aquifer at a depth of 100 feet in the sea water saturated portion of the aquifer would be 2.57 feet higher.

4.3.5 Well Package

Pumping of groundwater for irrigation and municipal use is simulated using the MODFLOW-2000 well package. This package removes a specified quantity of water that is distributed across model layers corresponding to well screen intervals. The flow was specified proportional to the hydraulic conductivity and thickness of individual layers that correspond to the reported screen intervals.

Estimates of agricultural pumping were developed in the 2007 study based on land use and water user interviews (Yates, 2007). Production records from CCSD were used for the municipal pumping rates. **Figure 4-10** shows the location of pumping wells that were included in the model. Total agricultural pumping occurs during the growing season from June through October, with an average of 180 AF per year of groundwater produced. The CCSD production from the San Simeon basin is limited to 454 gpm (0.635 MGD) during the dry season. The recent pumping was previously presented on Figure 2-11. Well 9P7, located in the percolation pond area, is periodically pumped to maintain a seaward gradient from the well field. However, detailed records of pumping from this well are not available.

4.4 Transport Packages

Analysis of transport of dissolved constituents was conducted using MT3DMS, which uses information from MODFLOW to define flow terms and physical characteristics. The primary additional parameters necessary for transport analysis include effective porosity, which is important in determine groundwater velocity, and dispersivity. Dispersivity is a parameter used to describe the spread of a solute in three dimensions due to small scale variations in groundwater velocity and localized flow directions.

Literature data were used to estimate the dispersivity parameter as a function of transport distance for sensitivity analysis. The selected value for longitudinal dispersivity was 67 feet, 6.7 feet for transverse dispersivity and .67 feet for vertical dispersivity. Effective porosity, which is a measure of the open pore space through which water actively flows, was estimated based on specific yield, which provides a lower limit estimate of the effective porosity.

Simulation of the selected emergency water supply alternative using the variable density package in SEAWAT was also conducted to assess the importance of variable density flow to confirm results of fresh water equivalent head simulations.

4.5 Selection of Calibration Targets

Model calibration is the process of adjustment of model parameters to match model results with field observations. The available information at the site was assessed to identify field measurements that can be used to assess model calibration. The model is configured with known information, as identified in the site conceptual model and in the descriptions provided above.

Parameters in the model that have the greatest uncertainty are selected for adjustment in the process of calibration. The principal data available for comparisons between field measurements and model calculated results are water levels at wells. The CCSD has a comprehensive water level monitoring program in place that records water levels twice per month at available wells. Climatic information was examined to select a period that encompassed a range in rainfall quantity during a period where information on pumping and wastewater discharge was available, along with water level measurements.

The 2001–2002 period was selected for this analysis. **Figure 4-11** shows the location of wells with water level measurement. The water level records were screened to remove wells that had been recently pumped to obtain a data set representative of aquifer conditions for use in the calibration process. This resulted in a total of 411 water level measurements at 13 wells distributed in the San Simeon basin.

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Figure 4-1
Model Grid

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Figure 4-2
Detail Area Showing Model Grid

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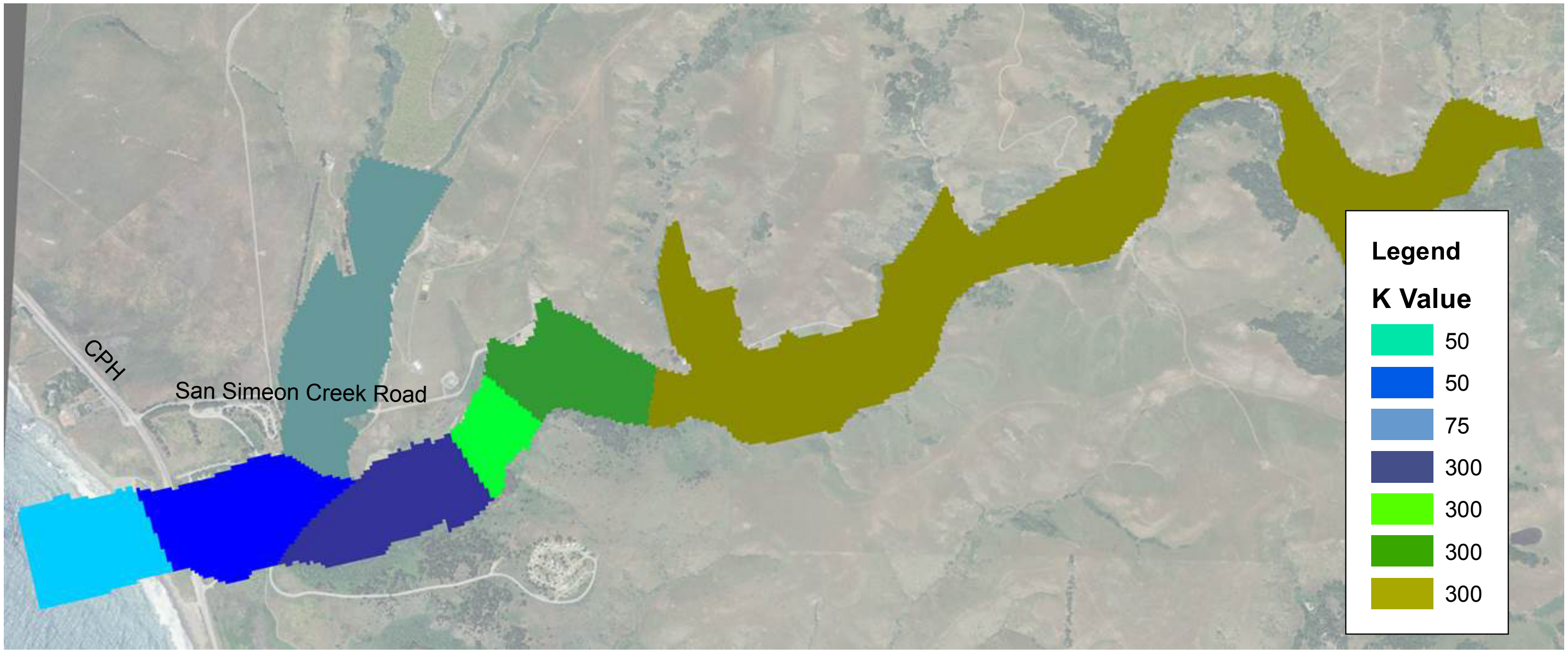

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Figure 4-3
Upper Zone Hydraulic Conductivity Distribution

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Figure 4-4

Middle Zone Hydraulic Conductivity Distribution

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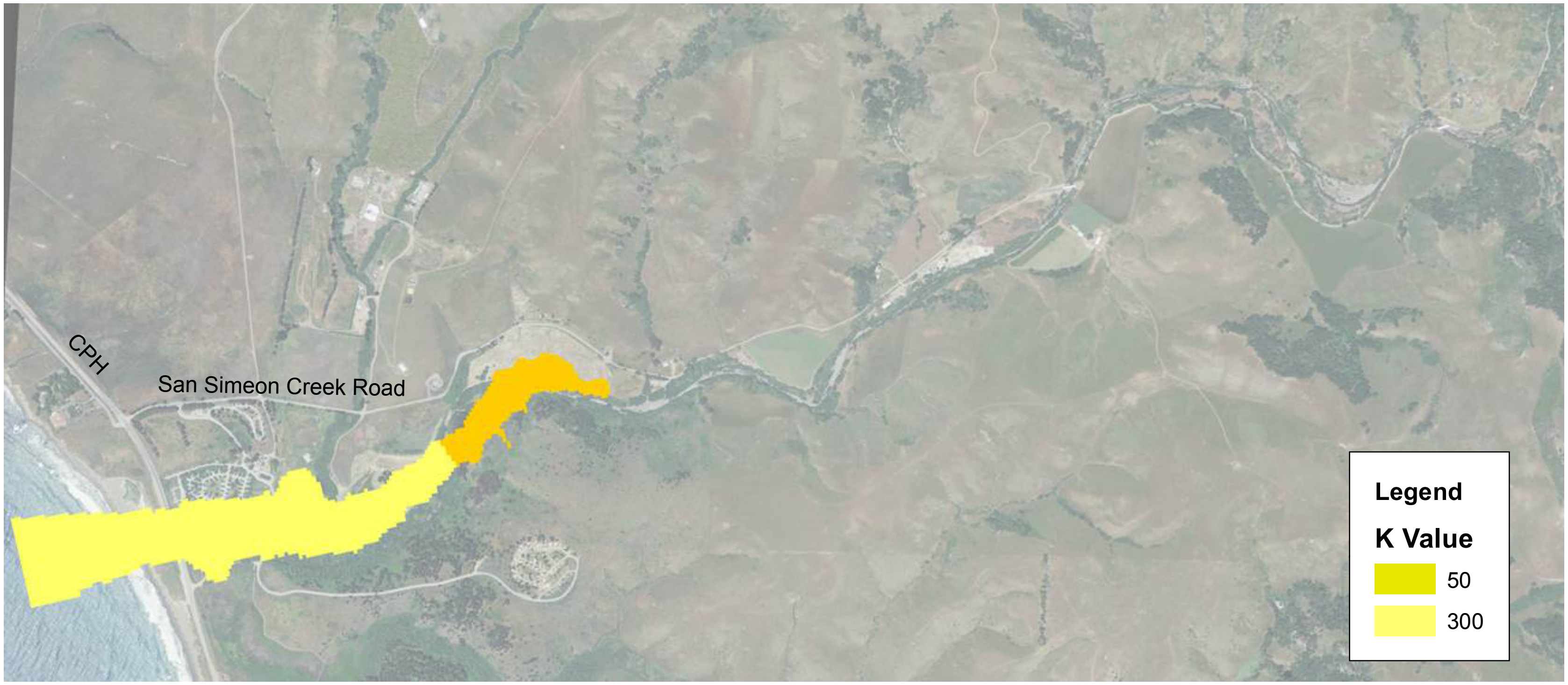

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Figure 4-5
Deep Zone Hydraulic Conductivity Distribution

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0 250 500 1,000
Feet

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Figure 4-6
Location of Wastewater Percolation Ponds

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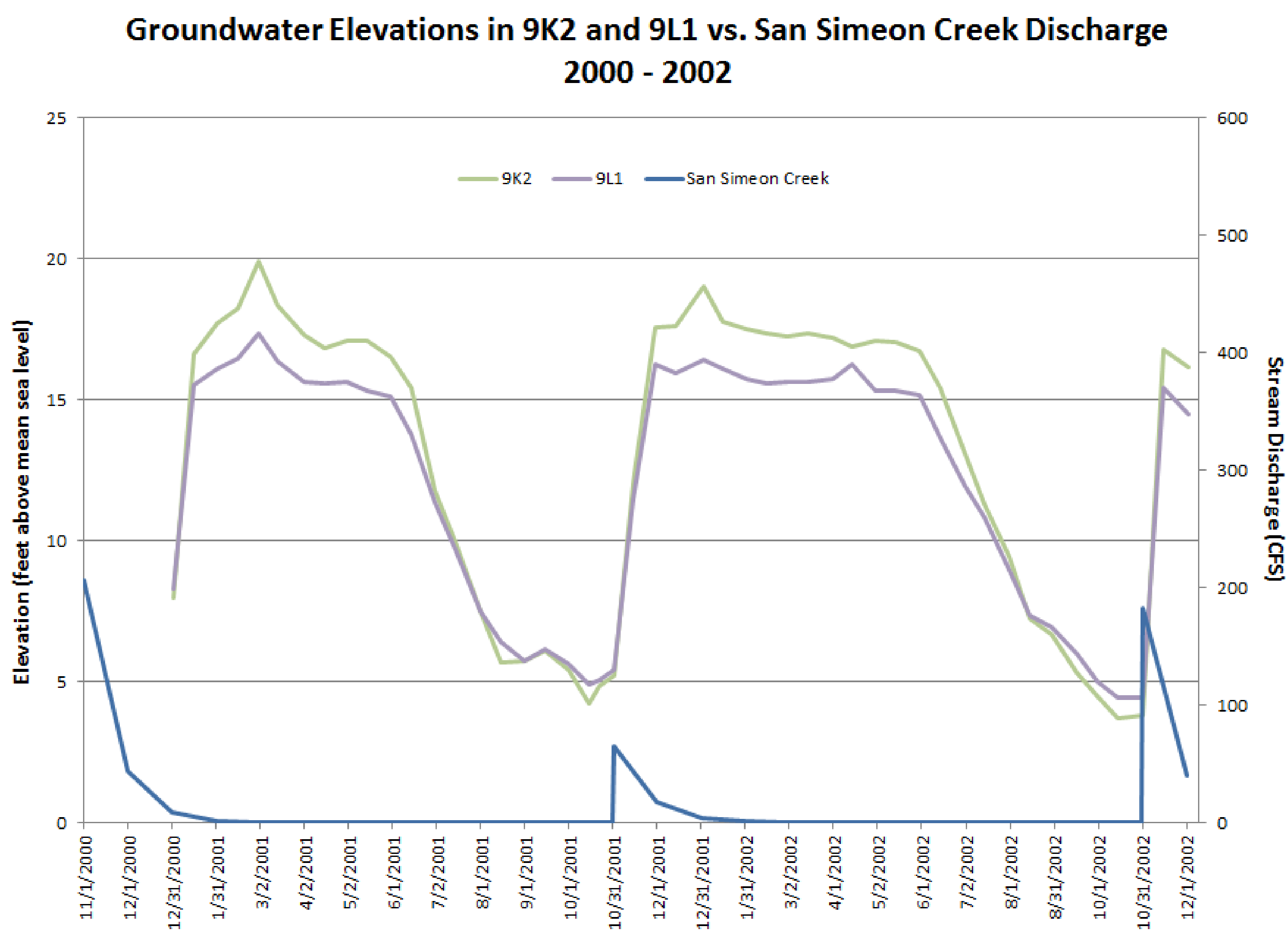

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Figure 4-7
San Simeon Creek, 9K2 and 9L1 Hydrographs

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Figure 4-8
Location of Stream and Lake Boundary Conditions

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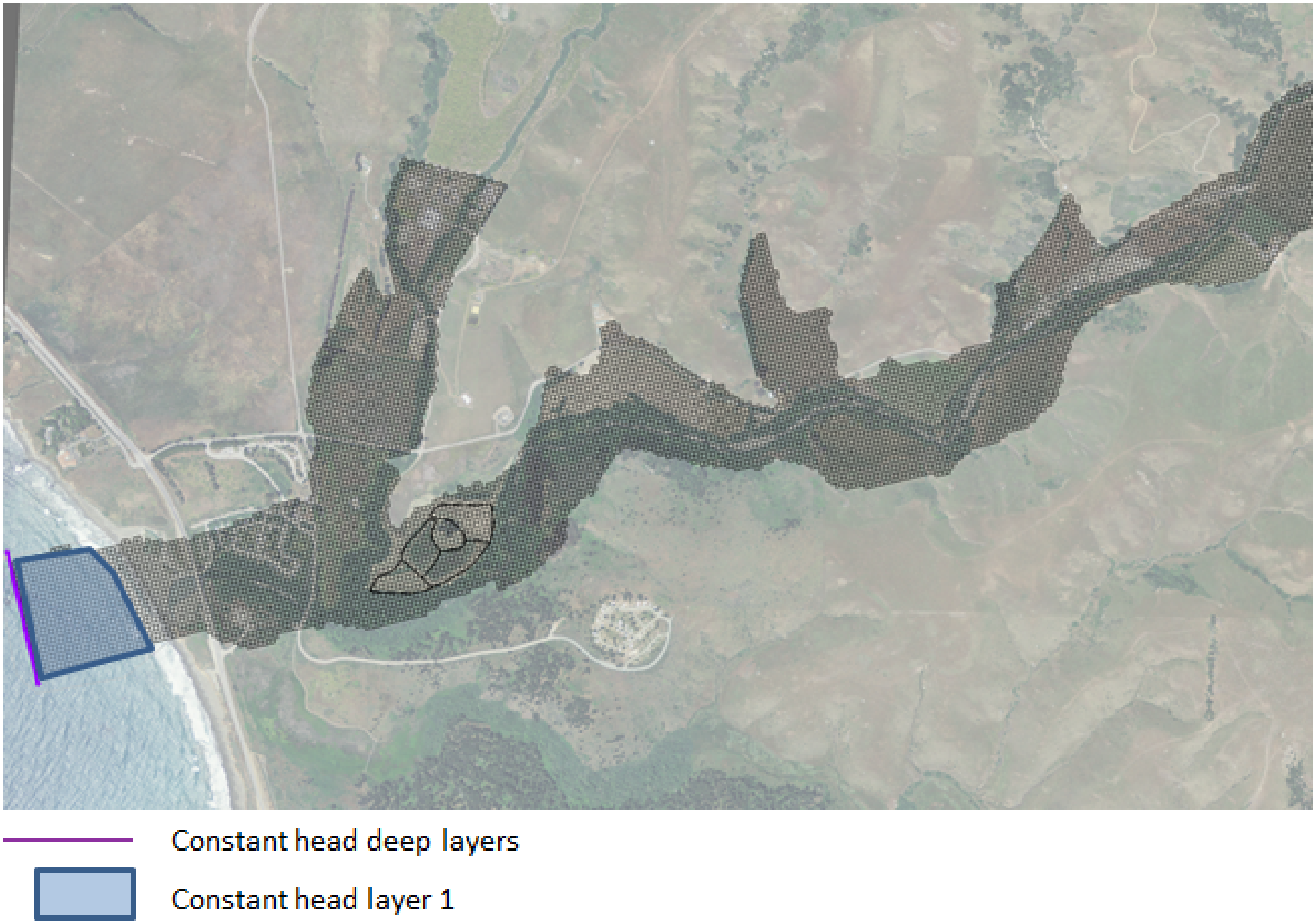

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Figure 4-9
Location of Constant Head Boundary Conditions

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Figure 4-10

Location of Pumping Wells

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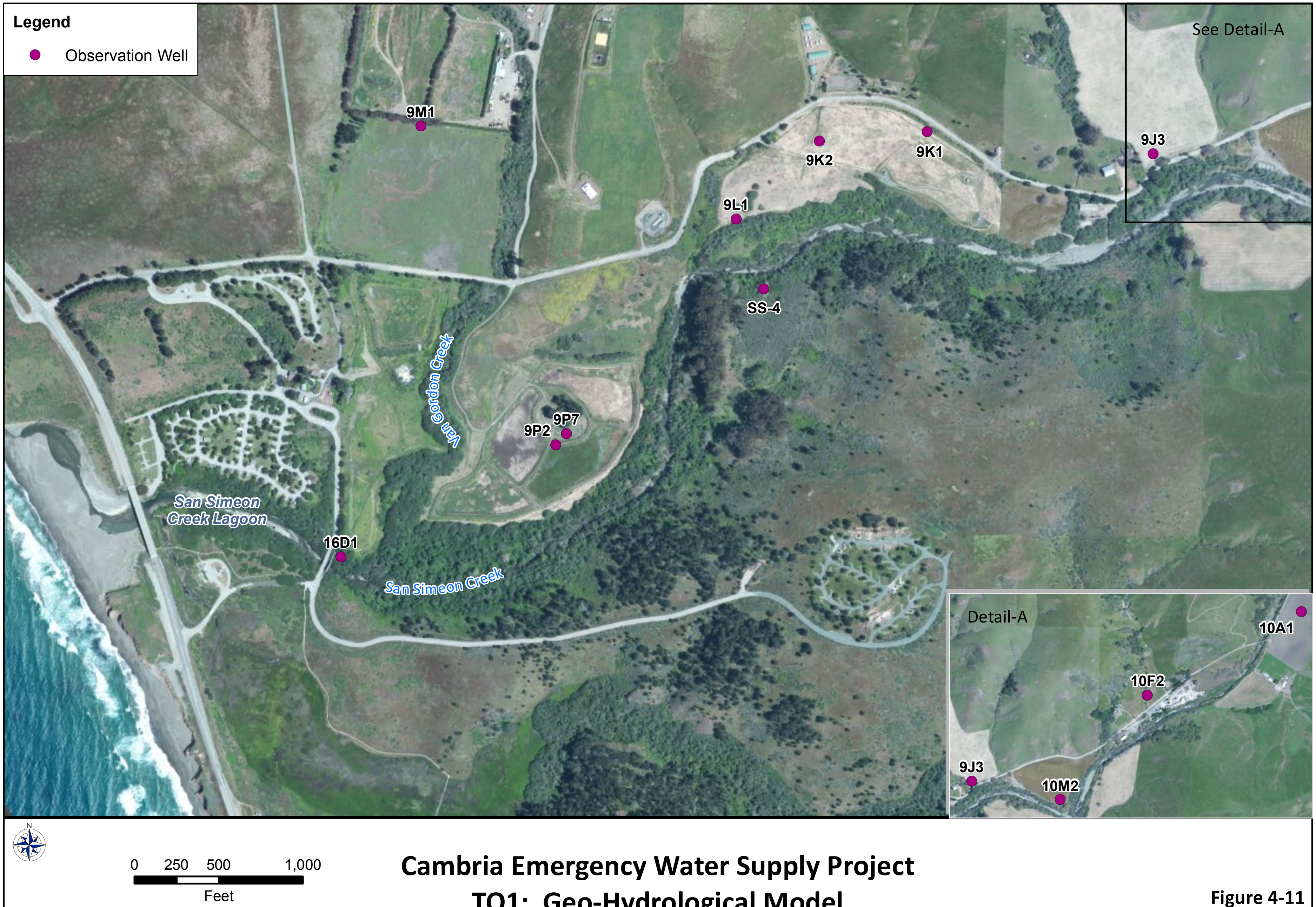

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Figure 4-11
Location of Wells with Water Level Measurements

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Section 5 Calibration

5.1 Model Calibration

A well calibrated model was developed in 2007 (Yates and Van Konynenburg, 1998) that was used as the basis for development of the current model. The groundwater flow model was calibrated by identifying sensitive characteristics with the greatest uncertainties, and varying those parameters systematically within this range of uncertainty to obtain a reasonable match between field observations and model simulated results. Hydraulic characteristics have the greatest uncertainty, since initial estimates are made at a limited number of locations, using a variety of testing methods. The initial distribution of hydraulic conductivity from the 2007 provided a reasonable match to field observations and was largely retained for this model. Additional calibration was conducted for specific yield, due to its importance for this project.

Conditions for the 2000 to 2002 period for pumping and recharge were configured from the site data and used to simulate the corresponding period. Since stream-flow occurred during 2000, prior to the formal calibration period, stable conditions prevailed in the model for the 2001 and 2002 periods that were used for the calibration. Simulations were run varying hydraulic characteristics and no significant improvement was obtained by changing hydraulic conductivity from the configuration consistent with the 2007 model.

Figure 5-1 shows a sensitivity analysis for variation of specific yield, which indicates a minimum error measure (mean of absolute value of residuals) was obtained at a specific yield of 0.16. The current model has considerably greater discretization to facilitate the transport analysis, but retains many of the characteristics of the 2007 model. A significant update included the incorporation of surveyed elevations for stream channels and the lagoon area.

5.2 Calibration results

Figure 5-2 provides an overall comparison of the final calibrated model results for corresponding field measurements. This figure plots model calculated water levels versus the field measurements for the corresponding locations and times. The 45 degree line shows a perfect agreement between the model and field measurements, while the actual scatter around this line represents the difference between modeled and measured conditions. This difference is the residual. **Figure 5-3** shows a histogram of the residuals (modeled – measured) for the calibration data set.

Several statistical measures of residuals were computed to summarize the ability of the model to represent field conditions. The mean residual value (Σ(modeled – observed)/n) was -0.48 feet, with a standard deviation of 1.72 feet. The median residual value was -0.2 feet. The range in water levels observed in the data set was from 5.4 to 57.8 feet. A standard measure of calibration is given by the RMS error/ data range, which should be less than ten percent. The RMS error in the calibration data set is 1.78, yielding a value for RMS error/data range of 3.4 percent, which meets the acceptance criteria.

Another comparison measure for the calibration is comparisons of observed water levels and modeled water levels plotted as hydrographs at individual wells. These hydrographs are available at the locations previously shown on Figure 4-11**. Figures 5-4** through **Figures 5-15** provide hydrographs from the eastern portion toward the western limit just upgradient of the fresh water lagoon.

The irrigation wells in the eastern portion of the basin typically show the greatest residuals, particularly during the later portion of 2002. This may be due to overestimation of the quantity of lateral boundary inflow or underestimation of the quantity of pumping in the upper basin. These wells are upgradient of the area of primary concern where water supply alternatives will be implemented. The area from immediately upgradient of the CCSD well field to the fresh water lagoon show very good agreement between the model and observed water levels. Limited data were available in the upper reaches of Van Gordon Creek. However, inconsistencies between estimated pumping and responses at the single well with periodic measurements indicate that a reliable calibration of this drainage is not possible. This area also has minimal interaction with the area of interest due to the lower permeability and limited groundwater flow.

The model calibration is acceptable for use in the assessment of alternatives.

5.3 Water Budget

The water budget for the model for the 2001–2002 period is summarized in **Table 5-1.** The components that are specified input values are in a bold font on this table. A negative value, (in parenthesis), indicates a net removal from the aquifer, while a positive is an inflow to the aquifer.

Table 5-1 Summary of Water Budget Components for 2001-2002 Calibration Period

Component	Annual Volume (AF)
Storage	(315)
Ocean Boundary	(251)
Recharge	**881**
Stream Seepage	806
Fresh Water Lagoon Seepage	(103)
Well Pumping	**(1015)**
Difference	2

During the calibration period, the sources of recharge, including precipitation recharge, irrigation return flows, percolation pond infiltration, lateral boundary inflow and seepage from San Simeon Creek, was 1687 AF/year. The primary outflow from the aquifer was associated with pumping for municipal and agricultural use. Outflows of groundwater to the ocean and to the fresh water lagoon were 354 AF/year, with a decrease in storage of 315 AF/year during this period.

On a long-term average basis, the change in storage is expected to be negligible, since the basin is recharged each season from stream seepage. The water budget components differ from the 1988-1989 conditions simulated in the USGS report, since many of the model inputs, including stream flow duration and pumping rates were updated.

5.4 Sensitivity Analysis

A sensitivity analysis was conducted assessing sensitivity to specific yield and to hydraulic conductivity. As noted above, specific yield was a sensitive parameter and a value of 0.16 was selected since this resulted in the minimum RMS error. A sensitivity run was also conducted to assess the impact of decreasing hydraulic conductivity throughout the model by 20 percent. This sensitivity test showed that when the hydraulic conductivity was decreased by 20 percent, the average absolute value of the residuals increased by 16 percent compared to the selected calibration values.

5.5 Model Uncertainties and Limitations

All mathematical models are simplified representations of very complex natural systems. The model is configured using a limited number of borings to assess the distributions of lithologies in the subsurface. Factors such as the lateral boundary inflow, connection with the ocean, configuration of the aquifer west of the shoreline and other factors are uncertain and have no direct field data for their characterization. The model provides a reasonable approximation of the aquifer response during calibration periods and provides a tool for assessing alternatives. The model should be refined in the future when significant changes in water use in the basin occur after implementation of the selected emergency water supply alternative to refine operational parameters.

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Figure 5-1
Specific Yield Sensitivity Analysis

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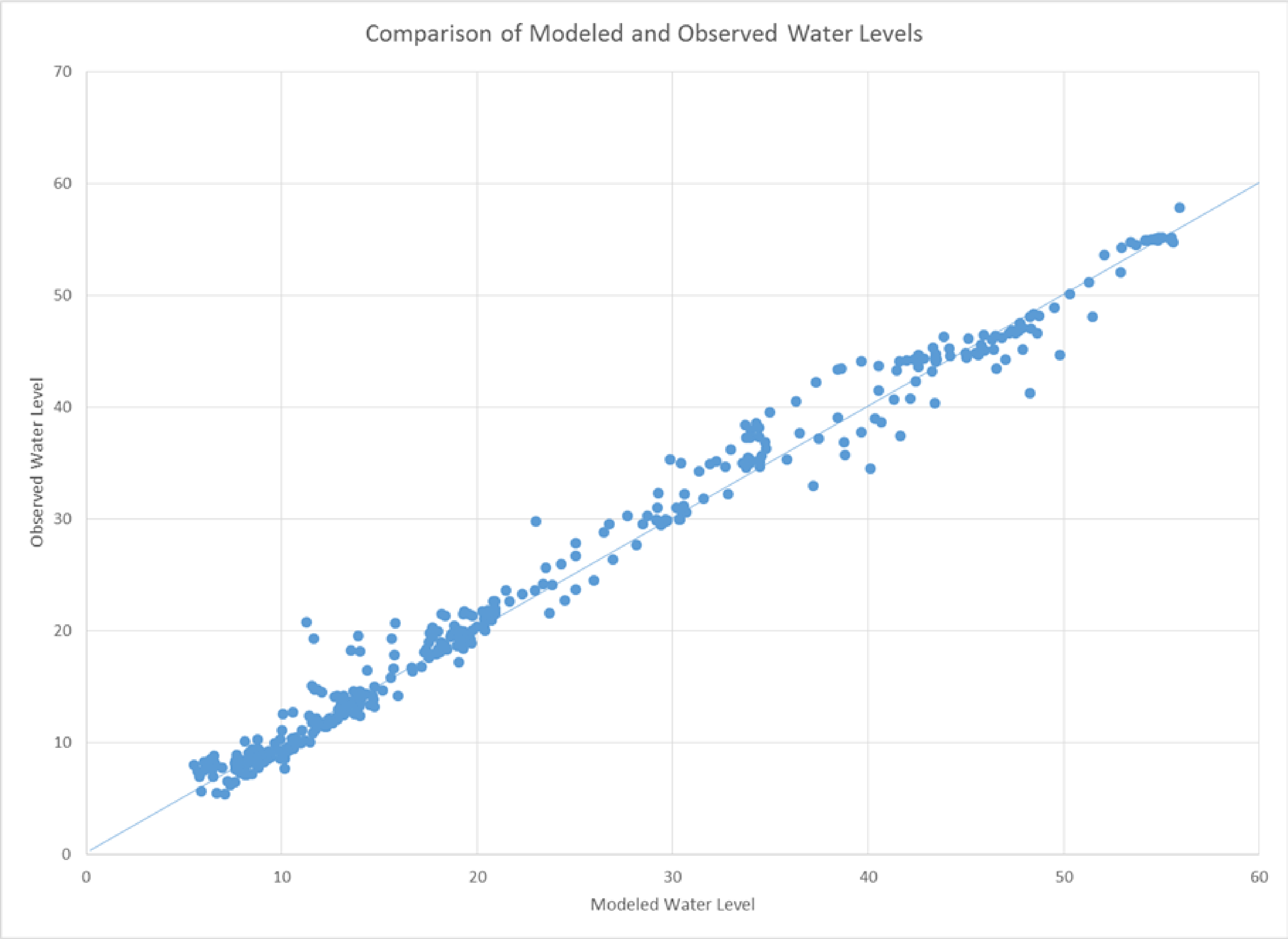

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Figure 5-2

Comparison of Modeled and Field Measured Water Levels During the 2001 to 2002 Calibration Period

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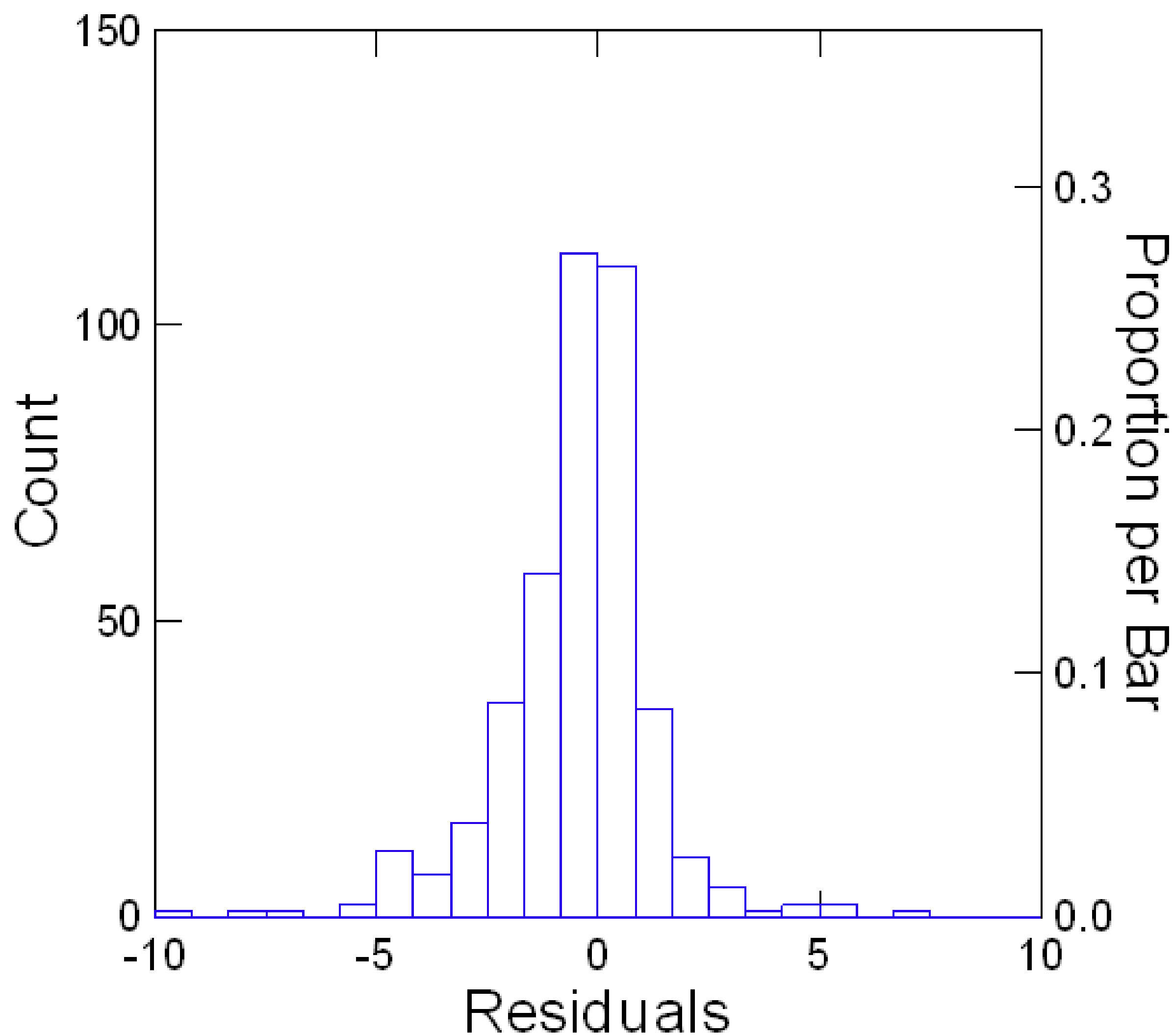

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Figure 5-3
Histogram of Model Residuals

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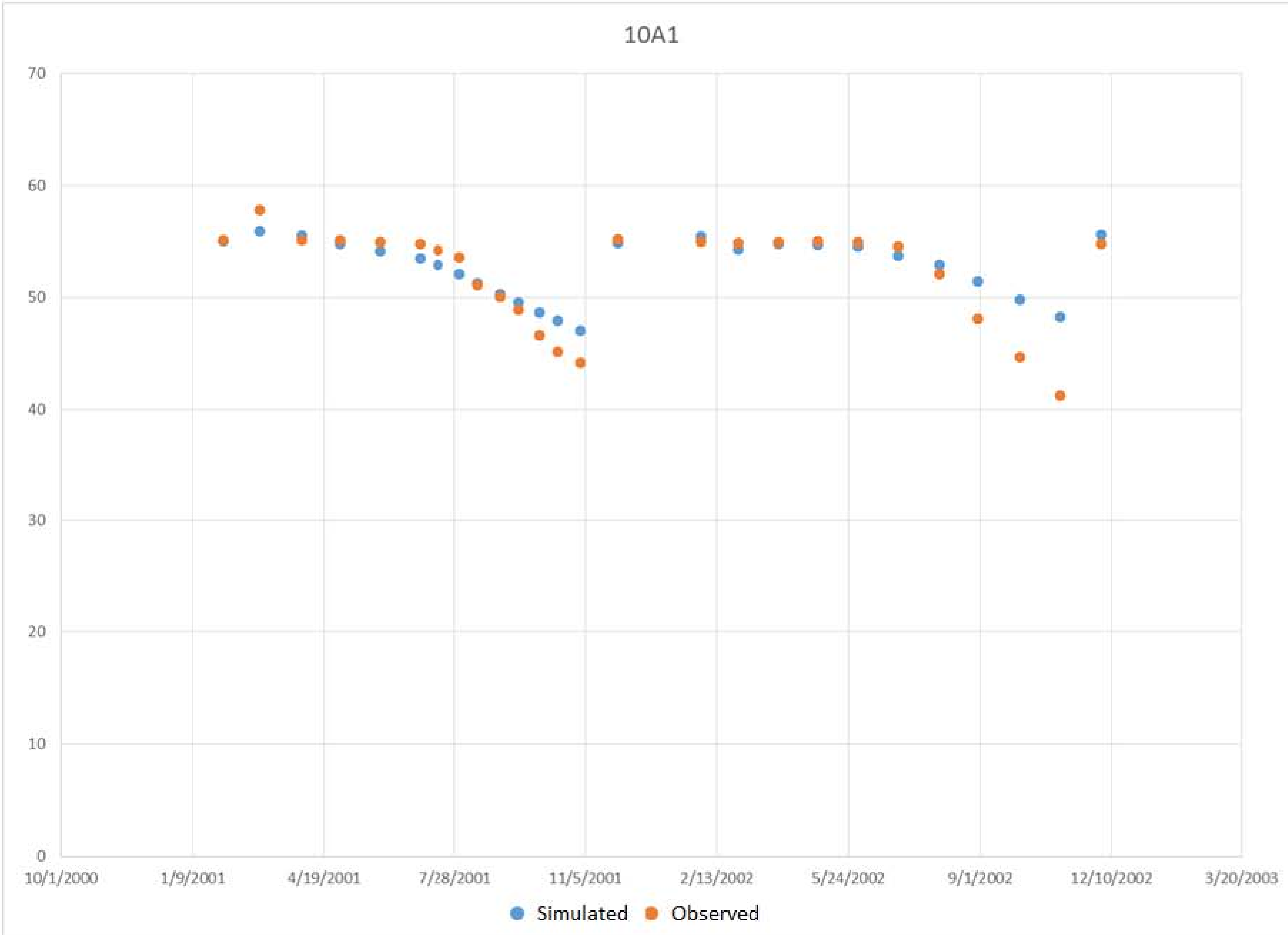

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Figure 5-4
Observed and Modeled Hydrographs at Well 10A1

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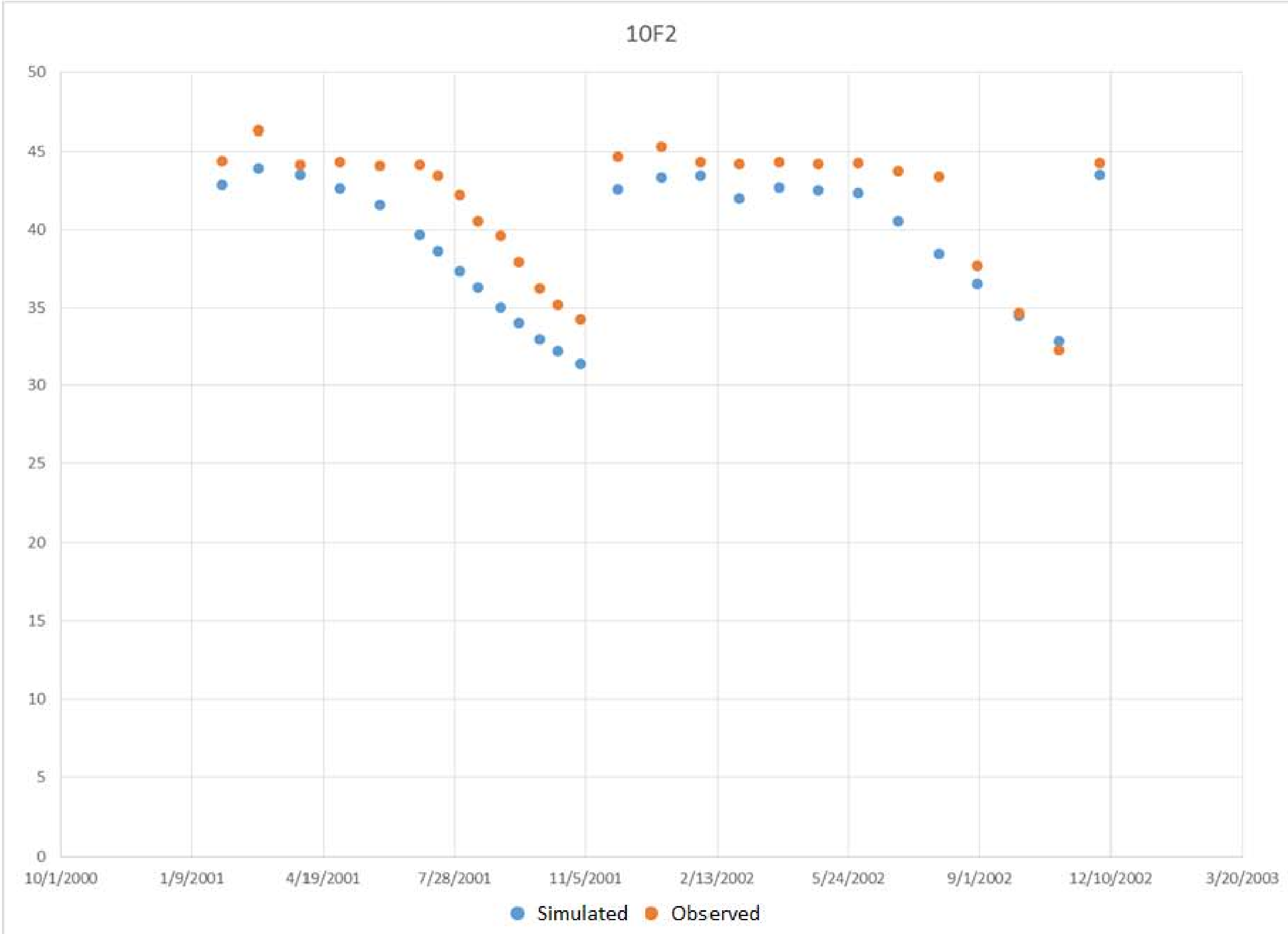

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Figure 5-5
Observed and Modeled Hydrographs at Well 10F2

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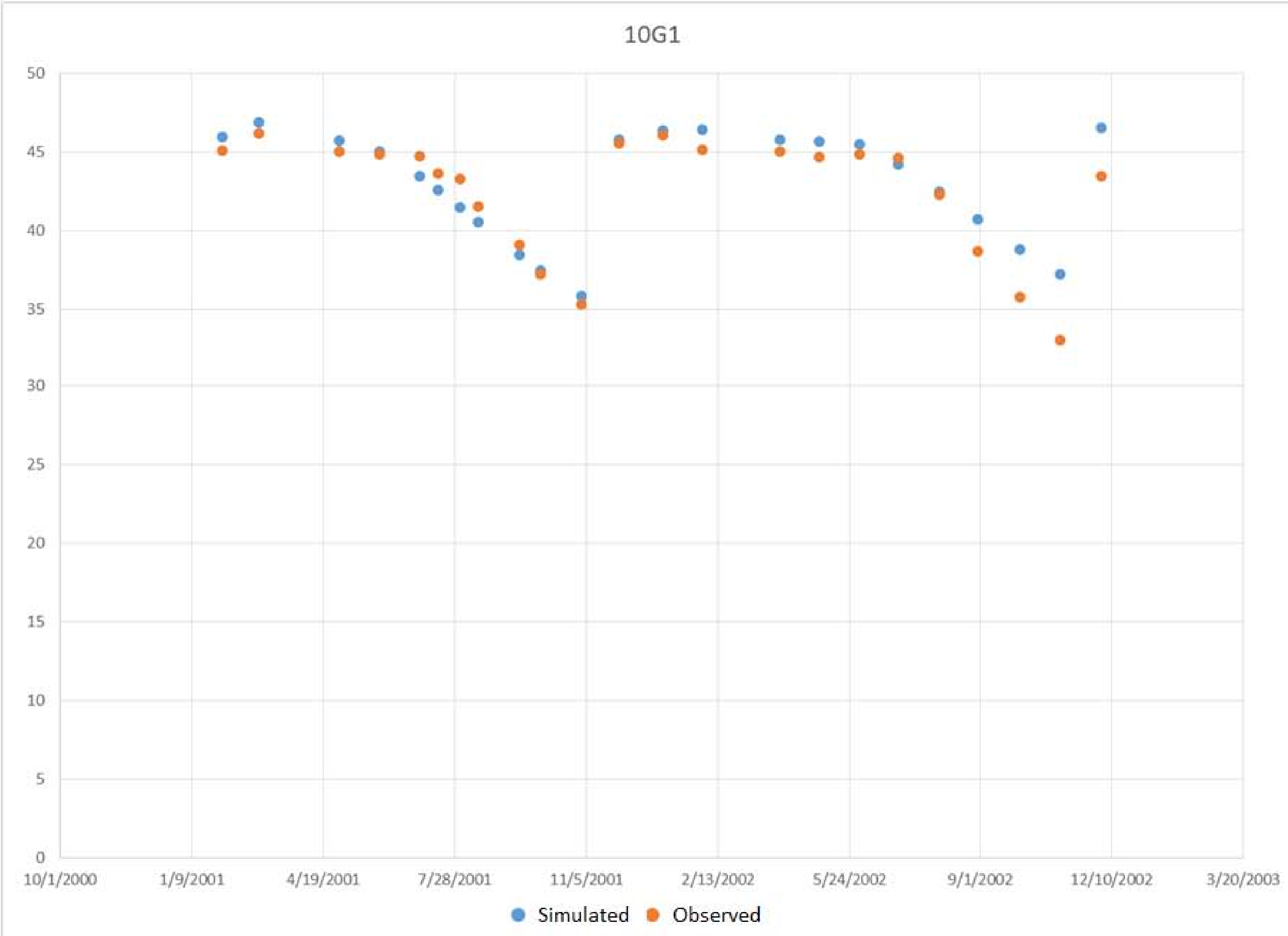

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Figure 5-6
Observed and Modeled Hydrographs at Well 10G1

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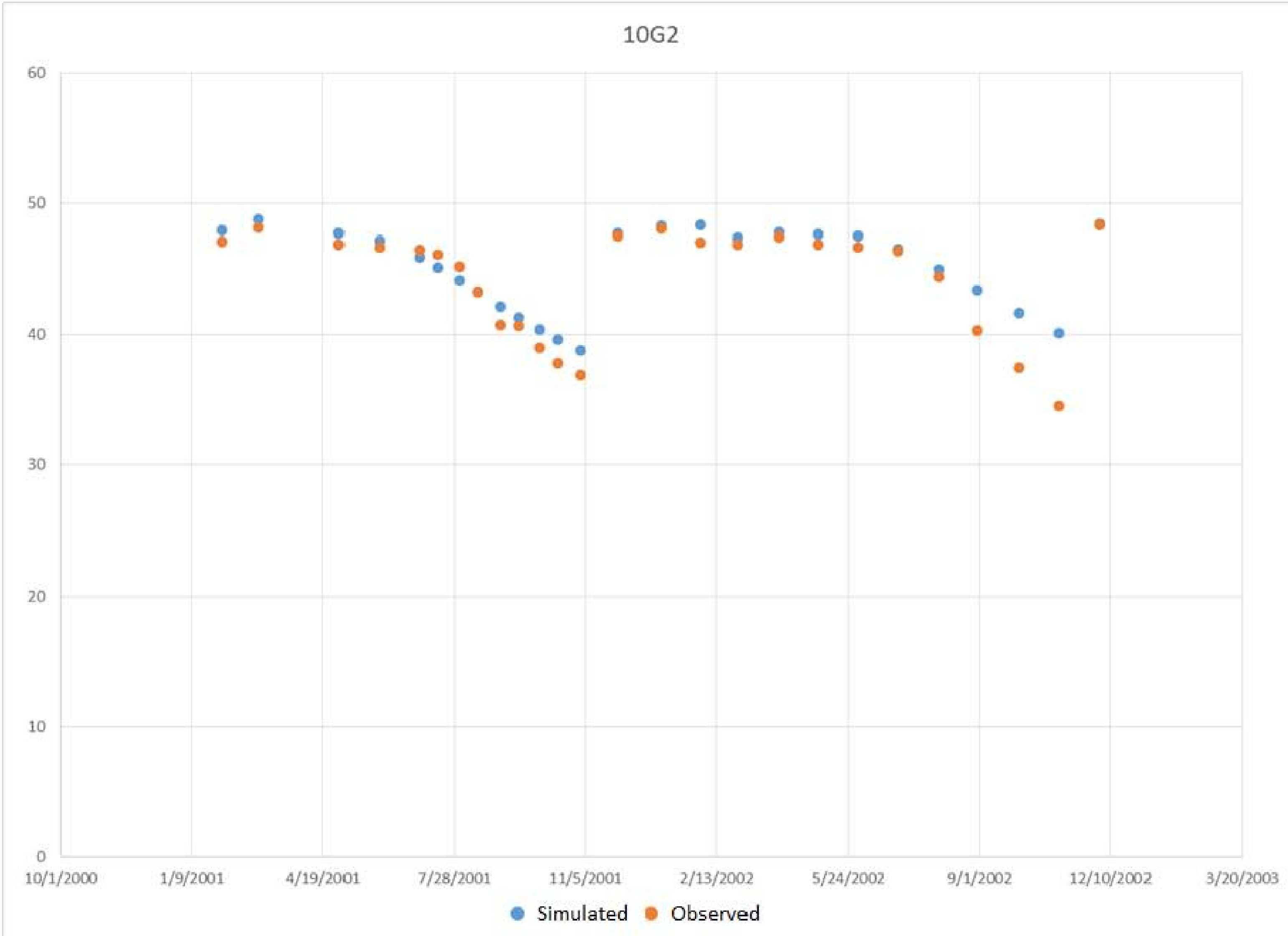

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Figure 5-7
Observed and Modeled Hydrographs at Well 10G2

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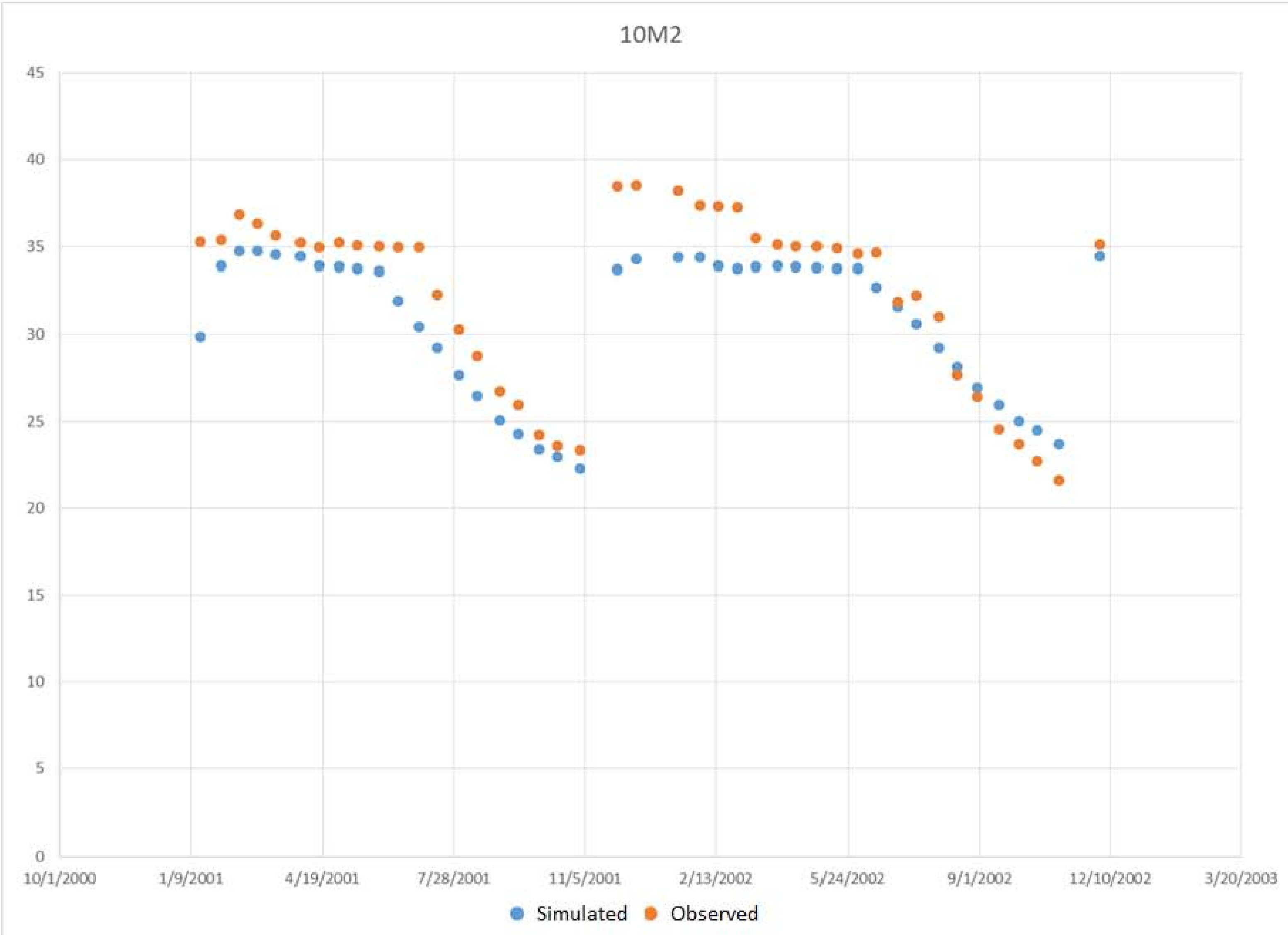

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Figure 5-8
Observed and Modeled Hydrographs at Well 10M2

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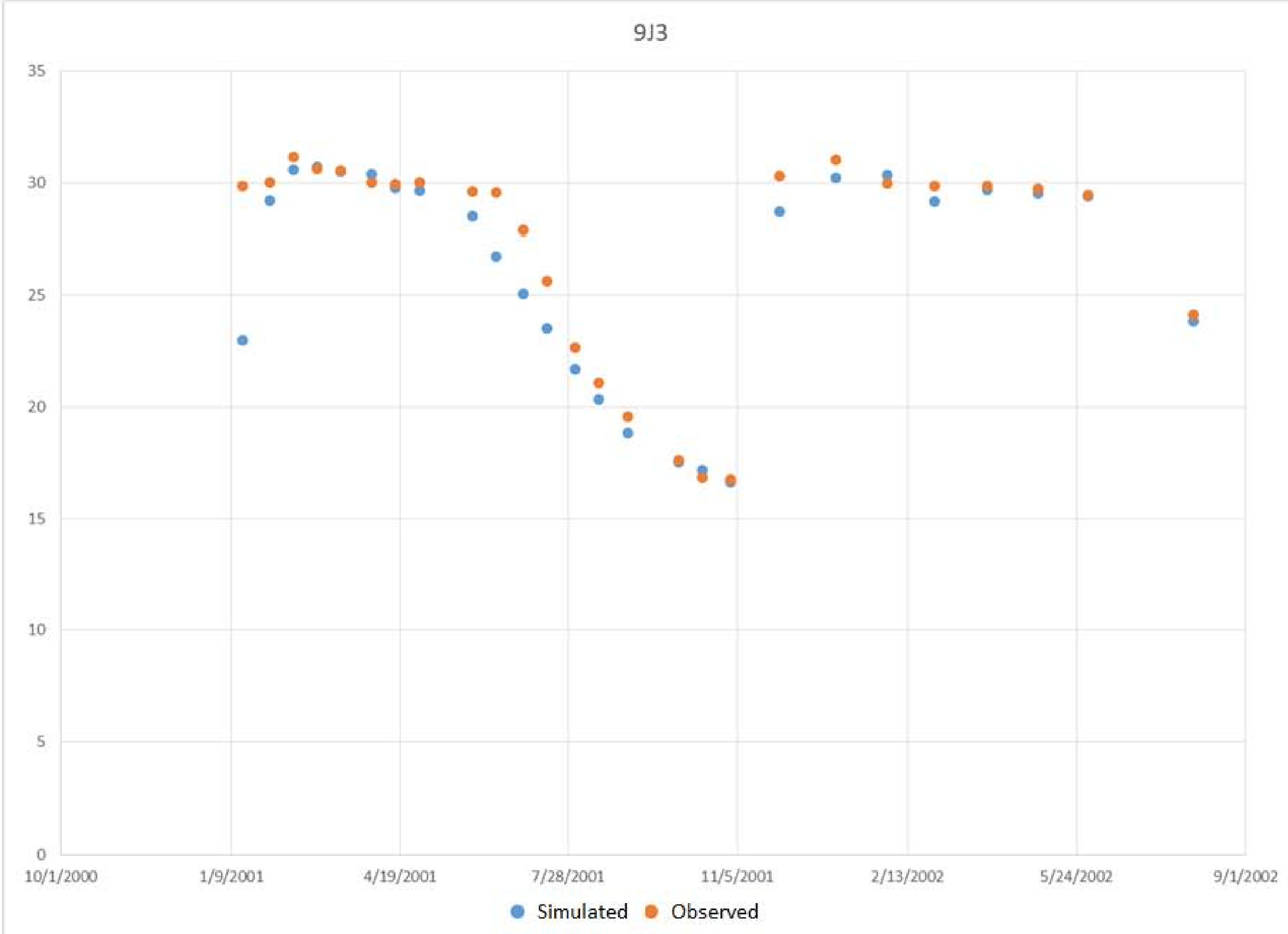

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Figure 5-9
Observed and Modeled Hydrographs at Well 9J3

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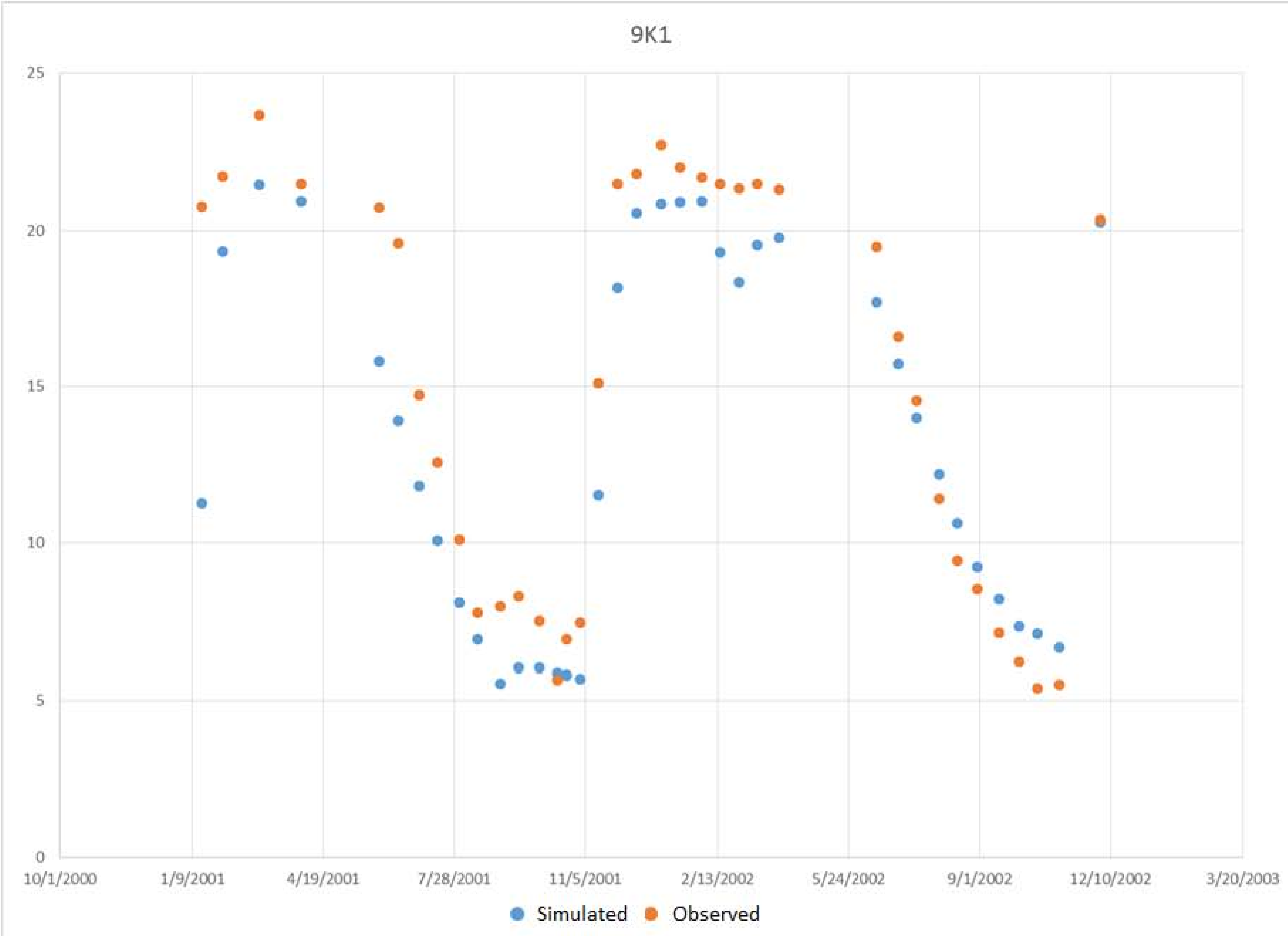

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Figure 5-10

Observed and Modeled Hydrographs at Well 9K1

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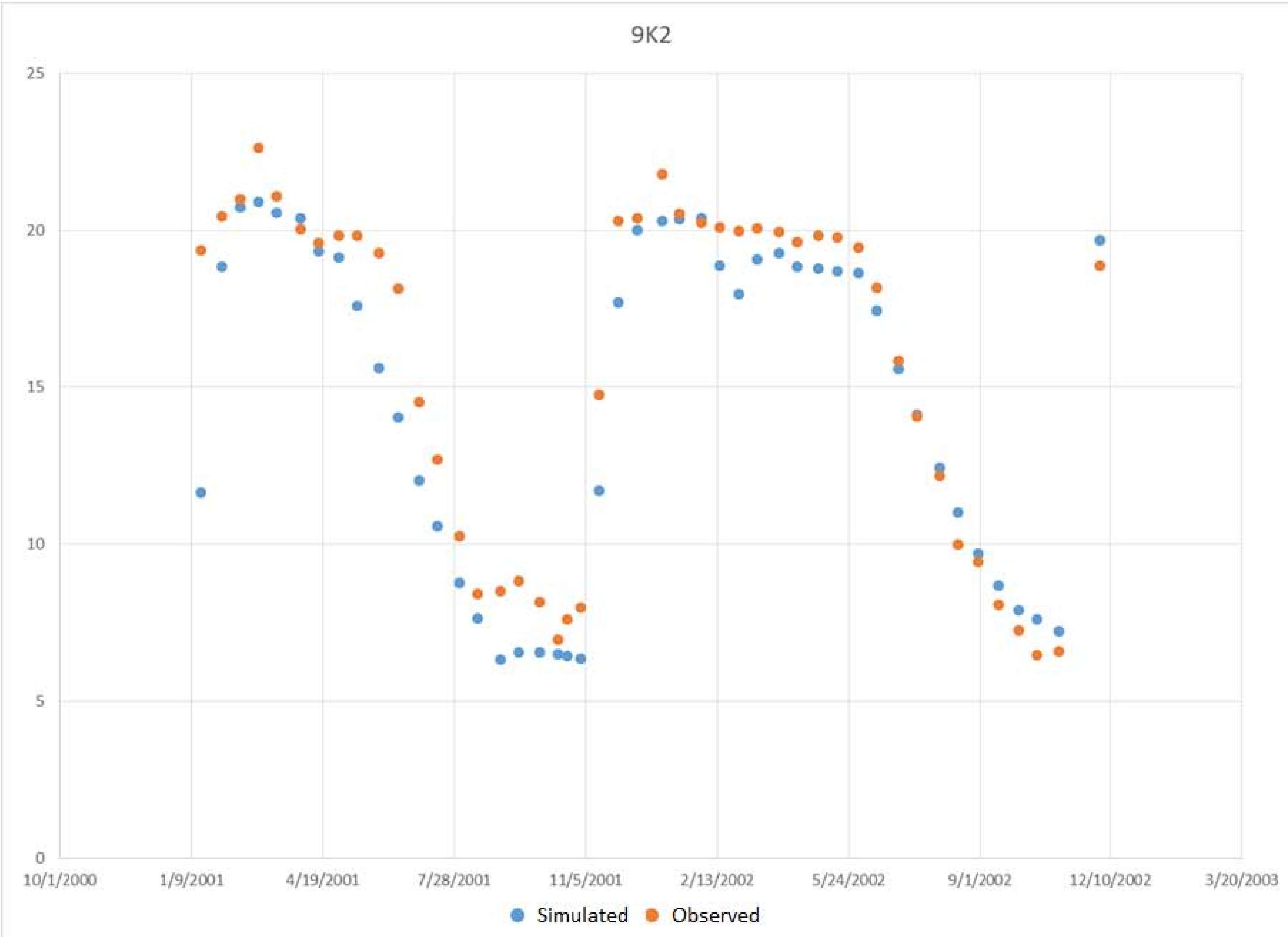

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Figure 5-11
Observed and Modeled Hydrographs at Well 9K2

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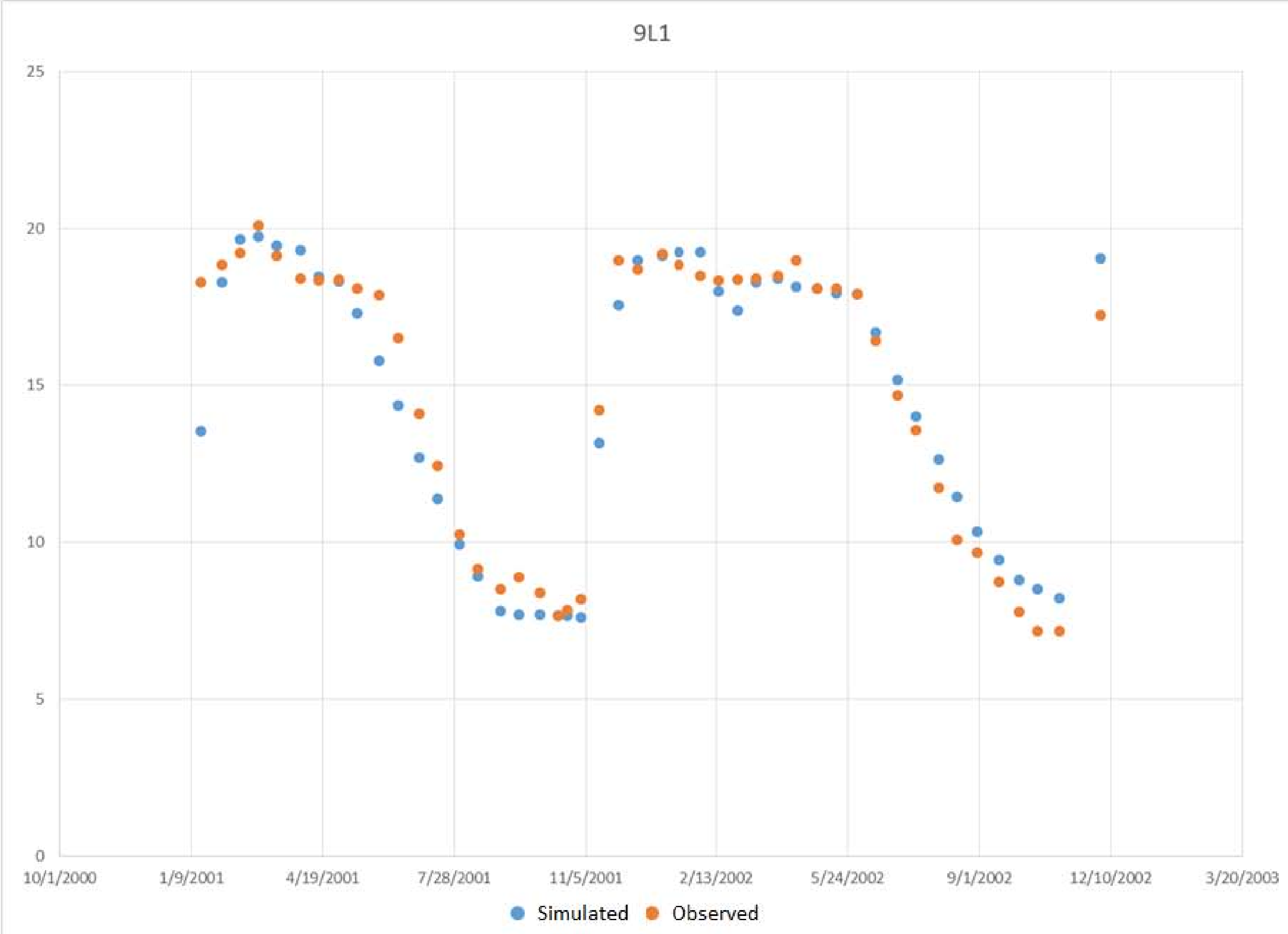

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Figure 5-12
Observed and Modeled Hydrographs at Well 9L1

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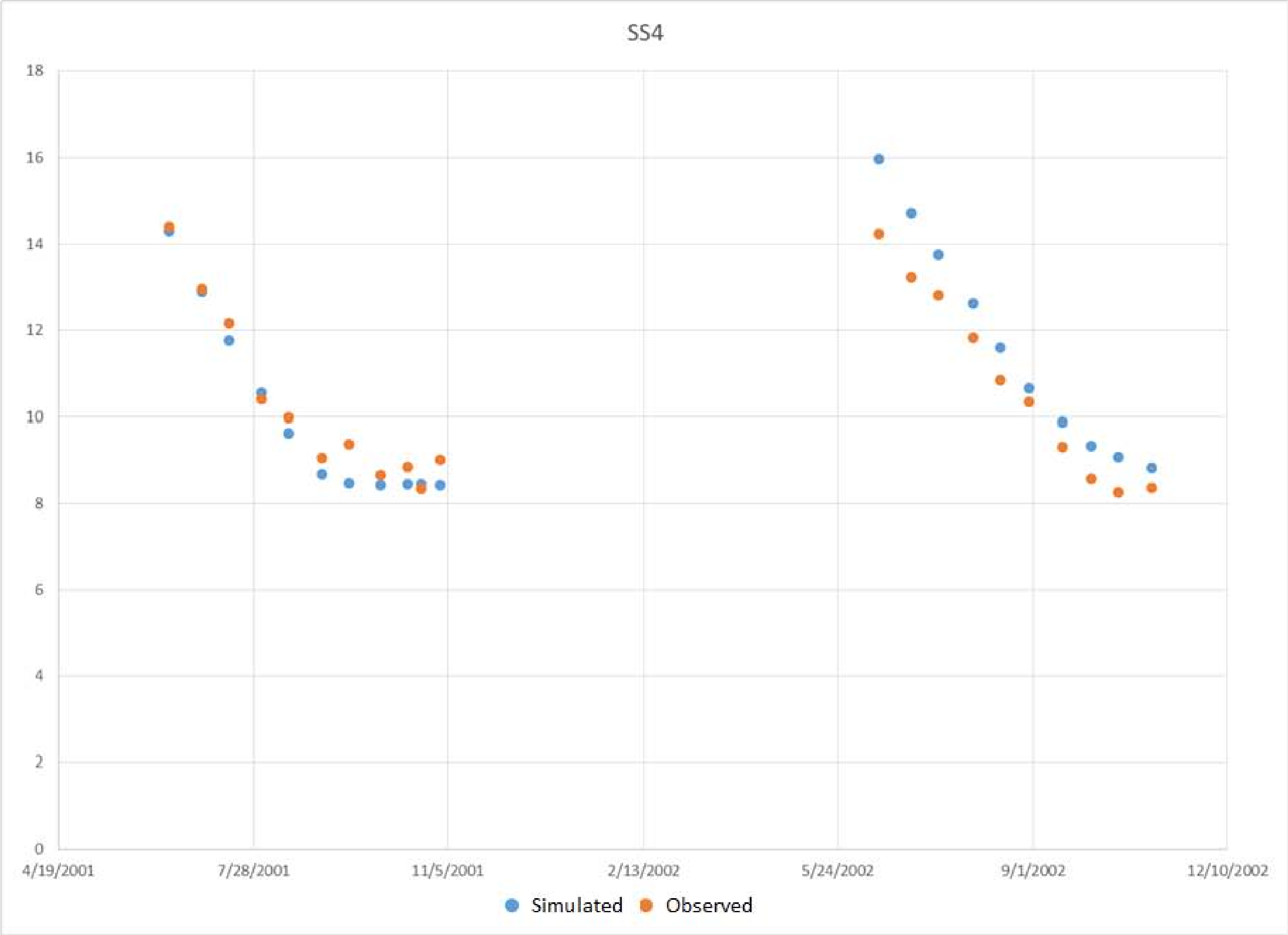

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Figure 5-13
Observed and Modeled Hydrographs at Well SS4

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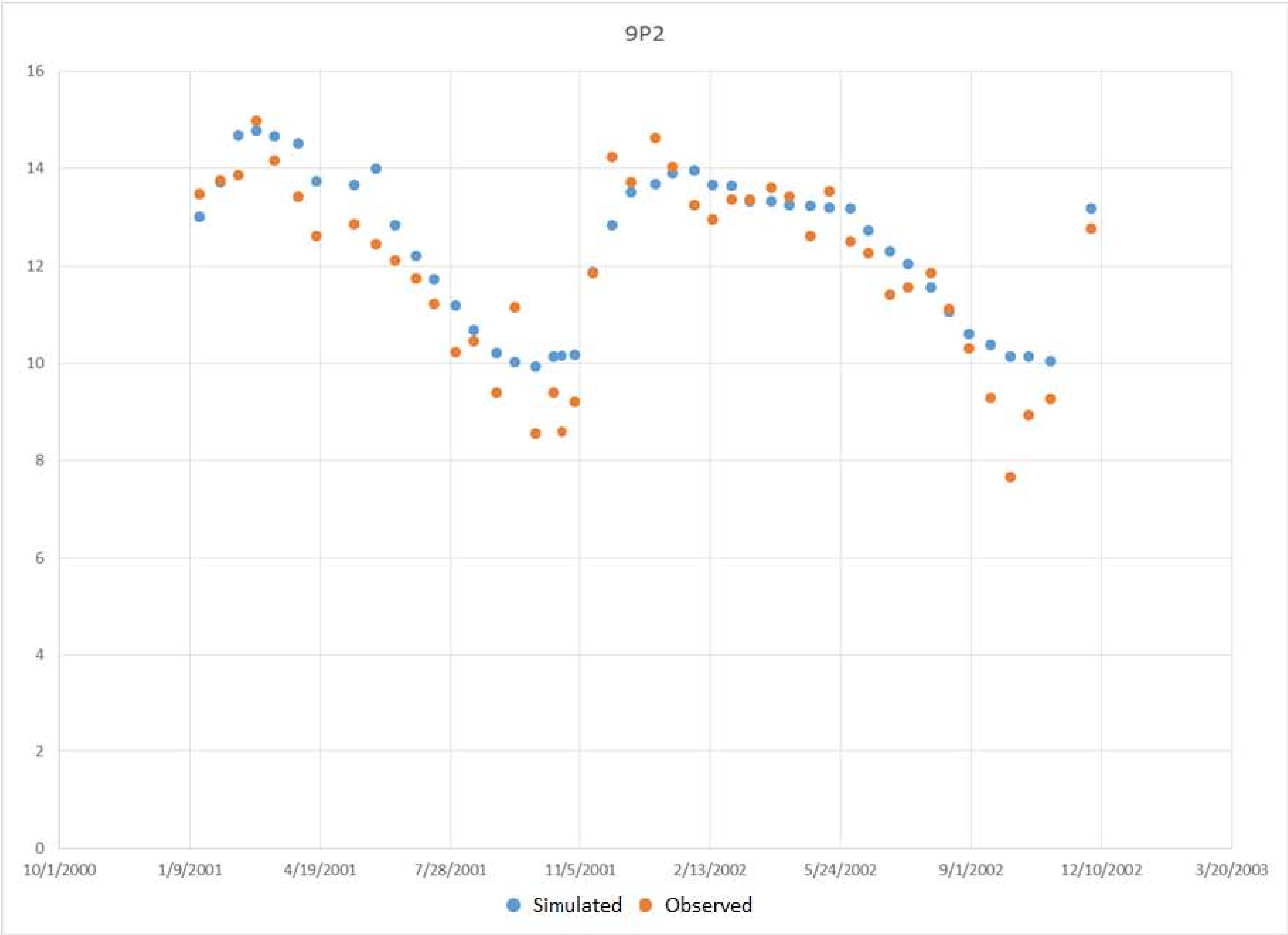

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Figure 5-14
Observed and Modeled Hydrographs at Well 9P2

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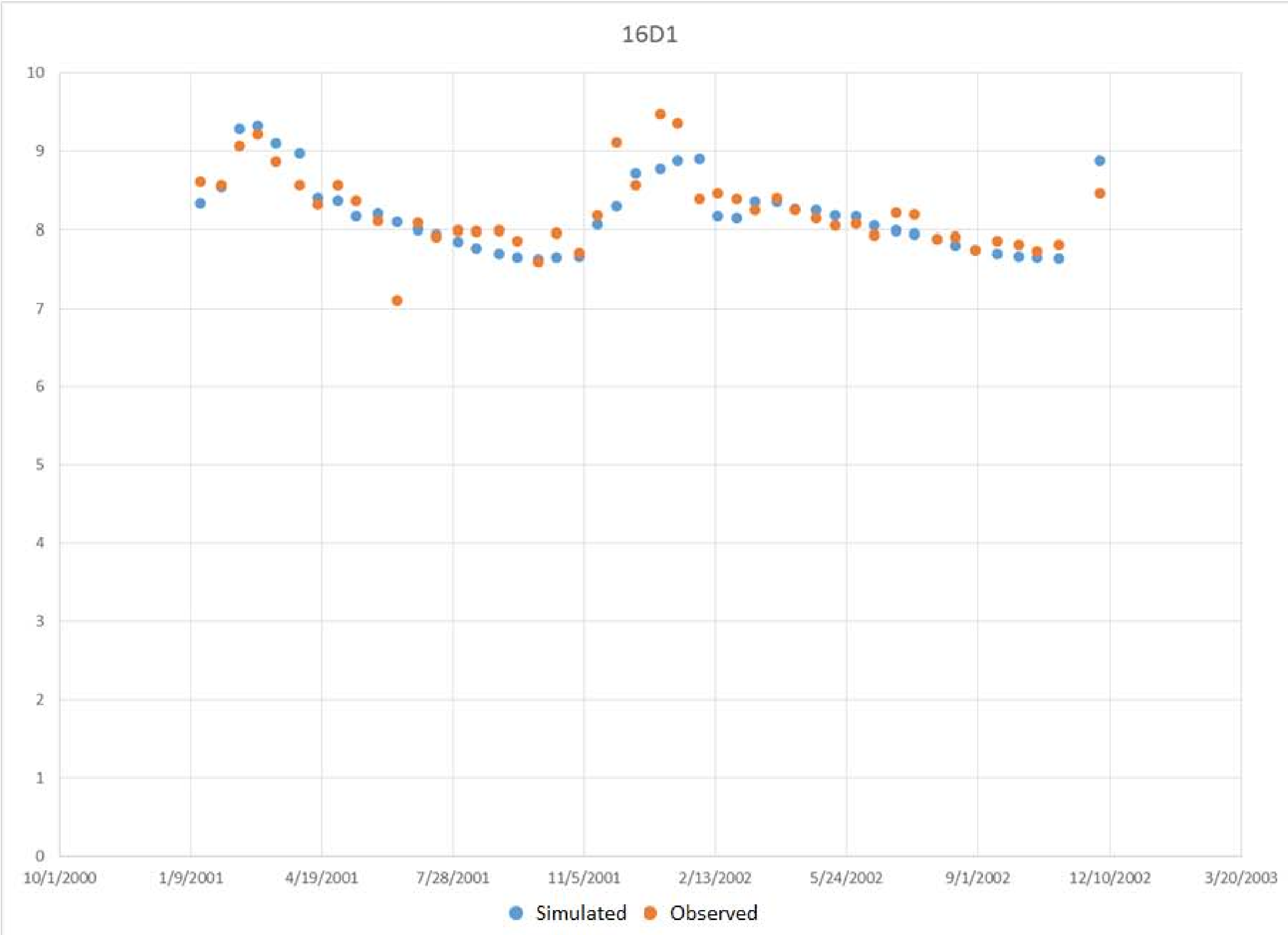

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Figure 5-15
Observed and Modeled Hydrographs at Well 16D1

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Section 6
Alternatives Analysis

A series of alternatives were defined to address short term emergency water supply for CCSD in the San Simeon basin. These alternatives are focused on development of additional emergency water supply by optimizing recovery of fresh and brackish water in the basin. Currently, significant quantities of fresh water discharge to the ocean. The secondary treated wastewater that is percolated into the aquifer is lost to the ocean or discharges to surface water in the western portion of the basin. A series of simulations were defined to assess the ability to recover additional groundwater and meet requirements for residence time for indirect potable reuse of wastewater affected groundwater in the basin, while also providing for habitat mitigation in the fresh water lagoon.

The assumptions for basin recharge for all of the emergency supply alternatives were identical to allow comparisons to be made. The period incorporated stream flow conditions starting in December 2012 through March 2014 using records from the gaging station in the lower portion of San Simeon Creek. Agricultural pumping rates and return flows were assumed to remain at the rates estimated in the 2007 analysis (Yates, 2007), which were also used during the calibration period. Operational data from CCSD for pumping and percolation pond discharge were obtained from records for the period through February 2014. This simulation period was selected for evaluation of the emergency water supply alternatives since it represents the current drought conditions.

Each of the alternatives will also require disposal of brines from the treatment process. However, brine disposal for the emergency supply alternatives assumes brine evaporation processes from lined ponds and does not interact with the aquifer and is not simulated. Alternatives were simulated using monthly stress periods. The solute transport model tracked the fate of secondary treated waste water and highly treated injected water by simulating movement of a hypothetical tracer compound at a concentration of 100 mg/L. The extent of the tracer over time was assessed by examination of contour maps. The calculated concentrations of the hypothetical tracer at CCSD potable water supply wells was tracked in the model to assess the residence time that the highly treated water remained in the aquifer prior to recovery at the supply wells.

Two sets of emergency water supply alternatives have been considered including two direct potable supply alternatives and two indirect potable reuse alternatives. To qualify for direct potable supply, content of the percolated secondary effluent in the basin water needs to be less than five percent. Otherwise, the basin water will be considered as reclaimed wastewater requiring treatment as it is required for the indirect potable reuse.

For wells that receive recharge from injection of the highly treated basin water, a residence time estimated by modeling needs to be greater than 120 days, which is a safety factor of two over the required field verified residence time of 60 days. The alternatives are described and results of the analysis are presented in following sections. Detailed presentation of simulation results is only presented for the potentially viable alternatives.

6.1 Emergency Alternative 1 (Direct Potable Supply)

This alternative would recover water from the deep portion of the alluvial aquifer for advanced treatment and direct potable supply in the system. This alternative would require that the produced water contain less than five percent water that originated from the percolation ponds. **Figure 6-1** shows the location of the new supply well for this alternative, which would be located on CCSD owned property just east of Van Gordon Creek and in the vicinity of the existing Wells 9N2 and 9N3.

This alternative was simulated using the standard conditions by configuring a new pumping well in only the lower portion of the aquifer and pumping the new supply well at 185 gpm, which would yield 150 gpm after advanced treatment. The design concept for this alternative was to assess the potential for obtaining water from the deeper portion of the aquifer in order to minimize production of secondary treated effluent from the percolation ponds. The existing CCSD well field would be pumped at 260 gpm, for a total potable yield of 410 gpm. Shallow recharge to support the fresh water lagoon would be done by injecting 100 gpm into the shallow aquifer near the upper extent of the lagoon, resulting in a potable water supply of 310 gpm for the CCSD distribution system.

The simulation results indicate that pumping at this location would result in development of significant vertical gradients that would induce movement of the percolated secondary treated wastewater to this well. The natural gradients also indicate that past operations at the percolation ponds have likely impacted these deeper zones, thus the criteria for less than five percent wastewater content will not be met with this alternative.

Figure 6-2 illustrates the movement of percolated wastewater in the groundwater system for a hypothetical tracer injected in the percolating treated wastewater after 270 days. Since the percolation ponds have been operating for several decades, this wastewater is present through the thickness of the aquifer and insufficient isolating strata are present to prevent this downward movement. This alternative is not viable.

6.2 Emergency Alternative 2 (Direct Potable Supply)

This alternative is similar to alternative 1, with the exception that the supplemental production well is sited near the beach area on property that is not controlled by CCSD, as shown on **Figure 6-3**. This supplemental well would also have to be pumped at a higher rate, since the TDS is higher, which will decrease the recovery efficiency of the treatment system. This well would also have to meet the criteria of not producing water with more than a five percent content of the percolated waste water in order for the treated water to be directly used.

The results of this simulation also indicate that significant quantities of waste water are present throughout the aquifer, and operation of the well would induce vertical movement of groundwater from the entire thickness of the aquifer. This alternative is also not viable due to a wastewater content greater than five percent. This well location would also produce very high TDS water, which would result in a lower recovery percentage for treated water. Recent measurements at well 8R3 in the area of this alternative indicates that the groundwater has a TDS of about 5,000 mg/L, and pumping in this area would lead to an increase in TDS.

6.3 Emergency Alternative 3 (Indirect Potable Reuse)

This alternative would pump groundwater near the percolation ponds at a rate of about 500 gpm, use advanced treatment with an estimated 92 percent recovery efficiency and re-inject this water up-gradient of the existing well field. **Figure 6-4** shows the configuration of this alternative. This water would be injected down-gradient of existing irrigation wells and upstream of the CCSD well field to minimize loss of the treated water to other users.

The objective of this alternative is to provide a source of recharge for beneficial use of the secondary treated waste water that would otherwise be lost to the ocean. The simulation results indicated that travel times to the closest CCSD production well will not meet the criteria of 120 days of residence time with an injection well located down-gradient of the irrigation wells. This is due to the short distance available to avoid losses to the irrigation wells and a narrowing of the bedrock valley that result in higher groundwater velocities in this area. The criteria could be met by moving the injection well up-gradient of these irrigation wells, however, this would result in loss of injected water under drought conditions to the irrigation wells when they are pumping. This alternative is potentially viable with a move to a further up-gradient location and resolution of the potential loss of highly treated water to irrigators.

6.4 Emergency Alternative 4 (Indirect Potable Reuse)

This alternative is designed to maximize recovery of the percolated secondary treated wastewater while maintaining a mound to avoid movement of percolated waste water toward the existing well field. This alternative is summarized on **Figure 6-5**. Existing well 9P7, located within the percolation pond area, will be pumped at 710 gpm and will undergo advanced water treatment. A new injection well located between the percolation ponds and the existing CCSD well field will receive 485 gpm, while 100 gpm will be infiltrated near the fresh water lagoon to maintain its viability. Wells SS1 and SS2 would be pumped at 227 gpm each to supply CCSD demands. Well SS3 will not be operational when the basin receives the injected water from the advanced water treatment plant due to its proximity to the recharge well. This conservative assessment assumes that the emergency operations would continue for over a year, assuming that no significant runoff occurs in San Simeon Creek.

Since this alternative meets the selection criteria, detailed simulation results are presented. In order to assess the residence time, a hypothetical tracer was injected with the water at the new injection well location. The areal extent of this tracer was tracked in the model and the simulated tracer concentration in CCSD wells SS1 and SS2 summarized. **Figure 6-6** through **Figure 6-12** show a plan view extent of simulated tracer concentration greater than ten percent of the injected concentration the aquifer at 30 day intervals through 210 days of operations. These figures are a visualization through all of the model layers and represent the maximum extent of the ten percent contour in all of the layers. **Figure 6-13** shows the simulated water level after one year of operations, illustrating the mounding at the injection well with radial flow along the aquifer extent both toward the CCSD supply wells and toward the percolation ponds.

Figure 6-14 shows the simulated breakthrough curve for simulated tracer concentration at wells SS1 and SS2 under pure advective flow conditions. Based on this simulation, the estimated residence time from the injection well to well SS2 is 133 days, which exceeds the criteria time of 120 days, which include the 2 times safety factor over the regulatory target residence time of 60 days. The current draft regulations indicate that with the degree of treatment proposed, a residence time of 60 days, confirmed by a tracer study, will meet the requirements for indirect potable reuse. This alternative has the disadvantage of recirculating a significant quantity of water back to the source well at the percolation ponds where it would be repumped and retreated. Some of this recirculated water would also maintain water levels in the lower basin, which will be beneficial for habitat mitigation at the fresh water lagoon. Approximately 60 percent of the water produced at wells SS1 and SS2 would originate from the injection well during the simulated 1.25 years of operation. The breakthrough curves on Figure 6-14 indicate that half of the water produced at wells SS1 and SS2 would originate from the highly treated water recharged to the basin by between 160 and 200 days for the range of assumptions simulated. The percentage of recovery would increase for longer durations under more extreme drought conditions, as basin inflow decreases. If the emergency alternative is operated for only a period of 3 months, all of the water produced by wells SS1 and SS2 would originate from the basin, since the reinjected water would still be in transit from the recharge well, however, the mounding created at the recharge well would serve to maintain a protective westward gradient, and decrease the rate of water level decline at the production wells.

In order to assess uncertainties in the projections of residence time for this alternative, a series of sensitivity analyses were conducted. The sensitivity analyses included assessing the impact of a significant decline in basin sources of recharge, including native precipitation and lateral boundary inflow. These factors were decreased to half the value used in calibration. The effect of variations in groundwater velocity in the aquifer was assessed by adding the effect of dispersion. As noted earlier, the dispersion process accounts for uncertainties in groundwater velocity associated with small scale variations in the aquifer.

An additional sensitivity simulation decreased the effective porosity and included dispersion. This reasonable worst case simulation included a longitudinal dispersivity of 67 feet and an effective porosity of 0.14. This is a very conservative assessment. Figure 6-14 also shows the simulated tracer breakthrough curves for the base alternative and the three sensitivity simulations. The worst case simulations show that the ten percent breakthrough could occur in less than 120 days with the simulated location of the injection well. The location of the well will be moved slightly down-gradient during preliminary design so that a simulated breakthrough for the worst case simulation is beyond the criteria 120 days.

Maintaining the viability of the fresh water lagoon that is present in the lower reach of San Simeon is an important goal of the project. This viability will be maintained by infiltrating treated water in an area adjacent to the channel on CCSD property to support flow into the upper reach of the lagoon area. A preliminary estimate of 100 gpm was used as a basis to assess the potential for maintaining fresh water in the lagoon area during the drought conditions. The intention of mitigation is to avoid or minimize to the extent feasible negative impacts on the fresh water lagoon.

This fresh water lagoon support was assessed by comparing simulated water levels near the channel and fresh water injection wells to determine the extent to which this injection rate could support discharge to the channel and flow into the lagoon area. The lower extent of the lagoon near the beach has an invert elevation that is below mean sea level, so under extreme drought conditions, this lower reach will maintain a water level near mean seal level (~2.81 feet on the site datum), however, as the quantity of fresh water diminishes, the lagoon will become more saline.

Figure 6-15 shows a comparison of simulated shallow groundwater levels and the channel invert, which indicates that some discharge to the channel will occur for up to a year after commencement of the alternative. This plot assumes that alternative operations would start in late summer 2014. The quantity of water actually entering the channel will diminish over time as the drawdown in the shallow aquifer increases due to the drought and continued pumping of the basin. The rate of decline in water levels increases when irrigation pumping starts around day 300. The permeability of the lagoon deposits is unknown, so it may be necessary to provide increased discharge to the wells or directly to the channel if the drought persists for an extended period. If additional mitigation flow are required, then additional pumping from well 9P7 would be required.

The impact of the emergency operations on movement of brackish water inland from the ocean was assessed using the flow and transport model. A water balance from the simulation is shown on

Figure 6-16, which indicates that a small net discharge to the ocean will occur during the initial year of operations of the emergency alternative as storage is depleting in the basin. This figure also presents the net storage decline in the basin, since pumping will exceed the sources of recharge to the basin. The negative values for ocean outflow indicate a net discharge to the ocean, while the positive rates at month 12 of emergency operations indicate a reversal of flow and inducing a net inflow to the basin from the ocean. Depletions from storage occur through the simulated operating period.

Recent sampling of wells at the site indicated that the total dissolved solids (TDS) in groundwater have been elevated due to probable limited salt water intrusion. The secondary treated wastewater has helped to attenuate the increased TDS of the basin water. A profile of specific conductance was run at well 9P7 at the percolation ponds that indicated a TDS indicative of the treated waste water in the upper 25 feet of the aquifer, with deeper zones indicating possible impacts from limited saltwater intrusion. **Figure 6-17** shows a profile of TDS (primarily estimated based on specific conductance) extending from the beach area to the CCSD well field. A well cluster (9N2/9N3) did not indicate vertical differences in TDS. The values ranged from about 5000 mg/L at well 8R3 near the beach, to a range of 350 to 540 mg/L from the CCSD supply wells. The vertical profile data at 8R3 suggested that the well had been impacted by salt water in the past, either from flow within the aquifer or surface flooding, since the interval below the screen openings showed a TDS of about 23,500 mg/L.

Simulation of the effects of variable density was conducted using the SEAWAT model for this alternative, including the impacts of lower basin recharge, in order to validate the primary simulations using MODFLOW and MT3DMS. These simulations confirmed simulation results that were obtained using the equivalent fresh water head approach. The variable density model did show stratification of high TDS water near the base of the aquifer, however, for the 1.25 year simulated duration of emergency operations, the high TDS water did not migrate inland by a significant distance, and the closest wells near the percolation ponds are not impacted.

The simulations of TDS during operation of the emergency supply alternative was assessed using the equivalent fresh water head approach, since the more compute intensive variable density simulations indicated that this process was not required for the duration of the emergency water supply simulations. The ocean boundary was defined for the simulations as an equivalent fresh water head for each of the zones. Since the density of salt water is higher than for fresh water, as the height of the water column increases, the pressure at depth will be higher in salt water than in fresh water. The current distribution of concentrations of TDS in the aquifer was configured in MT3DMS and the emergency alternative was simulated to assess the water quality that would be produced at well 9P7, which is used as the supply well for the advanced treatment system. This provides a reasonable assessment of water quality since a net outflow to the ocean occurs through most of the simulation period. In order to develop a reasonable estimate of the impact of flow reversals from the ocean toward the 9P7 brackish extraction well, a constant concentration boundary was configured in the model between wells 8R3 and 9N2, with a concentration of 3,000 mg/L, which represents an average between these wells. The current observed data represents a long term average condition during a period when little recharge to the aquifer occurred.

Figure 6-18 shows the simulated TDS concentration at the brackish extraction well 9P7 for the emergency alternative. The simulated TDS at the start is about 800 mg/L, similar to what is observed in the percolated secondary treated wastewater. Over time, the concentration drops, since the capture zone of 9P7 includes up-gradient areas that have groundwater not impacted by either wastewater percolation and eventually recharge water that was injected at RIW1, which has a very low TDS (simulated at 100 mg/L). Flow is induced up-gradient from the west off the ocean. However the higher TDS water that is in this area does not reach 9P7 over the 1.25 year duration of the assumed emergency operations. If emergency operations were to continue into the future with no runoff in San Simeon Creek, then this higher TDS water and eventually sea water would be induced to the area of 9P7. If this extreme drought condition were to occur, the steady-state TDS would be a blend of the percolated waste water, return flows from injection at RIW1 and sea water, with minor basin flow from up-gradient after several years. Under this extreme condition, the TDS could rise as high as 8,500 mg/L when this equilibrium is reached after several years of no stream flow recharging the system.

Based on the simulations, the planned TDS should include a safety factor for design and use a design value of 1200 mg/L to account for uncertainties. If the drought extends into 2017 with no stream flow, then the TDS values will increase, potentially resulting in decreased recovery efficiency from the treatment system.

6.5 Emergency Alternative Recommendation

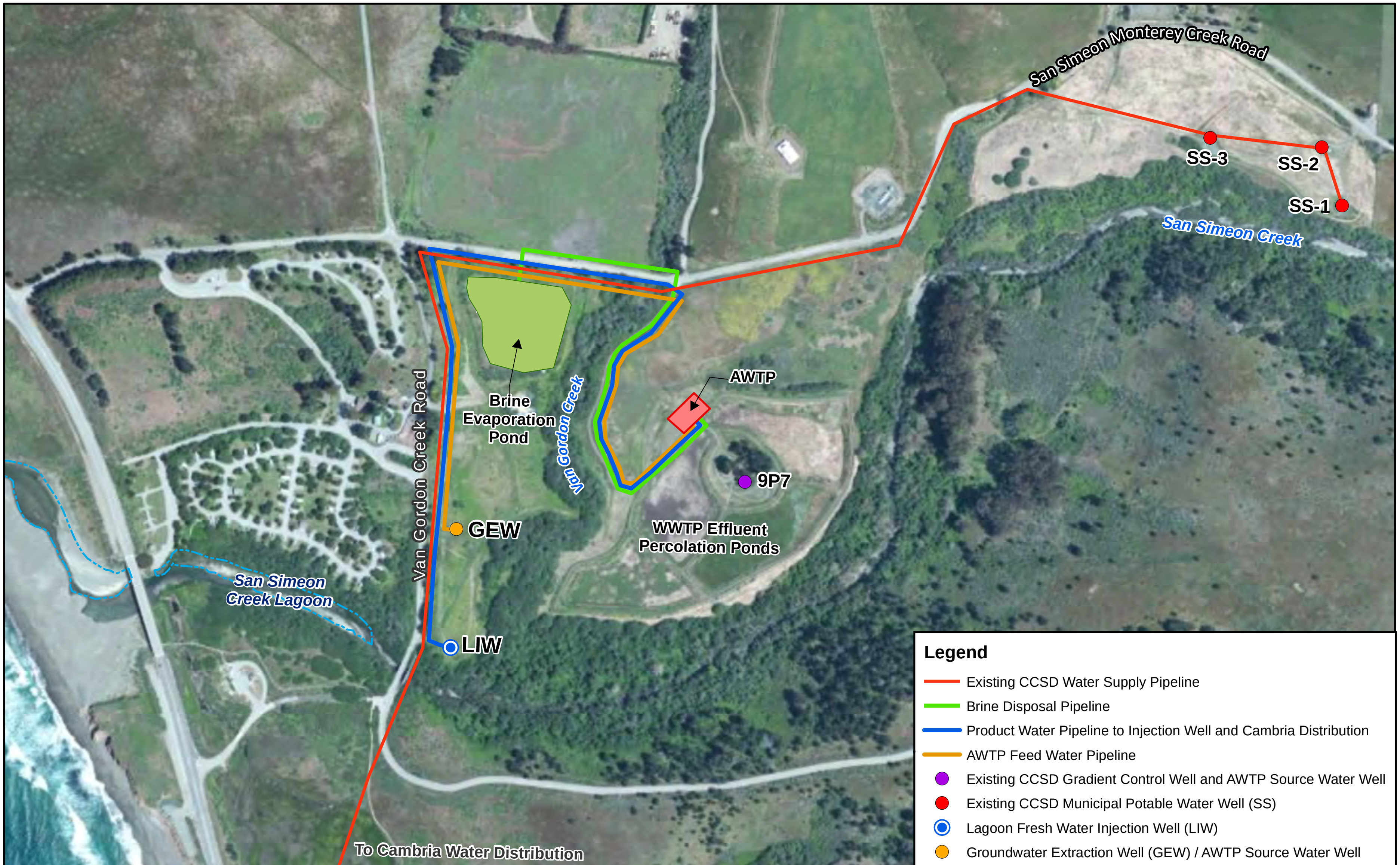
Based on the modeling simulations emergency water supply Alternative 4 is feasible, though there is significant recirculation of the highly treated water. Alternative 3, with a modification to the location of the injection well further up-gradient is also feasible. However, this would require access to property not owned by CCSD.

A key element of this feasibility is the use of an injection well between the CCSD well field and the percolation ponds. Use of this approach allows maintenance of a gradient that protects the well field from impacts from the percolated effluent and brackish water present in the lower basin. Emergency water supply Alternative 4 increases sustainability of the water supply under the current drought conditions, since the previously lost percolated effluent is captured, highly treated, and produced for water supply after appropriate residence time in the aquifer. The brackish water that is pumped from the basin for treatment will be diluted with percolated secondary effluent and a portion of highly treated water that is injected will maintain a protective gradient between the percolation ponds and the potable water well field.

Use of the injection well to create a mound near the freshwater lagoon has limited benefits later in the season as basin water levels are drawn down below the channel invert, precluding discharge of the mounded groundwater to the lagoon. Mitigation would be more effective by discharging the treated water directly in the open channel.

6.7 Conclusions

The modeling analysis indicates that enhancing water supplies for both emergency and long-term conditions is feasible in the San Simeon Creek Basin.



CDM Smith

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-1
Emergency Alternative 1 Summary

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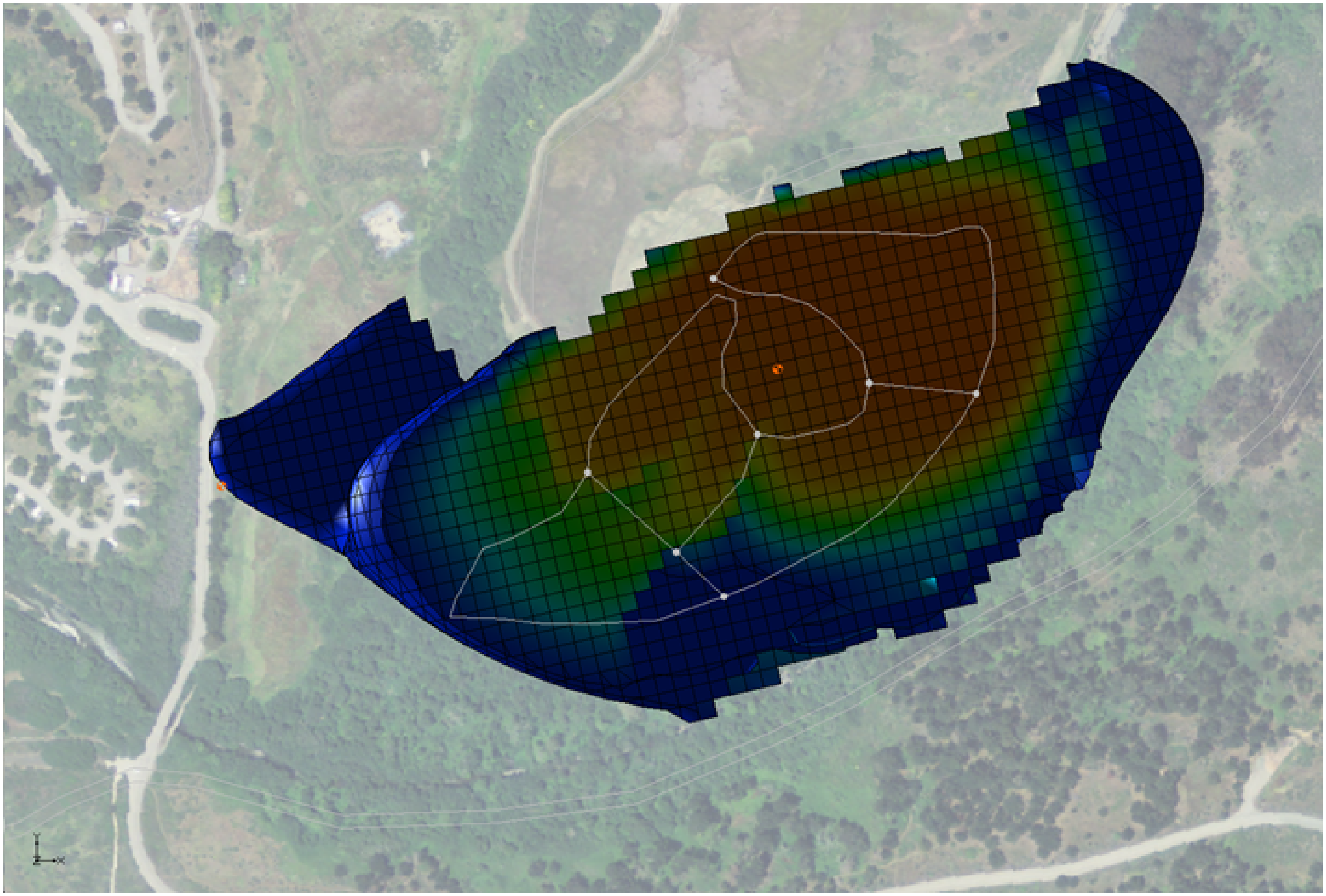

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-2

Alternative 1: Simulated Extent of Treated Wastewater after 270 days of operation Emergency

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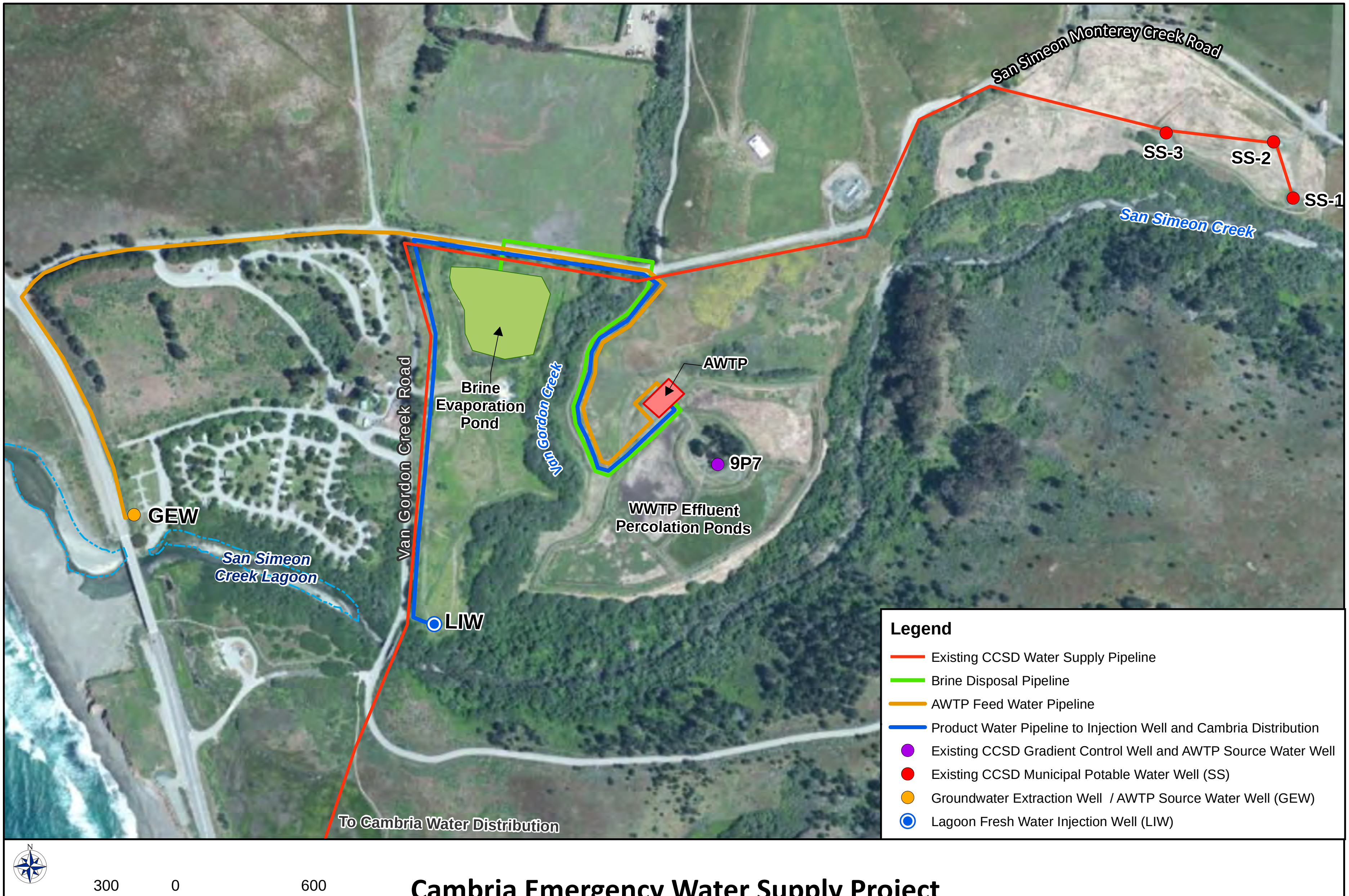

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-3
Emergency Alternative 2 Summary

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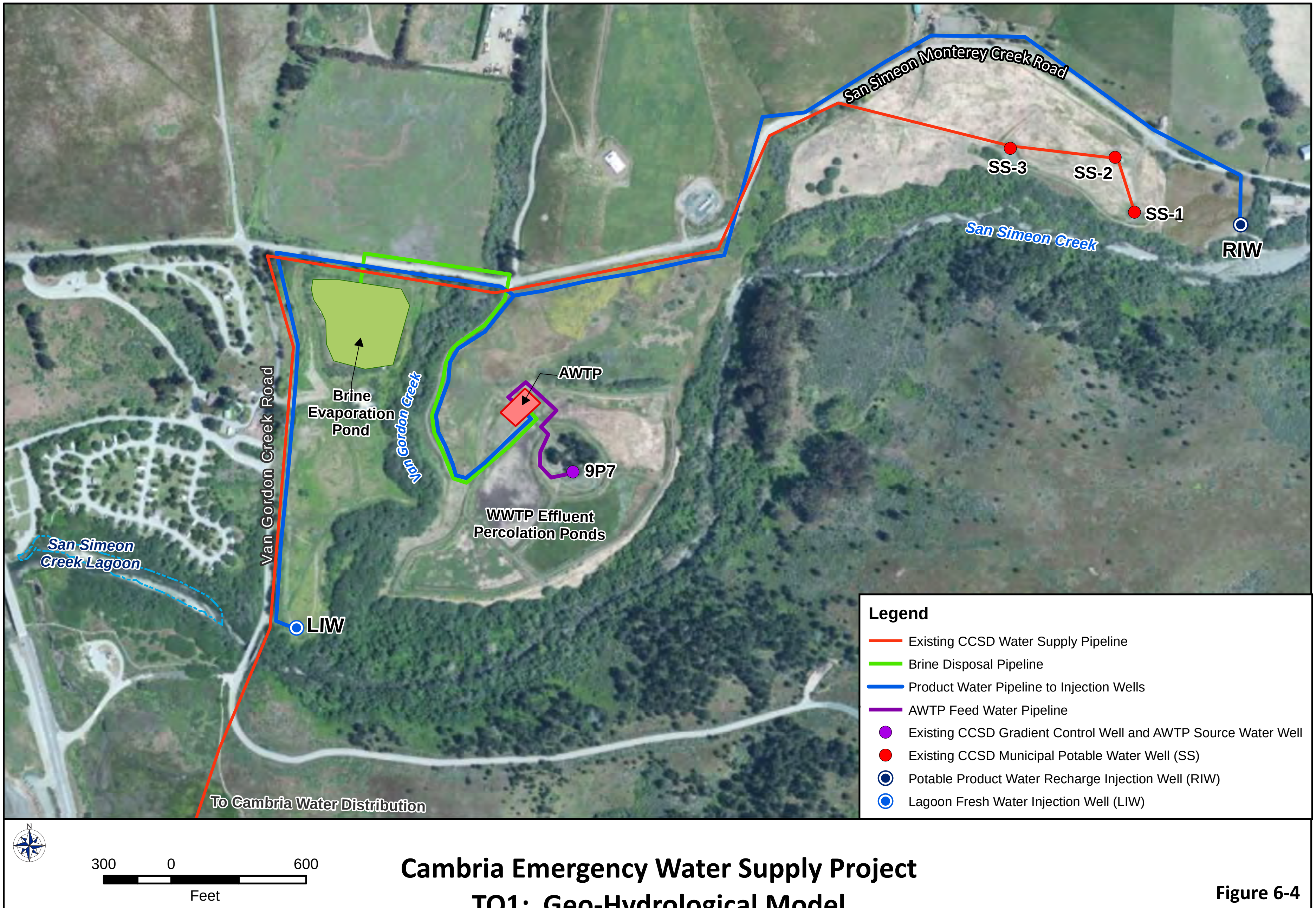

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-4
Emergency Alternative 3 Summary

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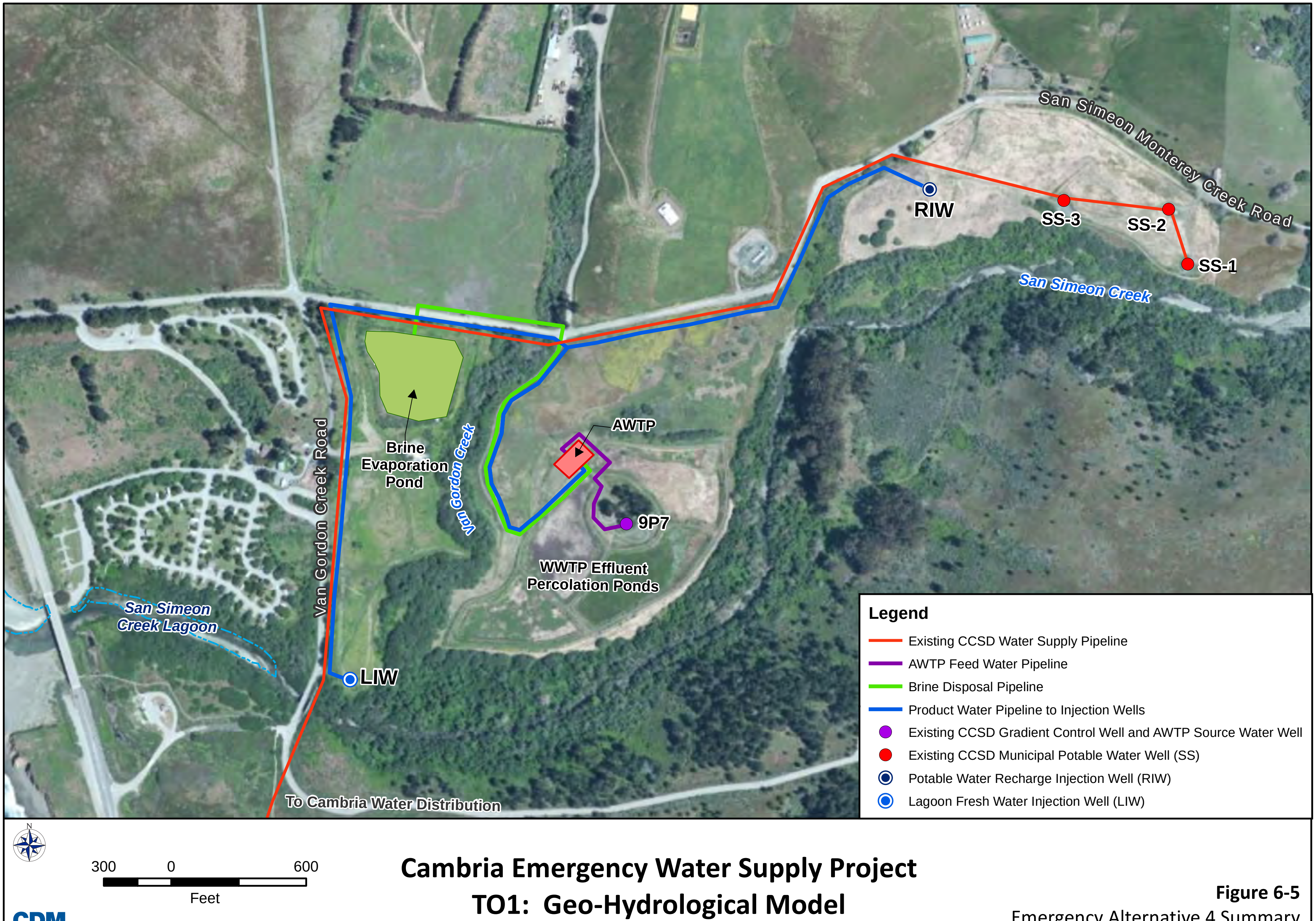

CDM Smith

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-5
Emergency Alternative 4 Summary

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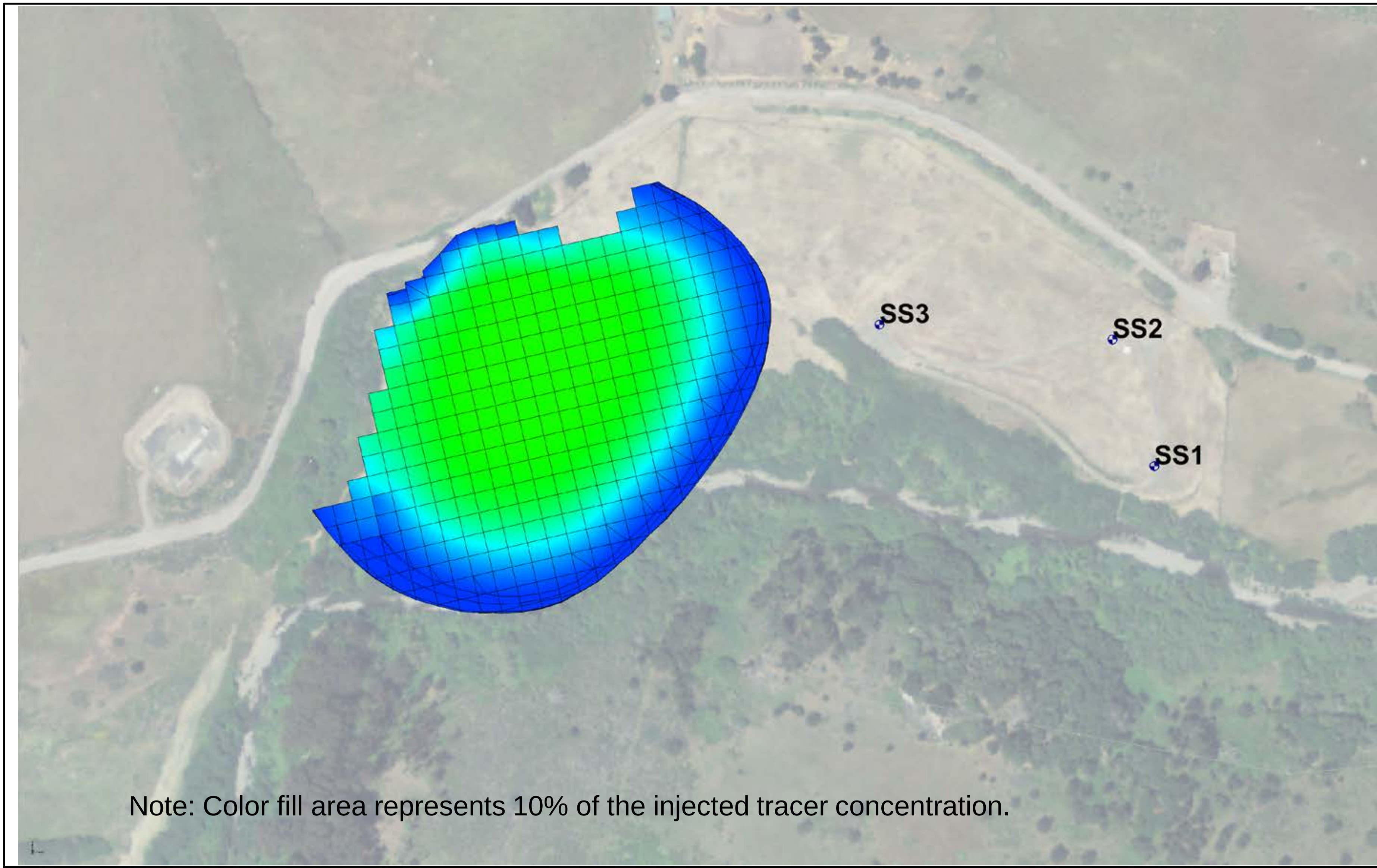

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-6
Simulated Tracer Extent at 30 Days

CDM Smith

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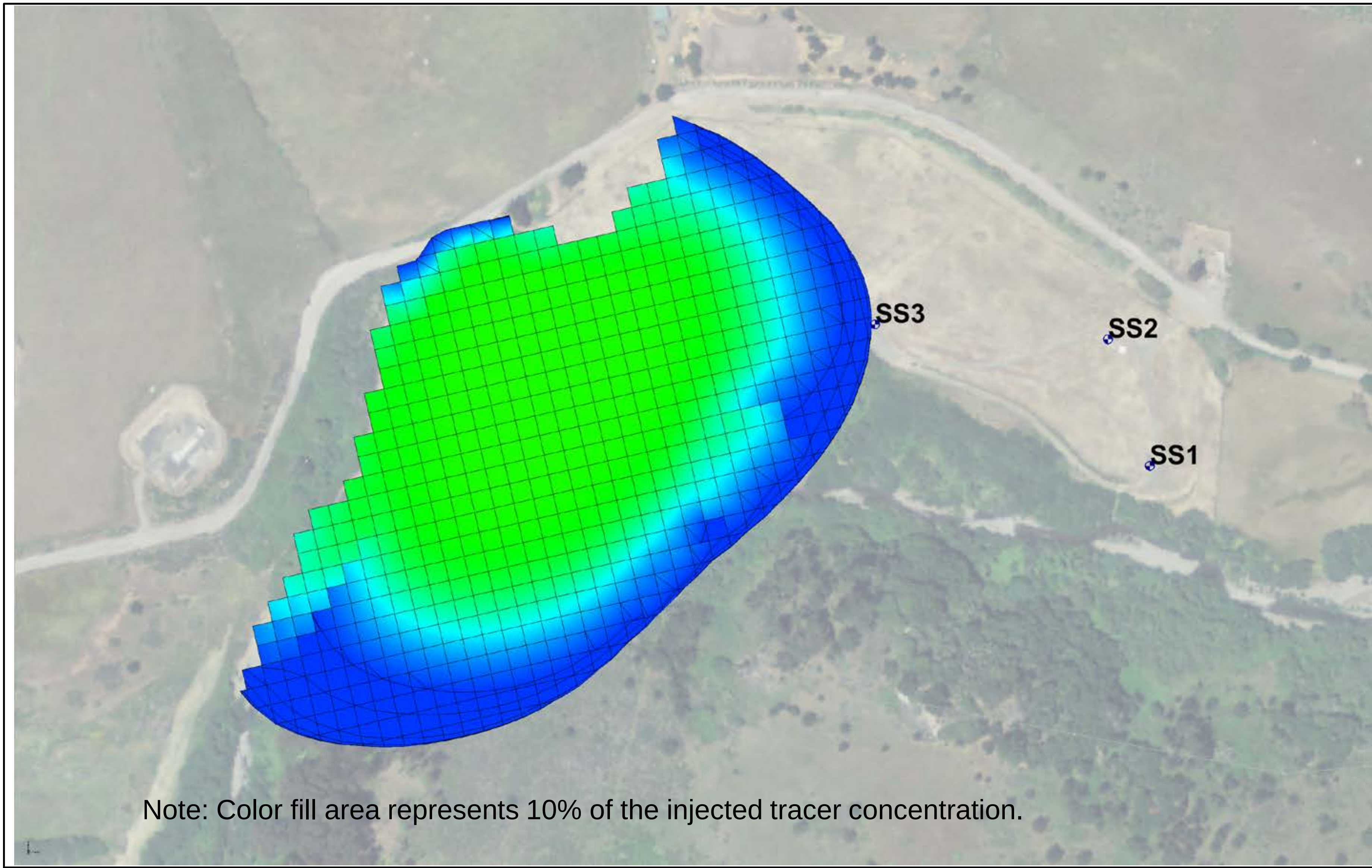

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-7
Simulated Tracer Extent at 60 Days

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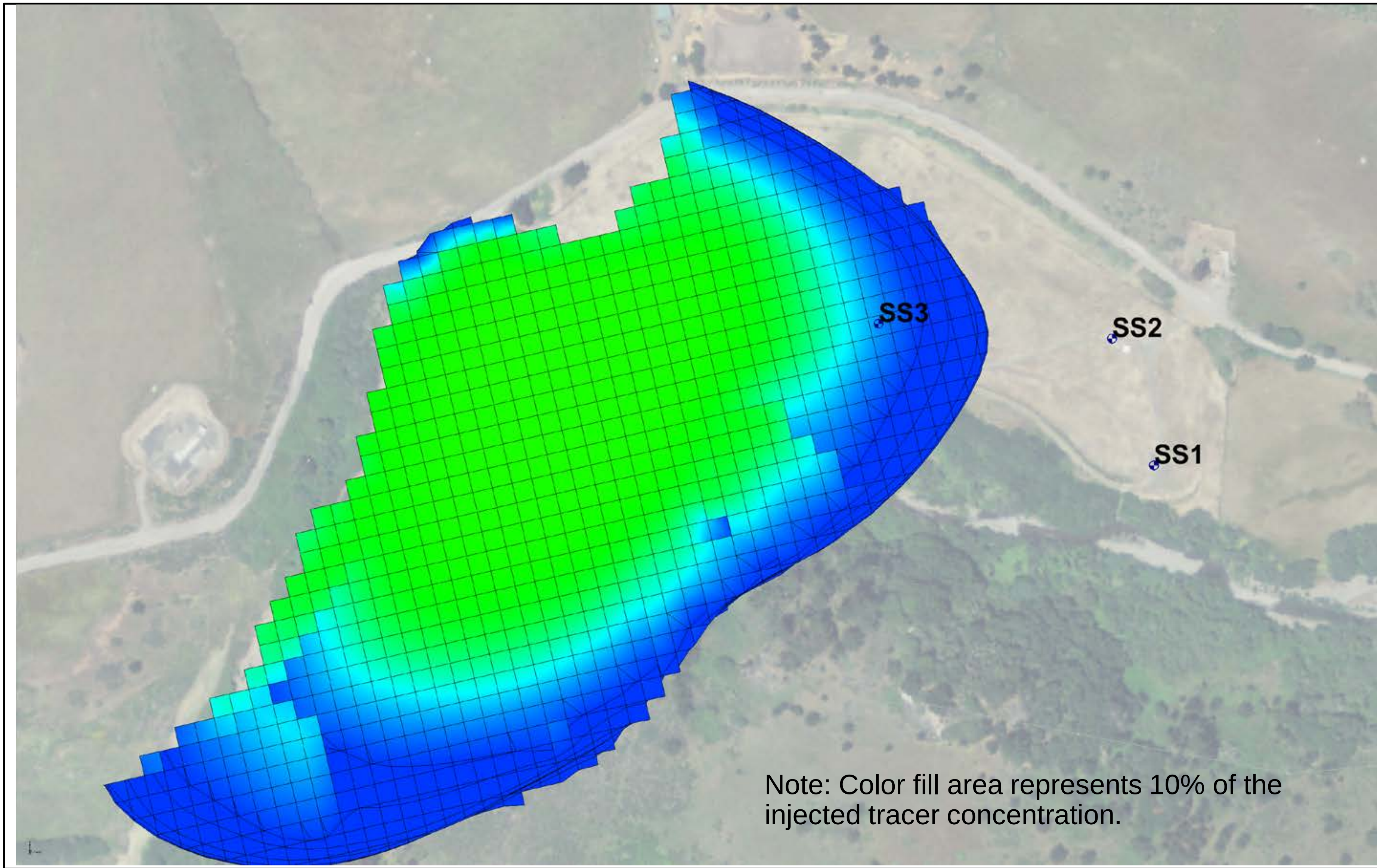

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-8
Simulated Tracer Extent at 90 Days

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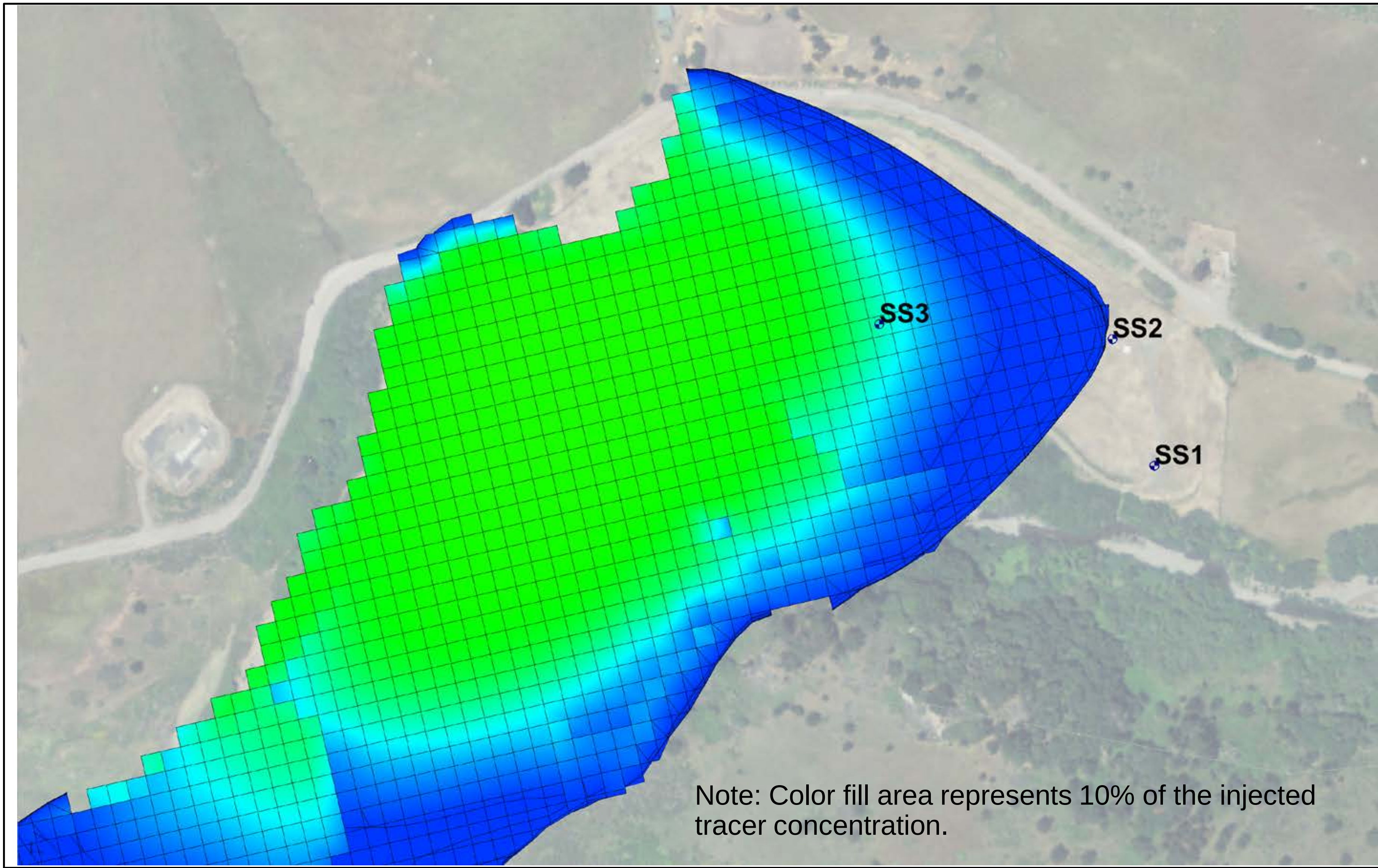

Cambria Emergency Water Supply Project

TO1: Geo-Hydrological Model

CDM Smith

Figure 6-9

Simulated Tracer Extent at 120 Days

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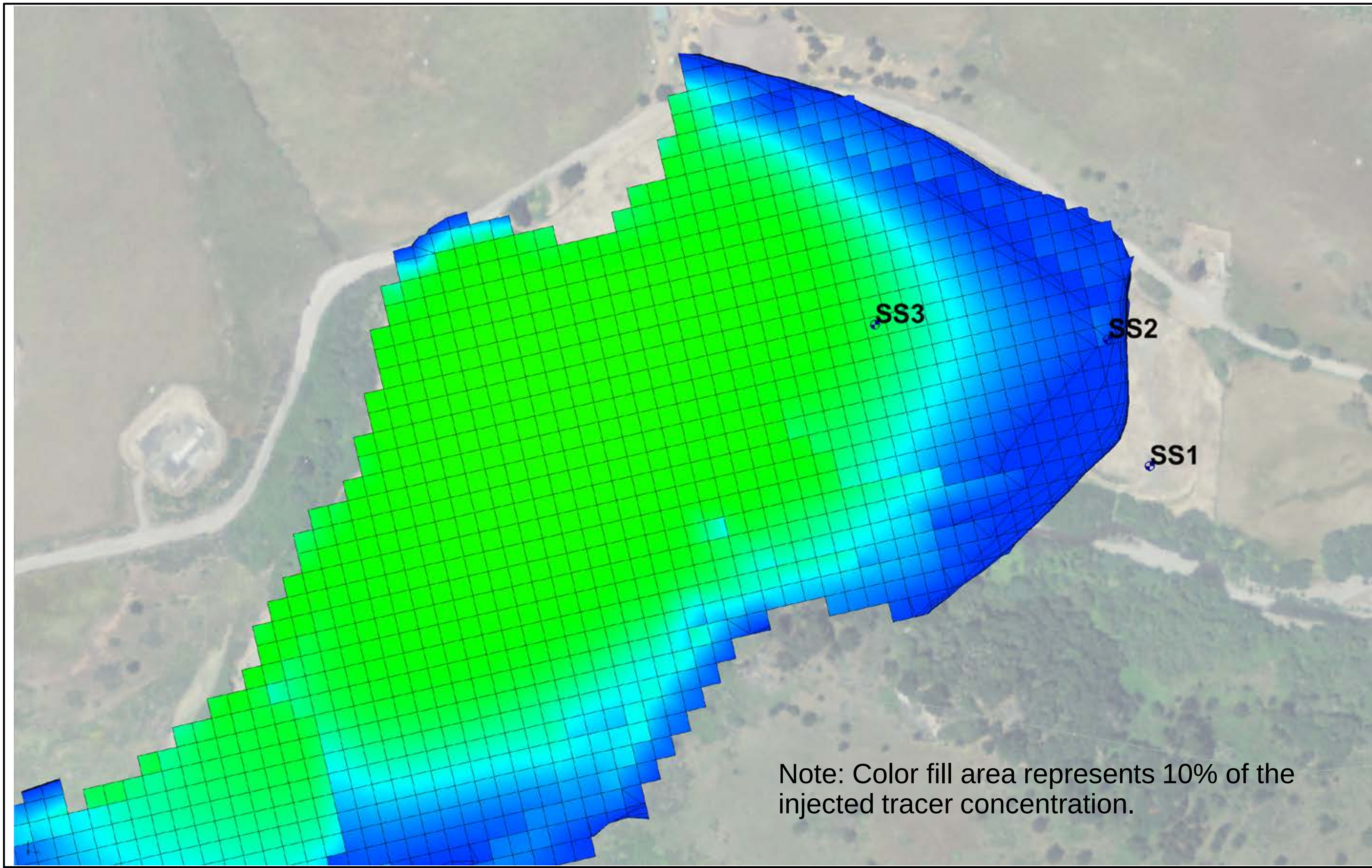

Cambria Emergency Water Supply Project

TO1: Geo-Hydrological Model

CDM Smith

Figure 6-10

Simulated Tracer Extent at 150 Days

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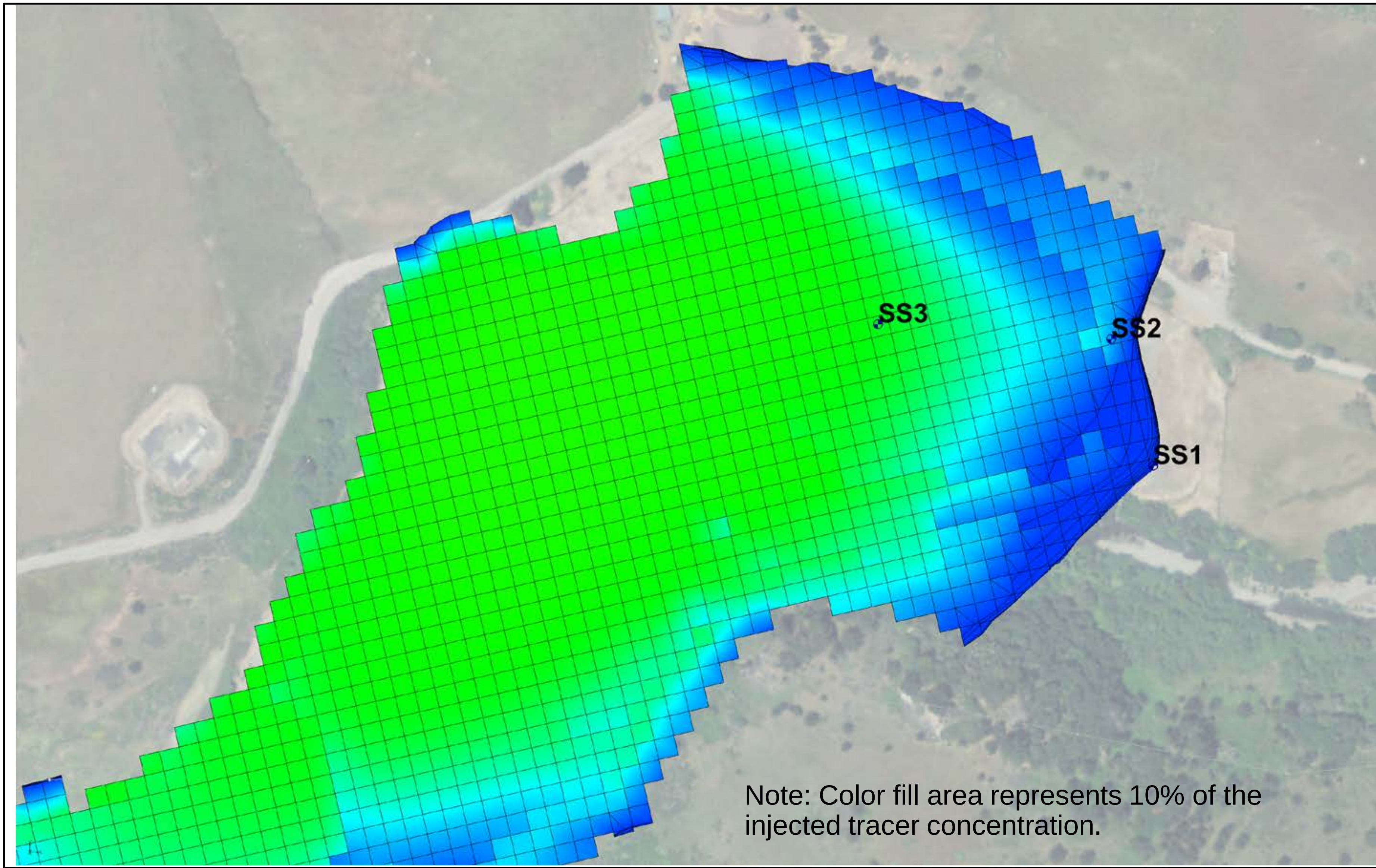

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-11
Simulated Tracer Extent at 180 Days

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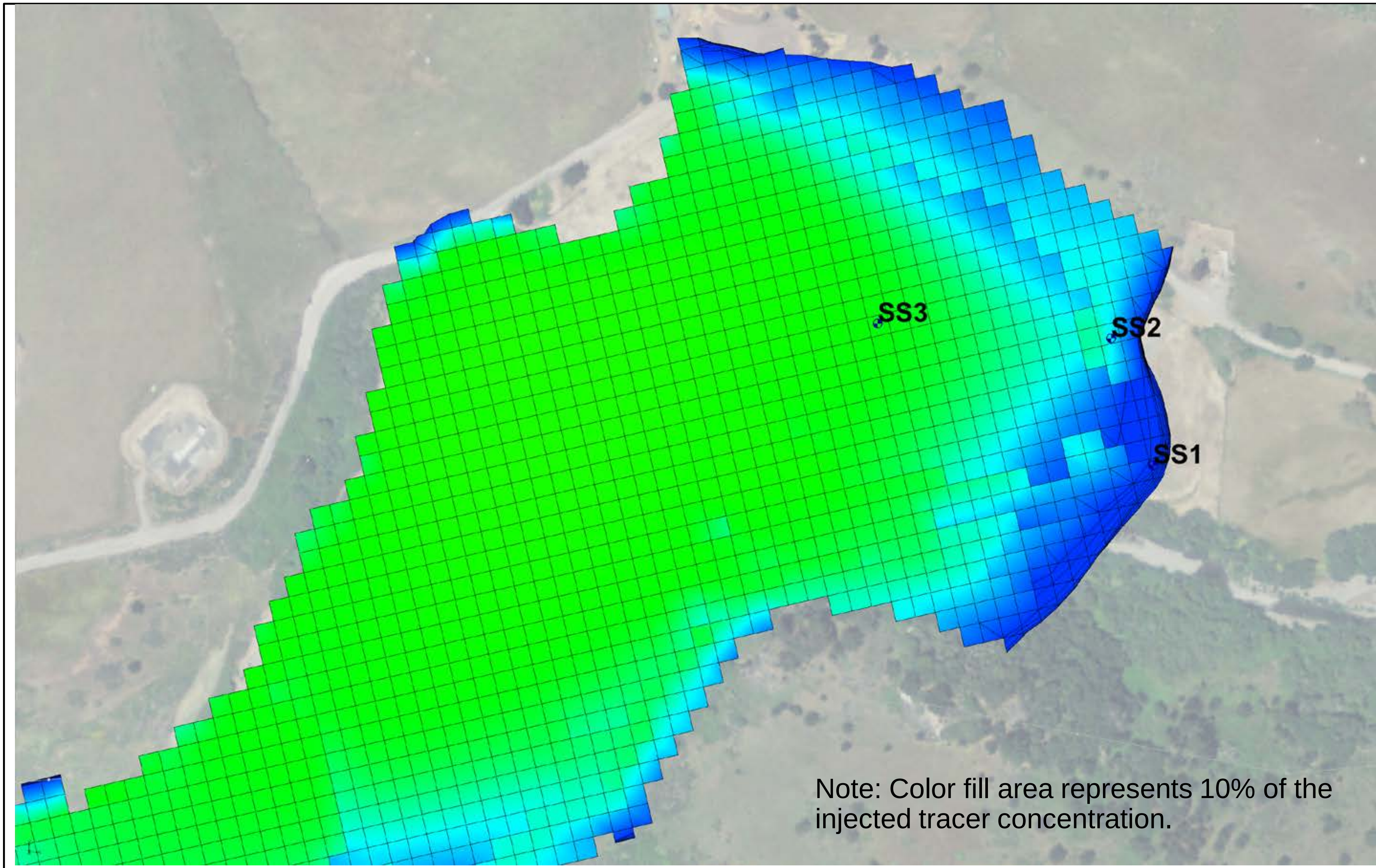

Cambria Emergency Water Supply Project

TO1: Geo-Hydrological Model

CDM Smith

Figure 6-12

Simulated Tracer Extent at 210 Days

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Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-13
Simulated Water Levels After One Year of Operation

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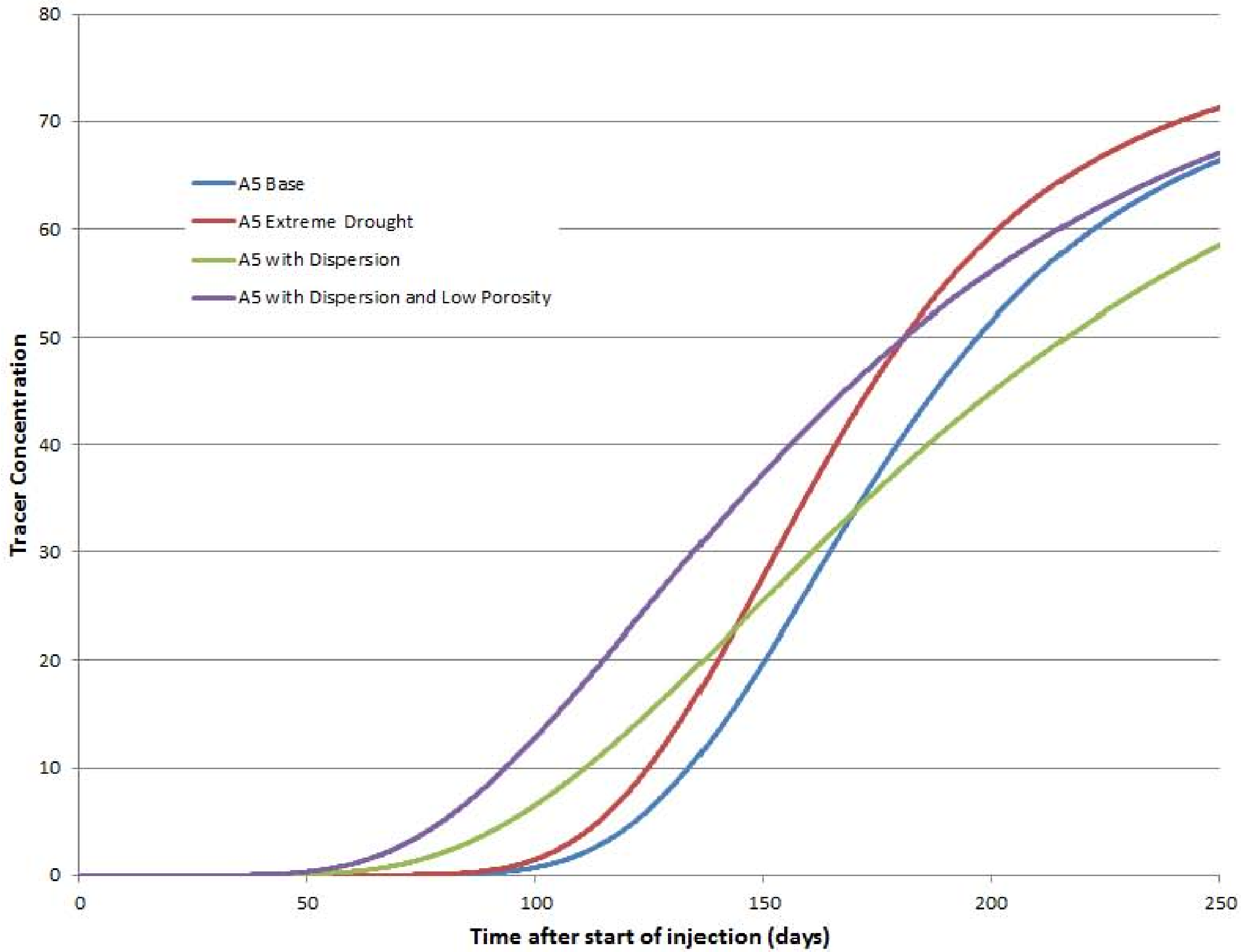

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

Figure 6-14
Simulated Tracer Breakthrough at wells SS1 and SS2

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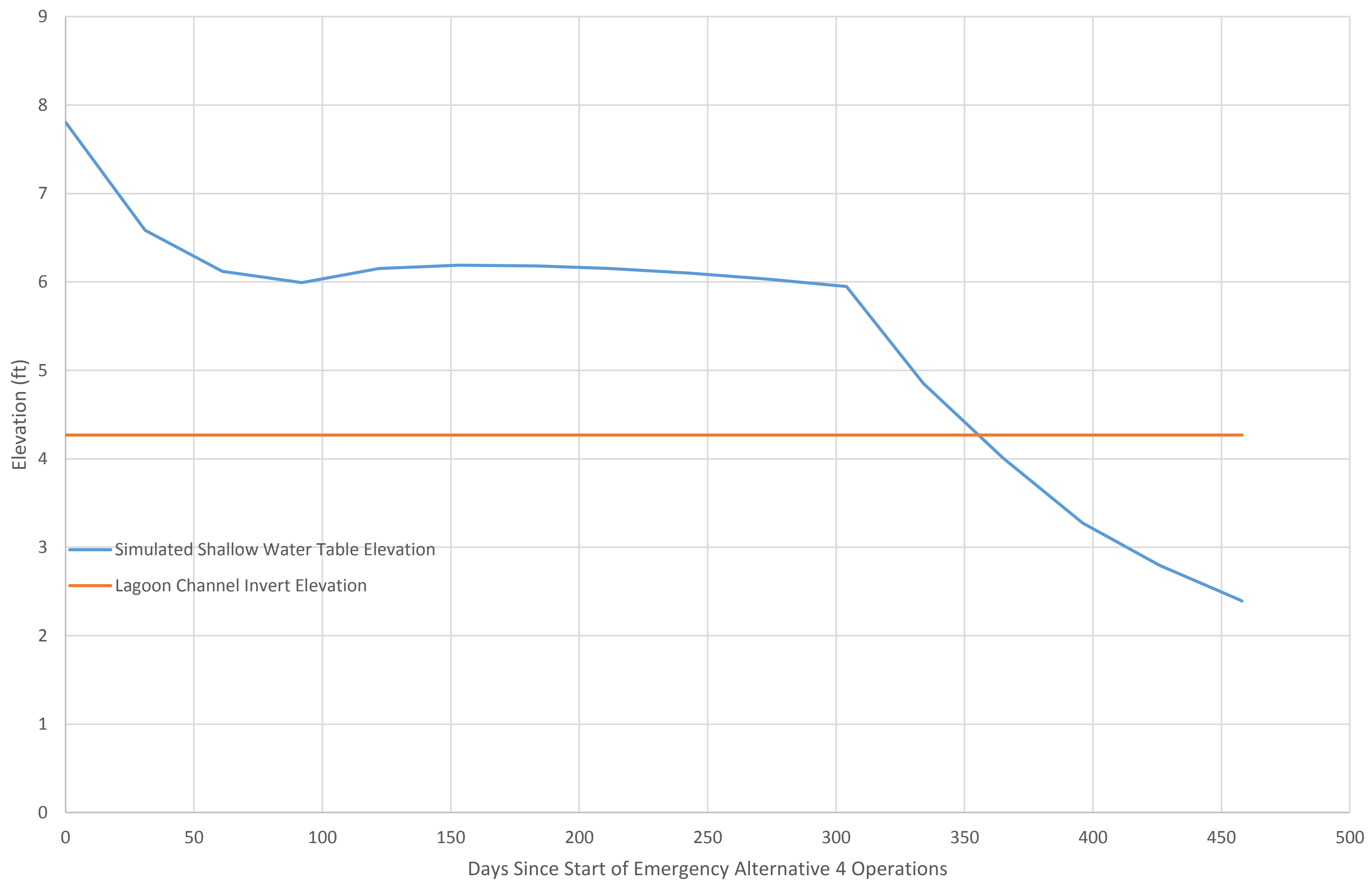

Cambria Emergency Water Supply Project

TO1: Geo-Hydrological Model

Figure 6-1p

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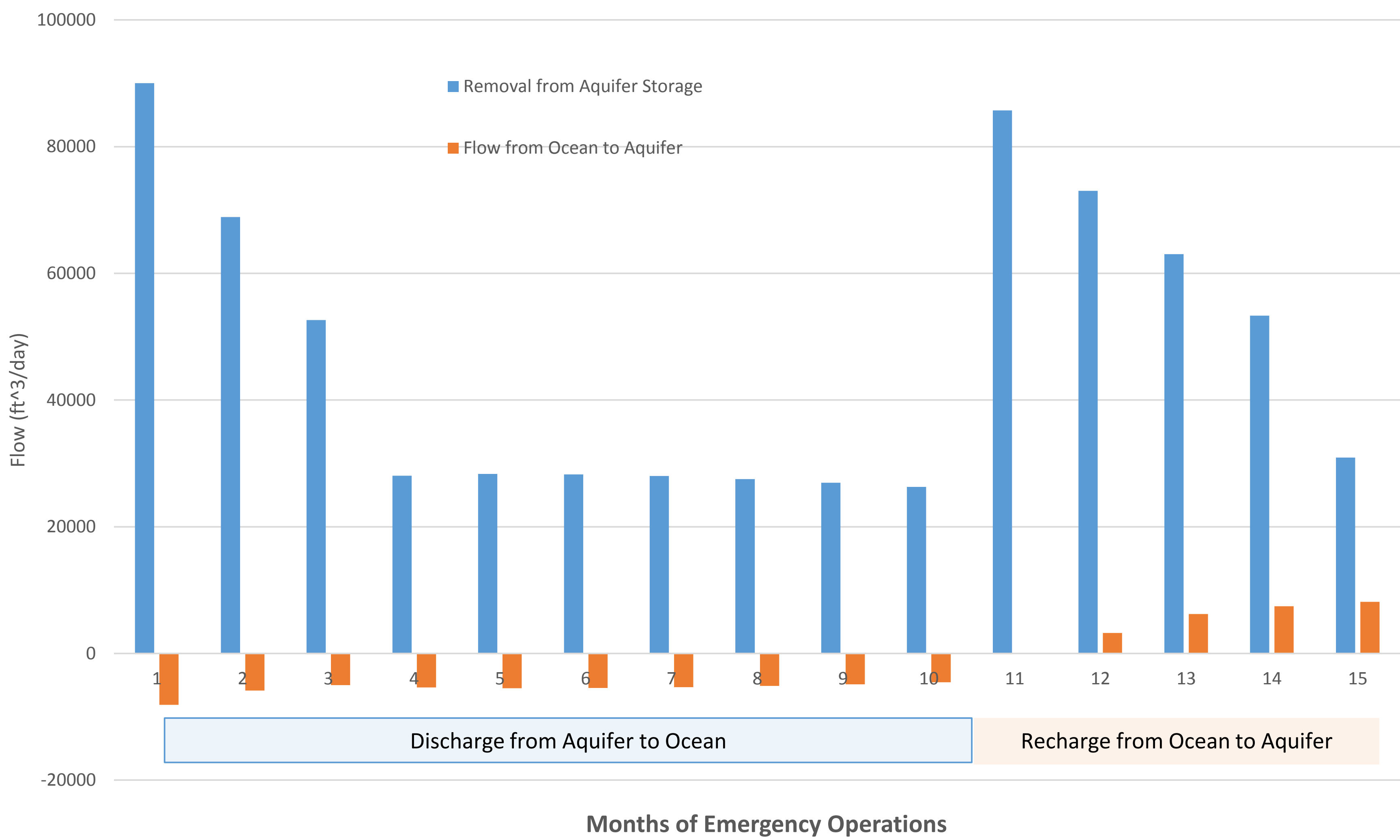

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-16
Simulated Basin Storage Depletion and Ocean Inflows and Outflows

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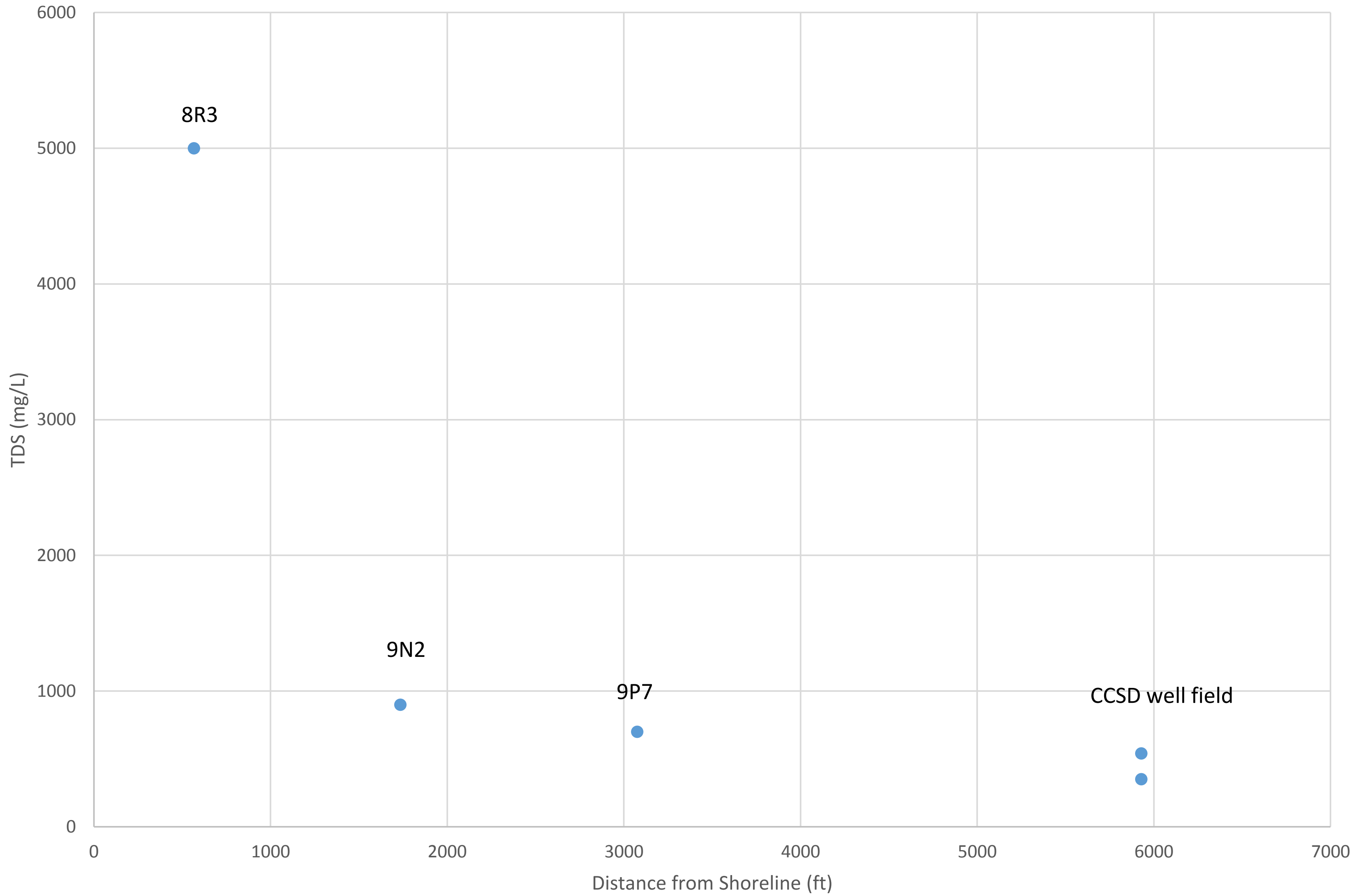

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-1T
TDS Profile from Well Samples

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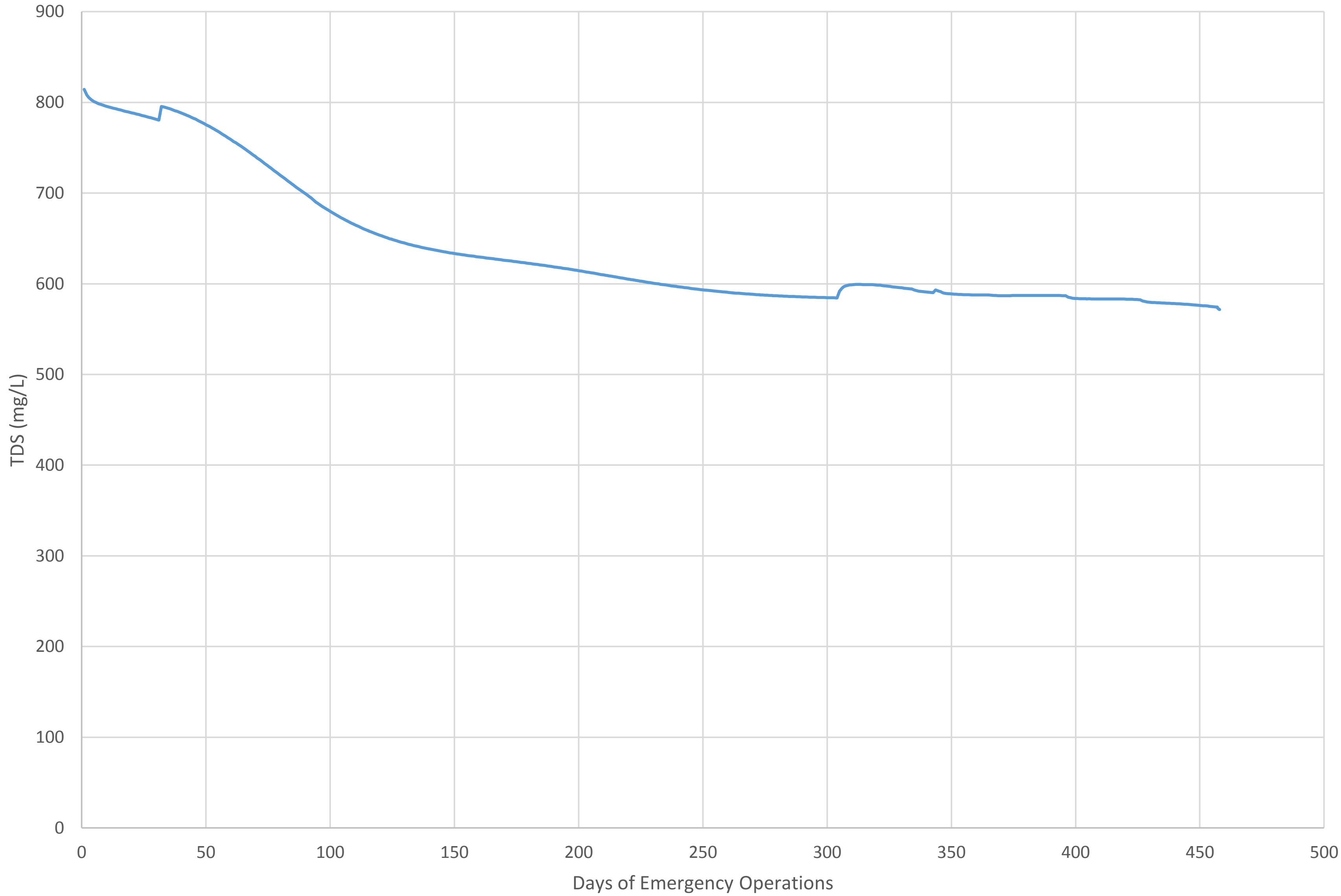

Cambria Emergency Water Supply Project
TO1: Geo-Hydrological Model

CDM Smith

Figure 6-18
Simulated TDS at Brackish Extraction Well

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Section 7
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Appendix E2
Cambria Emergency Water Supply Project Delineation of State and Federal Jurisdictional Waters

CAMBRIA EMERGENCY WATER SUPPLY PROJECT

City of Cambria, California

DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

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September 2014

JN 141290

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INTERNATIONAL

CAMBRIA EMERGENCY WATER SUPPLY PROJECT

SAN LUIS OBISPO COUNTY, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of a jurisdictional "waters of the U.S." (including wetlands) and "waters of the State" determination for the above-referenced project.

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Executive Summary

Introduction: At the request of the Cambria Community Services District, RBF Consulting, a Michael Baker International Company (RBF) has prepared this Delineation of Jurisdictional Waters for the Cambria Emergency Water Supply Project, located in the City of Cambria, County of San Luis Obispo, State of California.

Methods: This delineation documents the regulatory authority of the U.S. Army Corps of Engineers Los Angeles District (Corps), Central Coast Regional Water Quality Control Board (Regional Board), California Department of Fish and Wildlife South Coast Region (CDFW), and California Coastal Commission (CCC), pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act, the California Porter-Cologne Water Quality Control Act, Section 1600 of the California Fish and Game Code[1] respectively, and the California Coastal Act. The field work for this delineation was conducted on August 13 and 14, 2014.

Results: State and federal jurisdictional areas were identified within the project site. San Simeon Creek, Van Gordon Creek, and three (3) wetland features were observed within the boundaries of the project site. Placement of fill and/or alteration within these jurisdictional areas is subject to Corps, Regional Board, CDFW and California Coastal Commission (CCC) jurisdiction and approval. Tables ES-1 thru ES-3 identifies the total jurisdiction on site of each regulatory agency.

Table ES-1: Corps/Regional Board Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Non-Wetland		Wetland		Non-Wetland		Wetland	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	0.39	-	-	-	-	-
Van Gordon Creek	0.77	2,233	-	-	0.001	5	-	-
Total	**6.71**	**9,025**	**0.39**	**-**	**0.001**	**5**	**-**	**-**

[1] The project area was surveyed pursuant to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008); the Practices for Documenting Jurisdiction under Section 404 of the CWA Regional Guidance Letter (Corps 2007); Minimum Standards for Acceptance of Preliminary Wetland Delineations (Corps 2001); and the Field Guide to Lake and Streambed Alteration Agreements Section 1600-1607 (CDFW 1994).

Table ES-2: CDFW Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Streambed		Associated Vegetation		Streambed		Associated Vegetation	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	45.17	-	-	-	-	-
Van Gordon Creek	0.77	2,233	8.59	-	0.01	5	-	-
Total	**6.71**	**9,025**	**53.76**	**-**	**0.01**	**5**	**-**	**-**

Table ES-3: CCC Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Stream		Wetland		Stream		Wetland	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	46.06	-	-	-	-	-
Van Gordon Creek	0.77	2,233	8.59	-	0.01	5	-	-
Total	**6.71**	**9,025**	**54.65**	**-**	**0.01**	**5**	**-**	**-**

Conclusion: Based on current site conditions and project design plans, the project applicant must obtain the following regulatory approvals prior to impacts occurring within the identified jurisdictional areas: Corps CWA Section 404 Permit and Corps Section 10 Permit; Regional Board CWA Section 401 Water Quality Certification; CDFW Section 1602 Streambed Alteration Agreement (SAA); and CCC Coastal Development Permit. Refer to Sections 1-6 for a complete discussion.

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LIST OF ACRONYMS

CCC	California Coastal Commission
CCSD	Cambria Community Services District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DBH	Diameter at Breast Height
EPA	Environmental Protection Agency
FAC	Facultative Vegetation
FACU	Facultative Upland Vegetation
FACW	Facultative Wetland Vegetation
GPS	Ground Positioning System
IP	Individual Permit
LF	Linear Feet
MSL	Mean Sea Level
NWP	Nationwide Permit
OBL	Obligate Wetland Vegetation
OHWM	Ordinary High Water Mark
RBF	RBF Consulting
RCP	Reinforced Concrete Pipe
RPW	Relatively Permanent Waters
SAA	Streambed Alteration Agreement
SBBM	San Bernardino Base and Meridian
SWANCC	Solid Water Agency of Northern Cook County
TNW	Traditional Navigable Water
UPL	Obligate Upland Vegetation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WoUS	Waters of the United States

Section 1 Introduction and Purpose

This delineation has been prepared for the Cambria Community Services District (CCSD), in order to document the jurisdictional authority of the U.S. Army Corps of Engineers Los Angeles District (Corps), Central Coast Regional Water Quality Control Board (Regional Board), California Department of Fish and Wildlife Central Region (CDFW), and California Coastal Commission (CCC) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act, the California Portor-Cologne Water Quality Control Act, Section 1600 of the Fish and Game Code, and the California Coastal Act. The field work for this delineation was conducted August 13 and 14, 2014.

The Cambria Emergency Water Supply Project (Project), hereinafter referred to as the project site, is generally located east of the State Route 1, south of the City of San Simeon, and north of the Community of Cambria in unincorporated San Luis Obispo County, California (Exhibit 1, *Regional Vicinity Map*). The Project site is located in section 9 of Township 27 South, Range 8 East of the Cambria quadrangle of the United States Geological Survey (USGS) 7.5-minute topographic map series (Exhibit 2, *Site Vicinity*). Specifically, the project site is located east of State Route 1, south of San Simeon Monterey Creek Road and north of Washburn Campground Road (Refer to Exhibit 3, *Project Site*). It is located north and east of Hearst San Simeon State park.

This delineation has been designed to explain the methodology undertaken by RBF Consulting (RBF), document the jurisdictional authority of the regulatory agencies, and support the findings made by RBF within the boundaries of the project site. This report presents our best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, only the regulatory agencies can make a final determination of jurisdictional boundaries.

1.1 PROJECT SITE BACKGROUND

The project site involves a CCSD owned property containing various water facilities, including a potable water well (San Simeon well field), an underground potable water supply pipeline, a percolation pond system, and an effluent storage reservoir (Van Gordon Reservoir).

All of Cambria's potable water is supplied by groundwater wells in the San Simeon and Santa Rosa Creek aquifers. The San Simeon and Santa Rosa aquifers are relatively shallow and porous, with the groundwater levels typically recharged every year during the rainy season. Groundwater levels generally exhibit a consistent pattern of high levels during the wet season, steady decline during the dry season, and rapid rise when the wet season resumes. To minimize loss or contamination of potable groundwater at the aquifer and

not to scale

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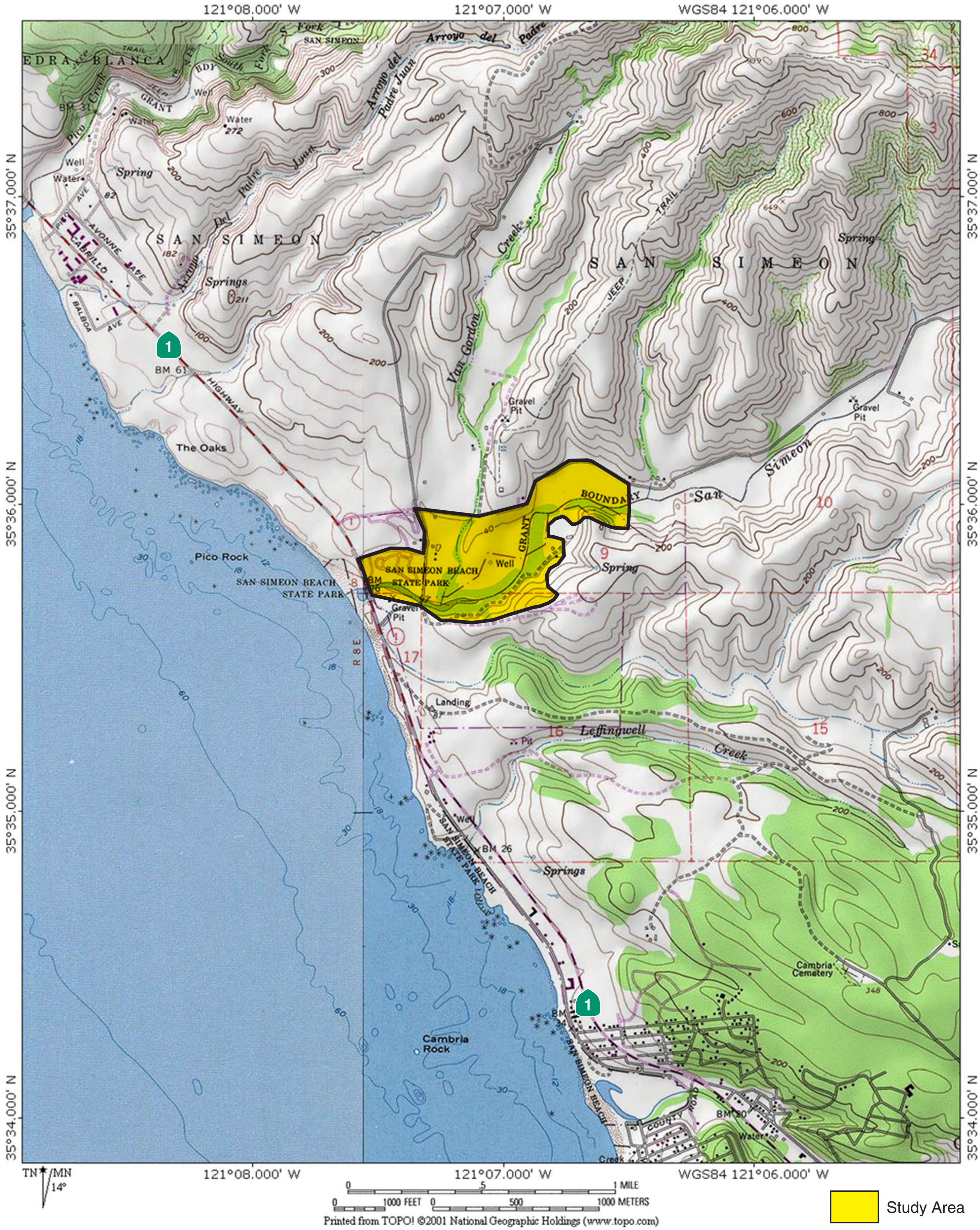
8/29/14 JN 141290-20450 MAS

CAMBRIA EMERGENCY WATER SUPPLY PROJECT

Regional Vicinity

Exhibit 1



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0 2500'

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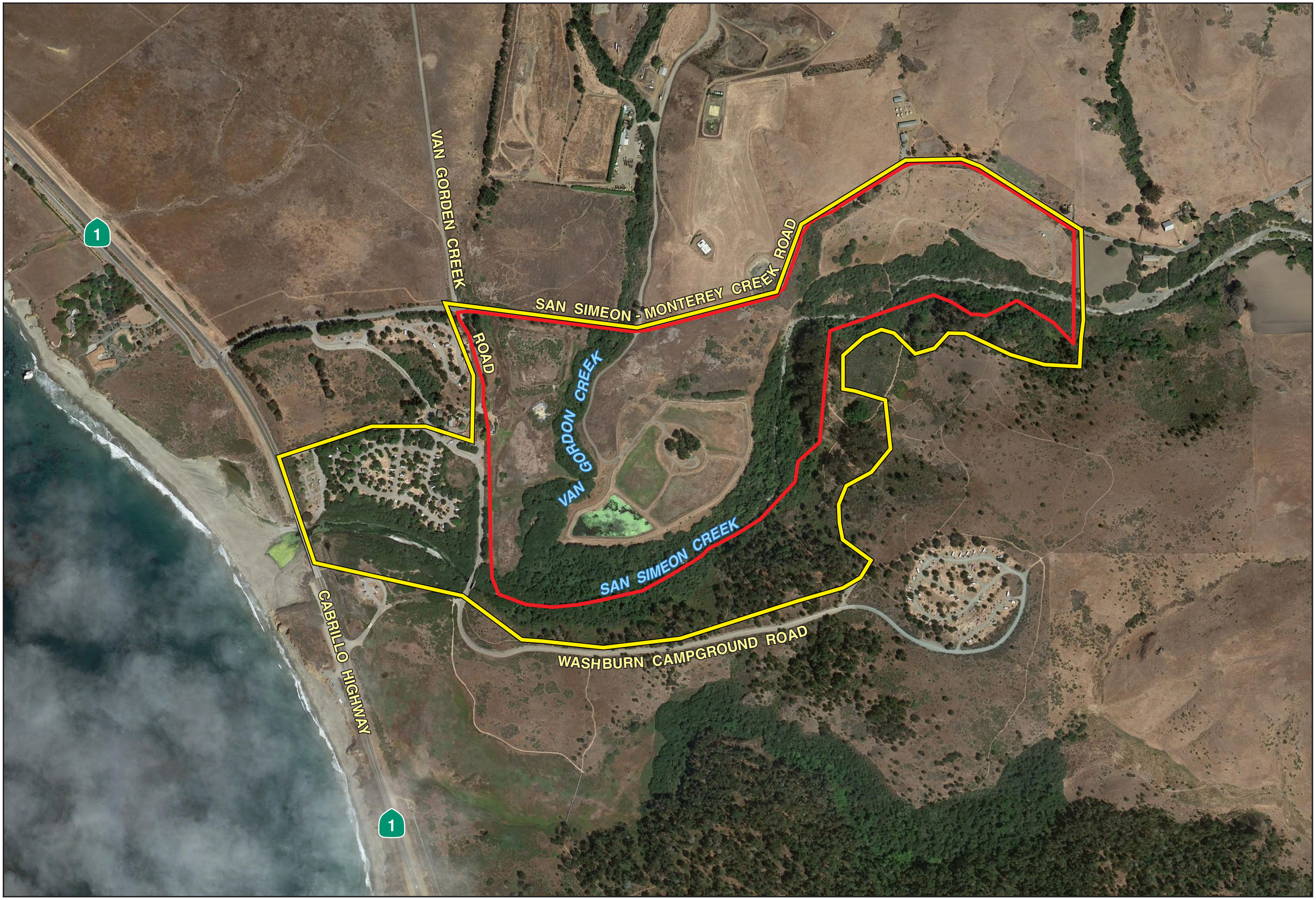
CAMBRIA EMERGENCY WATER SUPPLY PROJECT

Site Vicinity

Exhibit 2



SOURCE: Google Earth Pro Aerial, August 24, 2013.

Study Area

Project Site

not to scale

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9/30/14 JN 141290-20450 MAS

CAMBRIA EMERGENCY WATER SUPPLY PROJECT

Project Site

Exhibit 3

ocean interface, treated waste water effluent is percolated into the San Simeon Creek aquifer downstream from its production wells. This practice also helps prevent saltwater intrusion into the freshwater aquifer.

In January 2014, the CCSD declared a Stage 3 water shortage emergency, the most stringent of three levels. In response to this emergency status, the CCSD is proposing the Cambria Emergency Water Supply Project.

San Simeon Monterrey Creek Road (San Simeon Creek Road) forms the project site's northern boundary and agricultural uses are located further north. Surrounding land uses to the south include Hearst San Simeon State Park, Washburn Campground, and open space. Agricultural land uses are located to the east. State Route 1 and San Simeon Creek Campground together form the western boundary of the project site with the Pacific Ocean located further west beyond State Route 1.

1.2 PROJECT DESCRIPTION

The Project's source water is the San Simeon Creek aquifer from existing Well 9P7, which is located in the south end of a flat park like area in the middle of the existing percolation ponds. The extracted groundwater would be transferred to a proposed Advanced Water Treatment Plant (AWTP) that would treat brackish water to produce potable water. The AWTP would consist of multiple unit processes including ultrafiltration membranes, reverse osmosis membrane, advance oxidation, and post treatment and disinfection facilities. A feed water pipeline is proposed to transport the brackish water between the existing Well 9P7 and the proposed AWTP. To meet the California Department of Public Health and Regional Board regulations, the treated AWTP product water would be re-introduced/pumped for injection in the groundwater basin so that it would become available in the existing San Simeon well field. To inject the product water into the basin, a new potable water recharge injection well (RIW) is proposed at the existing potable water well field, approximately 1,000 feet east of existing potable water Well SS-3. A Project water pipeline is proposed to transport the product water between the proposed AWTP and proposed RIW and lagoon injection well (LIW).

A stream of the AWTP product water would be pumped southwest of the AWTP for discharge into the San Simeon creek via a LIW proposed just upstream of the freshwater lagoon, approximately 2,500 feet southwest of existing Well 9P7. The AWTP generated waste stream (brine) would be disposed for evaporation in the existing Van Gordon Reservoir, and evaporation pond that was originally constructed for percolation of the secondary effluent form the CCSD's waste water treatment plant. A brine disposal pipeline is proposed to transport the brine between the proposed AWTP and the existing Van Gordon Reservoir, which would be lined with an impermeable liner to serve as the evaporation pond for this Project. Depending on the AWTP recovery, the proposed brine evaporation may need to be aided with mechanical spray evaporators or another forced evaporation equipment.

It is assumed the Project would be capable of generating 400 gallons per minute (gpm) of new water, out of which 300 gpm would be used for emergency water supply to the Cambria community and 100 gpm would be used for recharge into the San Simeon Creek freshwater lagoons.

Section 2 Regulations and Methodology

2.1 SUMMARY OF REGULATIONS

There are four key agencies that regulate activities within streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. The CDFW regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act. The CCC regulates activities under the California Coastal Act. For a detailed summary of regulations, refer to Appendix B.

2.1.1 FEDERAL JURISDICTIONAL WATERS

Generally, the Corps and Environmental Protection Agency (EPA) will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The Corps and EPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters. It should be noted a significant nexus includes consideration of hydrologic and ecologic factors.

The Corps and EPA generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

2.1.2 STATE JURISDICTIONAL AREAS

2.1.2.1 California Regional Water Quality Control Boards

The California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters.

2.1.2.2 California Department of Fish and Wildlife Jurisdiction

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. The Fish and Wildlife's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation.

2.1.2.3 California Coastal Commission Jurisdiction

The CCC was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976. The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. The Coastal Act (PRC Section 30121) defines "wetlands" as "lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." In addition, the Coastal Act (PRC Section 30107.5) defines environmentally sensitive areas in a manner that would include rivers, streams or other aquatic habitat.

Section 30107.5 of the Coastal Act defines "environmentally sensitive area" as "any areas in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." The Coastal Act criteria for determining whether an area qualifies as an ESHA are based upon ecological importance, including the rarity or function of the habitat, and the habitat's sensitivity.

2.2 METHODOLOGY

RBF conducted a site reconnaissance to determine jurisdictional “waters of the United States” and “waters of the State” (including potential wetlands and vernal pools), located within the boundaries of the project site. The literature review and site visit are utilized to define:

- the Corps’ ordinary high water mark (OHWM) and any three (3) parameter wetlands on-site. The actual presence or absence of wetlands on-site was verified through the determination of the presence of hydrologic conditions, hydrophytic vegetation, and hydric soils pursuant to the September 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*.

- the CDFW’s jurisdiction being identified via the top of bank of the on-site streambed or to the outer drip line of riparian vegetation (if present) pursuant to the 1994 CDFW *Field Guide to Lake and Streambed Alteration Agreements*; and,

- in cases where isolated and/or Rapanos conditions are present, the delineation would identify areas under the jurisdiction of the Regional Board pursuant to the California Porter-Cologne Water Quality Act.

- The CCC’s regulations establish a “one parameter definition” that only requires evidence of a single parameter to establish wetland conditions. The upland limit of a wetland is defined as the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover; the boundary between soil that is predominantly hydric and soil that is predominantly non-hydric; or in the case of wetlands without vegetation or soils, the boundary between land that is flooded or saturated at some time during years of normal precipitation, and land that is not.

Analysis presented in this document is supported by field surveys and verification of current conditions conducted on August 13, 2014 and August 14, 2014. While in the field, jurisdictional areas were recorded onto a base map at a scale of 1" = 600' using the topographic contours and visible landmarks as guidelines. Data points were obtained with a Garmin 62 Global Positioning System (GPS) Map62 in order to record and identify specific widths for the ordinary high water marks (OHWM), soil pit locations, picture point locations, and pertinent jurisdictional features. This data was then transferred via USB port as a .shp file and added to the project's jurisdictional map. The jurisdictional map was prepared in ESRI ArcGIS Software Version 10.1. For a detailed summary of methodology, refer to Appendix C.

Section 3 Literature Review

Review of relevant literature and materials often aids in preliminarily identifying areas that may fall under an agency's jurisdiction. A summary of RBF's literature review is provided below (refer to Section 7.0 for a complete list of references used during the course of this delineation). In addition, refer to Appendix D for further documentation.

3.1 WATERSHED REVIEW

The project site is located within the Central Coastal Watershed (HUC 18060006). The watershed includes the western coastal regions of San Luis Obispo and a southern portion of Monterey County. The watershed consists of approximately 3,154 square miles. The Central Coastal Watershed is bound on the southern section by the Santa Maria Watershed and the Cuyama Watershed as well as the Salinas Watershed and Carmel Watershed along the eastern.

More specifically, the project site is located within the San Simeon-Arroyo de la Cruz watershed grouping (CalWater HUC 10 Scale). The watershed grouping is 60,141 acres in size, spanning over the community of San Simeon, the northern portion of Cambria and the Hearst San Simeon State Historical Monument. There are two major drainages throughout the watershed, the Arroyo de la Cruz and San Simeon Creek. The watershed originates in the western slopes of the Santa Lucia Mountains, flowing in a westerly direction, until it discharges into the Pacific Ocean at San Simeon State Beach. Groundwater basins include Arroyo de la Cruz Valley, Piedras Blancas Point, San Simeon Point, San Simeon Valley and Santa Rosa Valley. The dominant land use throughout is agriculture and rangeland, and approximately 1,000 people live within the watershed grouping area.

3.2 LOCAL CLIMATE

San Luis Obispo County is characterized by a year-round Mediterranean climate, or semi-arid climate, with warm, sunny, dry summers and cool, rainy, mild winters. Climatological data obtained from nearby weather stations indicates the annual precipitation at an average of 16.74 inches. Most of the rainfall occurs between the months of November to April, with little precipitation occuring during the summer months. The warmest month of the year is September, at an average maximum of 68.2°F. The coolest month of the year is December, at an average minimum of 42.6°F. The average maximum temperature annually is 65.0°F and the average minimum temperature annually is 47.8°F. There is no recorded average snowfall around the area of the project site.

3.3 USGS TOPOGRAPHIC QUADRANGLE

The project site is located in Section 9 of Township 27 South, Range 8 East of the Cambria quadrangle of the USGS 7.5- minute topographic map series. On site topgraphy ranges from approximately 20 to 170 feet above mean sea level. According to the topographic map, the majority of the project site consists of vacant, undeveloped land. San Simeon Creek is indicated as a blue line stream and enters the project site along the eastern boundary flowing southwest towards the Pacific Ocean. Van Gordon Creek is indicated as a blue line stream and enters along the northern boundary of the project site flowing south towards it's confluence with San Simeon Creek within the southwestern portion of the project site. One unimproved dirt road historically existed in the southernmost portion of the project site, along with improved access roads within the western portion. One well is indicated within the central portion of the project site at the current location of the effulent percolation ponds. One gravel pit is located along the southwestern porion of the project site. A total of seven small structures are located within the boundaries of the project site generally clustered in the northwestern and central portions. San Simeon Monterey Creek Road and State Route 1 form the northern and western bondaries of the project site respectively. According to the topographic map, vacant, undeveloped land uses surround the project site to the north, south and east. The Pacific Ocean is located to the west of the project site beyond State Route 1.

3.4 AERIAL PHOTOGRAPH

Prior to field visits, RBF reviewed a current aerial photograph dated August 23, 2013 from Google Earth Imaging for the project site. Aerial photographs can be useful during the delineation process, as the photographs often indicate drainages and vegetation (i.e., riparian vegetation) present within the boundaries of the project site (if any).

According to the aerial photograph, the project site appears to consist of a mixture of dense riparian vegetation, riverine habitat, freshwater wetland and estuary habitat, dry upland habitat, open field/grassland, sparse development and vacant undeveloped land. Dense riparian vegetation follows the flow path of San Simeon Creek which enters along the eastern boundary traversing the project site in a southwest direction. The invert of San Simeon Creek is visible in the northeastern and southwestern portions of the project site becoming less visible within the central portion due to dense vegetation cover. Dense riparian vegetation also follows the southerly flow path of Van Gordon Creek which enters the project site along the northen boundary. The northeastern most portion of the site consists of an open field/grassland with sparse vegetation cover. Within this field are four small structures connected by an unimproved (gravel) access road. The rest of the eastern portion of the project site remains vacant undeveloped land. Four constructed ponds are located within the central portion of the project site surrounded by an unimproved (dirt) access road and fencing. The southwesternmost pond is filled with water. An improved road extending from San Simeon Creek Road to the north provides access to this facility. Two constructed basins/ponds, and two residential structures are located in the northwestern portion of the project site. San Simeon Creek Lagoon, campground facilities (San Simeon Creek Campground), parking lot, and associated improved access roads are located west of Van Gordon Creek Road which crosses over San Simeon Creek in the western portion of the project site. California State Route 1 (Cabrillo Highway) forms the western boundary of the project site.

3.5 SOIL SURVEY

On-site and adjoining soils were researched prior to the field visits using the U.S. Department of Agriculture, Soil Conservation Service, Custom Soil Resource Report for San Luis Obispo County, California Coastal Part. The presence of hydric soils is initally investigated by comparing the mapped soil series for the site to the County list of hydric soils. Soil surveys furnish soil maps and interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research and disseminating the results of research. In addition, soil surveys are now heavily used in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil chracteristics, drainage, and color).

The following soil series have been reported on-site: Beaches (107), Capistrano Sandy Loam, Rolling (114), Concepcion Loam, 5 to 9% slopes (121), Concepcion Loam, 9 to 15% slopes (122), Lodo Clay Loam, 5 to 15% slopes (147), Los Osos Loam, 5 to 9% slopes (158), Los Osos Loam, 30 to 50% slopes (161), Los Osos-Diablo Complex, 15 to 30% slopes (164), Los Osos-Diablo Complex, 30 to 50% slopes (165), Marimel Sandy Clay Loam, Occassionally Flooded (169), Riverwash (194), and Salinas Silty Clay Loam, 0 to 2% slopes (197). Refer to Appendix D, *Documentation*, and Exhibit 4, *Soils Map*.

Beaches (107)

Beaches are poorly drained. In north coastal San Luis Obispo County they occur at an elevenation of 0 to 10 feet, with a mean annual precipitation of 42 to 48 inches, a mean annual air temperature range of 53 to 57°F. and a frost free period of 190 to 210 days. The typical profile for beaches include sand from 0 to 60 inches. The depth to the water table is about 0 to 72 inches and the available water capacity is very low at approximately 2.4 inches.

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Michael Baker
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Feet

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

Soils Map

Exhibit 4

Capistrano Sandy Loam, Rolling (114)

This soil type is well-drained and is developed in Eolian deposits. In north coastal San Luis Obispo County, it is found on dunes at an eleveation of 0 to 200 feet. The mean annual precipitation for where this soil type occurs is 20 to 24 inches, with a mean annual temperature of 55°F and a frost free period of 330 to 365 days. The typical profile of this soil in north coastal San Luis Obispo County includes sandy loam from 0 to 60 inches. The depth to a restrictive feature is more than 80 inches, the depth to the water table is more than 80 inches, and the available water capacity is moderate at approximately 6.8 inches.

Concepcion Loam, 5 to 9 percent slopes (121)

This soil type is moderately well-drained and is developed in alluvium dervived from sedimentary rock. In north coastal San Luis Obispo County, it is found on terraces at an elevation of 10 to 800 feet. The mean annual precipitation for where this soil type occurs is 17 to 24 inches, with a mean annual air temperature of 57°F and a frost-free period of 300 to 330 days. The typical profile includes loam from 0 to 19 inches, clay from 19 to 47 inches, and sandy clay loam from 47 to 63 inches. The depth to a restrictive feature is 10 to 21 inches to an abrupt textural change, the depth to the water table is more than 80 inches, and the available water capacity is low at approximately 3.2 inches.

Conception Loam, 9 to 15 percent slopes (122)

This soil type is moderately well drained, and is developed in alluvium derived from sedimentary rock. In north coastal San Luis Obispo County, it is found at elevations of 10 to 800 feet. The mean annual precipitation for where this soil type occurs is 17 to 24 inches, with a mean annual temperature of 57°F, and a frost free period of 300 to 330 days. The typical profile of this soil includes loam from 0 to 19 inches, clay from 19 to 47 inches, and sandy clay loam from 47 to 63 inches. The depth to restrictive feature is 10 to 21 inches to abrupt textural change, the depth to the water table is more than 80 inches, and the available water storage in profile is low at approximately 3.2 inches.

Lodo Clay Loam, 5 to 15 percent slopes (147)

This soil type is somewhat excessively-drained and is developed in residuum weathered from sandstone and shale. In north coastal San Luis Obispo County, it is found in the hills and mountains at an elevation of 300 to 3,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 35 inches, with a mean annual air temperature of 59°F, and a frost-free period of 250 to 365 days. The typical profile of this soil includes clay loam from 0 to 12 inches and unweathered bedrock from 12 to 22 inches. The depth to a restrictive feature is 4 to 20 inches to lithic bedrock, the depth to the water table is more than 80 inches, and the available water capacity is very low at approximately 1.9 inches.

Los Osos Loam, 5 to 9 percent slopes (158)

This soil type is well drained and is developed in residuum weathered from sandstone and shale. In north coastal San Luis Obispo County it is found on hills and ridges at an elevation of 100 to 2,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 25 inches, with a mean annual air temperature range of 55 to 59°F and a frost free period of 275 to 350 days. The typical profile of this soil includes loam from 0 to 14 inches, clay from 14 to 32 inches, sandy loam/loam/clay loam from 32 to 39 inches, and weathered bedrock from 39 to 59 inches. The depth to a restrictive feature is 20 to 40 inches to paralithic bedrock, the depth to the water table is more than 80 inches, and the available water capacity is moderate at approximately 7.3 inches.

Los Osos Loam, 30 to 50 percent slopes (161)

This soil type is well-drained and is developed in residuum weathered from sandstone and shale. In north coastal San Luis Obispo County it is found on hills and ridges at an elevation of 100 to 3,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 35 inches, with a mean annual air temperature range of 55 to 59°F and a frost-free period of 275 to 350 days. The typical profile of this soil includes loam from 0 to 14 inches, clay from 14 to 32 inches, sandy loam from 32 to 39 inches, and weathered bedrock from 39 to 59 inches. The depth to a restrictive feature is 20 to 40 inches to paralithic bedrock, the depth to the water table is more than 80 inches, and the available water capacity is low at approximately 5.6 inches.

Los Osos-Diablo Complex, 15 to 30 percent slopes (164)

This type of soil is well-drained and is developed in residuum weathered from sandstone and shale. In north coastal San Luis Obispo County, it is found on hills and mountains at an elevation of 200 to 3,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 28 inches, with a mean annual air temperature of 59°F and a frost-free period of 275 to 350 days. The typical profile of this soil includes loam from 0 to 14 inches, clay from 14 to 32 inches, sandy loam from 32 to 39 inches, and weathered bedrock from 39 to 59 inches. The depth to a restrictive feature is 20 to 40 inches to paralithic bedrock, the depth to the water table is more than 80 inches, and the available water capacity is low at approximately 5.6 inches.

Los Osos Diablo Complex, 30 to 50 percent slopes (165)

This type of soil is well drained and developed in residuum weathered from sandstone and shale. In north San Luis Obsipo County, it is found on hills and mountains at an elevation of 200 to 3,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 28 inches, with a mean annual air temperature of 59°F, and a frost free period of 275 to 350 days. The typical profile of this soil includes loam from 0 to 14 inches, clay from 14 to 32 inches, sandy loam from 32 to 39 inches and weathered bedrock from 39 to 59 inches. The depth to restrictive feature is 20 to 40 inches to paralithic bedrock, the depth to the water table is more than 80 inches and the available water capacity is low at approximately 5.6 inches.

Marimel Sandy Clay Loam, Occasionally Flooded (169)

This soil type is somewhat poorly-drained and is developed in alluvium derived from sedimentary rock. In north coastal San Luis Obispo it is found in valleys, alluvial fans, and floodplains at an eleveation of 0 to 400 feet. The mean annual precipitation for where this soil type occurs is 15 to 20 inches, with a mean annual air temperature range of 55 to 59°F and a frost free period of 300 to 365 days. The typical profile of this soil in north coastal includes sandy clay loam from 0 to 16 inches and stratified loam to clay loam to silty clay loam from 16 to 60 inches. The depth to a restrictive feature is more than 80 inches, the depth to the water table is about 24 to 60 inches, and the available water capacity is high at approximately 10.2 inches.

Riverwash (194)

This soil type is excessively-drained. In north coastal San Luis Obsipo County it is found in channels. The typical profile of this soil includes sand from 0 to 6 inches, and stratified coarse sand to sandy loam from 6 to 60 inches. The depth to the water table is 0 to 24 inches, and the available water capacity is very low at approximately 2.9 inches.

Salinas Silty Clay Loam, 0 to 2 percent slopes (197)

This soil type is well drained and is developed in residuum weathered from sandstone and shale. In north coastal San Luis Obispo County it is found on hills and mountains at an elevation of 200 to 3,000 feet. The mean annual precipitation for where this soil type occurs is 15 to 28 inches, with a mean annual air temperature of 59°F and a frost free period of 275 to 350 days. The typical profile of this soil includes loam from 0 to 14 inches, clay from 14 to 32 inches, sandy loam from 32 to 39 inches, and weathered bedrock from 39 to 59 inches. The depth to a restrictive feature is 20 to 40 inches to paralithic bedrock, the depth to the water table is more than 80 inches, and the available water capacity is low at approximately 5.6 inches.

3.6 HYDRIC SOILS LIST OF CALIFORNIA

RBF reviewed the Hydric Soils List of California, provided by the Natural Resources Conservation Service, in an effort to verify whether or not on-site soils are considered to be hydric. It should be noted that lists of hydric soils along with soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for on-site investigations. According to the Hydric Soils List, the on-site soils Beaches (107), Marimel sandy clay loam, occassionally flooded (169), Riverwash (194) and Salinas silty clay loam, 0 to 2 percent slopes (197) are listed as hydric.

3.7 NATIONAL WETLANDS INVENTORY

RBF reviewed the U.S. Fish and Wildlife Service's National Wetland Inventory maps. Wetland features were noted within the study area, and consisted of freshwater emergent wetland, freshwater/forested shrub wetland, freshwater pond, estuarine and marine wetland and riverine (refer to Appendix D). The freshwater emergent wetlands (PEMKh) are reported to be part of the palustrine system, emergent class, and are artficially flooded and diked/impounded. The freshwater forested/shrub wetlands (PSSS) on the western portion of the project site are reported to be part of the palustrine system, scrub-shrub class, with a temporary-tidal regime sometimes flooded by fresh water tides during the growning season. The freshwater forested/shrub wetland (PFOA) found on the eastern portion of the project site are reported to be part of the palustrine system, forested class, with temporary flooding regimes during the growing season. The freshwater pond (PUBKx) is reported to be part of the palustrine system, unconsolidated bottom class, and is artificially flooded and excavated. The estuarine and marine wetland (E2USP) is reported to be part of the estuarine system, intertidal subsystem, unconsolidated shore class, and is irregularly flooded less often than daily.

There are several different riverine systems denoted by the National Wetlands Inventory maps on the project site. The Riverine (R1USR) is reported to be of the riverine system, tidal subsystem, unconsolidated shore class with a seasonal tidal water regime. Riverine (R1UBV) is reported to be part of the riverine system, tidal subsystem, unconsolidated bottomc lass and permanent tidal water regime. Riverine (R4SBC) is reported to be part of the riverine system, intermittant subsystem, streambed class, and seasonally flooded. Riverine (R2UBH) is reported to be part of the riverine system, lower perennial subsytems, unconsolidated bottom class and permanently flooded.

3.8 FLOOD ZONE

RBF searched the Federal Emergency Management Agency website for flood data for the project site. Based on the Flood Insurance Rate Maps 06079C0510G and 06079C0530G, a portion of the project site is located within Zone A, and is subject to inundation by the 100 year flood (refer to Appendix D).

Section 4 Site Conditions

RBF regulatory specialist Lauren Mack and regulatory analyst Tim Tidwell visited the project site from approximately 11:00 a.m. to 4:00 p.m. on August 13, 2014 and 7:30 a.m. to 3:30 p.m. on August 14, 2014 to verify existing conditions and document potential jurisdictional areas. Temperatures during the site visit were in the mid 70's (degrees Fahrenheit) with foggy/cloudy mornings transitioning to partly cloudy afternoons with calm wind conditions. Due to the presence of very dense vegetation, including poison oak (*Toxicodendron diversilobum*) and stinging nettle (*Urtica dioica*), RBF was not able to access and evaluate all portions of the project site during the site reconnaissance. Refer to Appendix A for representative photographs taken throughout the project site.

4.1 NON-WETLAND FEATURES

4.1.1 San Simeon Creek

San Simeon Creek is considered an intermittent stream according to the Cambria (USGS) 7.5- minute topographic quadrangle map for Cambria, California. San Simeon Creek enters the project site along the eastern boundary as a natural earthen feature and generally flows southwest along the southern boundary of the site towards the San Simeon Creek Estuary and its terminus at the Pacific Ocean. Surface water was not present within the eastern half of San Simeon Creek. However, surface water was present within San Simeon Creek extending west from the central portion of the project site. Within the project site limits, San Simeon Creek traverses approximately 6,792 feet and ranges from 16 to 75 feet in width encompassing approximately 5.94 acres. Within the eastern portion of project site limits, San Simeon Creek is characterized by a channel invert/streambed mainly devoid of vegetation (unvegetated) consisting of a cobble and sand base material. Within the central portion of the project site San Simeon Creek is characterized by dense vegetation within the active channel (vegetated). The channel invert within the western portion of San Simeon Creek is characterized by open surface water devoid of vegetation (unvegetated). Throughout the project site, the surrounding banks of San Simeon Creek are steep and densely vegetated. The upstream reach (approximately the eastern half within project limits) of San Simenon Creek exhibited evidence of an OHWM which included changes in particle size distribution (cobble low-flow channel) below the OHWM, active channel invert stripped of vegetation below the OHWM, drift and debris deposits at the OHWM and bench formation above the OHWM. The downstream reach (approximately the western half within project limits) of San Simeon Creek exhibited evidence of an OHWM which included surface water below the OHWM, vegetation bent in the flow direction, drift and debris deposits at the OHWM and bench formation above the OHWM.

Vegetation associated with San Simeon Creek is characterized by Central Coast Arroyo Willow Riparian Forest. Associated vegetation included a mixture of native and non-native species including arroyo willow (*Salix lasiolepis*), sycamore (*Platanus racemosa)*, cottonwood (*Populus fremontii*), blue elderberry (*Sambucus nigra*), poison oak, blackberry (*Rubus ursinus*), mulefat, (*Baccharis salicifolia*), coyote brush (*Baccharis pilularis)*, mugwort (Artemesia douglasiana), stinging nettle, fuchsia-flowered gooseberry (*Ribes speciosum),* broad-leaf cattail (*Typha latifolia)*, California bulrush (*Schoenoplectus californicus*), horseweed *(Erigeron canadensis*), giant horsetail (*Equisetum telmateia),* California poppy *(Eschscholzia californica)*, everlasting (*Anaphalis margaritacea)*, watercress (*Nasturtium officinale),* sweetclover (*Melilotus albus*), rumex (*rumex sp.)*, common mustard (*Brassica rapa*), tree tobacco (*Nicotina glauca*), thistle (*carduus sp.*), fennel (*Foeniculum vulgare*), cape ivy (Delairea odorata*),* garden nasturtium (*Tropaeolum majus*), arrowweed (*Pluchea sericea*) and canarygrass (*Phalaris canariensis*).

According to the soil survey, Riverwash is the dominant soil type found throughout San Simeon Creek. These soils have the potential to be hydric and are excessively drained, have frequent flooding and the available water storage is very low. Due to the presence of dominant hydrophytic vegetation, five soil pits (1,2, 4-6) were dug throughout portions of San Simeon Creek to assess for the presence of hydric soils. Soil Pit 1 was dug within the northeastern portion of the project site on an elevated bench adjacent to the northern bank of San Simeon Creek due to the presence of wetland hydrology (drift deposits) and hydrophytic plant species including arroyo willow (FACW) and sycamore (FAC). Soil Pit 1 was dug to a depth of approximately 12 inches before encountering a restrictive layer and displayed a matrix color of 2.5Y 3/1 with no visible redox features. The soil texture consisted of Sand (0-12 inches) with cobble mixed throughout. Soil pit 1 did not exhibit hydric soil characteristics. Soil Pit 2 was dug along the northern bank of San Simeon Creek approximately 130 feet downstream from soil pit one due to the presence of arroyo willow (FACW) and evidence of wetland hydrology (drift deposits). Soil Pit 2 was dug to a depth of approximately 22 inches and displayed a matrix color of 10YR 3/2 with no visible redox features. The soil texture consisted of Sand (0-22 inches) below a surface litter and root layer. Soil Pit 2 did not exhibit hydric soil characteristics. Soil Pit 4 was dug on a terrace adjacent to the southern bank of San Simeon Creek and open water approximately 45 feet west of the Van Gordon Creek Road due to the presence of wetland hydrology (drift deposits) and hydrophtyic plant species consisting of sycamore (FAC), arroyo willow (FACW), and arrow-weed (FACW). Soil Pit 4 was dug to a depth of approximately 18 inches and displayed a matrix color of 10YR 3/2. Redox features were identified covering sand grains within the soil matrix comprising approximately 2% displaying a color of 7.5YR 3/4 when moist. The soil texture consisted of silt loam (0-18 inches). Soil pit four did not exhibit hydric soil characteristics. Soil Pit 5 was dug approximately 150 feet downstream of soil pit four along the northern bank of San Simeon Creek. Soil pit five was dug on a terrace adjacent to the northern bank of San Simeon Creek and open water approximately 155 feet downstream of Soil Pit 4 due to the presence of wetland hydrology (drift deposits) and hydrophtyic plant species consisting of arroyo willow (FACW), arrow-weed (FACW), and broad-leaf cattail (OBL). Soil Pit 5 was dug to a depth of approximately 20 inches and displayed a matrix color of 2.5Y 3/2 when moist. Covered or coated sand grain type (CS) redox features were identified within the matrix comprising approximately 10% of the soil profile and displayed a color of 5YR 4/6 when moist. The soil texture consisted of Silt Loam (0-20 inches). Soil Pit 5 displayed hydric soil characteristics. Soil Pit 6 was dug on a terrace adjacent to the northern bank of San Simeon Creek and open water due to the presence of wetland hydrology (saturation, high water table, sediment deposits) and hydrophytic plant species consisting of arroyo willow (FACW), arrow-weed (FACW), broad-leaf cattail (OBL) and California bulrush (OBL). Soil Pit 6 was dug to a depth of approximately 26 inches consisting of two layers. The surface layer continued to a depth of 4 inches and displayed a matrix color or 2.5Y 3/1 when moist. Redox features within the surface layer were noted along pore linings comprising 5% of the soil profile and displayed a color of 7.5YR 3/4 when moist. Layer two extended to a depth of approximately 26 inches and displayed a matrix color of 5Y 3/2 when moist. Redox features were noted along pore linings comprising 5% of the soil profile and displayed a color of 7.5YR 3/2 when moist. The soil texture consisted of Clay Loam (0-26 inches). Saturation was present at a depth of 2 inches and the water table was present at a depth of 8 inches. Soil Pit 6 displayed hydric soil characteristics. Due to the presence of hydric soil characteristics, wetland hydrology and hydrophytic plant species, state and federal jurisdictional wetlands were identified on-site in association with San Simeon Creek. Refer to Section 4.2 for additional information regarding on-site federal wetlands. San Simeon Creek and the associated riparian vegetation are considered coastal wetlands and fall within the jurisdiction of the CCC.

4.1.2 Van Gordon Creek

Van Gordon Creek is considered an intermittent stream according to the Cambria (USGS) 7.5- minute topographic quadrangle map for Cambria, California. Van Gordon Creek enters the project site along the northern boundary underneath San Simeon Creek road through a 15 foot corrugated metal pipe culvert as a natural earthen feature and generally flows south towards its confluence with San Simeon Creek in the western portion of the project site. No surface water was noted within Van Gordon Creek within the project site during the site visits. An unimproved dirt access road crosses over Van Gordon Creek within the central portion of the project site. Within the project site limits, Van Gordon Creek traverses approximately 2,233 feet and ranges from 9 to 21 feet in width, encompassing approximately 0.77 acres. The channel invert of Van Gordon Creek is unvegetated with a cobble/sand base material covered by a layer of leaf litter and organic debris. The surrounding banks of Van Gordon Creek are steep and densely vegetated, providing canopy cover over the active channel. Evidence of an OHWM within Van Gordon Creek included changes in particle size distribution (cobble low-flow channel) below the OHWM, active channel invert stripped of vegetation below the OHWM, drift and debris deposits at the OHWM and bench formation above the OHWM.

A Central Coast Arroyo Willow Riparian Forest characterizes the vegetation of Van Gordon Creek. Associated vegetation included a mixture of native and non-native species including arroyo willow, sycamore, poison oak, stinging nettle, coyote brush, blackberry, fennel, garden nasturtium, cape ivy, canarygrass, and thistle.

According to the soil survey, Salinas silty clay loam, 0 to 2 percent slopes is the dominant soil type found throughout Van Gordon Creek. These soils have the potential to be hydric and are well drained and the available water storage is high. Due to the presence of dominant hydrophytic vegetation including arroyo willow (FACW), and stinging nettle (FAC), one soil pit (#3) was dug on a shelf above the eastern bank of Van Gordon Creek to assess for the presence of hydric soils. Soil Pit 3 was dug to a depth of approximately 8 inches before encountering a restrictive rock layer and displayed a matrix color of 2.5Y 3/2 with no visible redox features. The soil texture consisted of Loamy Sand (0-8 inches). Soil Pit 3 did not exhibit hydric soil characteristics nor was there any evidence of wetland hydrology within the immediate area. Therefore, no federal wetland features were located in association with Van Gordon Creek. Van Gordon Creek and the associated riparian vegetation are considered coastal wetlands and fall within the jurisdiction of the CCC. Refer to Section 4.2 for additional information regarding on-site federal wetlands.

4.2 WETLAND FEATURES

4.2.1 Wetland 1

Wetland 1 is located within the western portion of the project site on an elevated terrace adjacent to the northern bank of San Simeon Creek and open water. Primary indicators of wetland hydrology noted within the immediate area of Wetland 1 include drift deposits, saturation (beginning at a depth of 16 inches) and a high water table (beginning at a depth of 20 inches). No surface water was present within Wetland 1. However, Wetland 1 is located immediately upslope of the northern bank San Simeon Creek resulting in a fringe wetland. Wetland 1 totals approximately 0.01-acre. Plant Species occurring within and adjacent to Wetland 1 include arroyo willow (FACW), broad-leaf cattail (OBL), and arrow-weed (FACW).

One soil pit (Soil Pit 5) was dug within Wetland 1 to a depth of approximately 20 inches. Soil Pit 5 consisted of a soil texture of Silt Loam (0-20 inches) and displayed a matrix color of 2.5Y 3/2 when moist. Covered or coated sand grain type (CS) redox features were identified within the matrix comprising approximately 10% of the soil profile and displayed a color of 5YR 4/6 when moist. Soil Pit 5 was determined to display hydric soil characteristics (Redox Dark Surface [F6]). No other soil pits were dug in this location due to a dense vegetation layer, and local topography (terrace formation) immediately upslope from Soil Pit 5. Refer to Appendix E, *Wetland Data Forms*, for additional information.

4.2.2 Wetland 2

Wetland 2 is located within the western portion of the project site on an elevated terrace adjacent to the northern bank of San Simeon Creek and open water. Primary indicators of wetland hydrology noted within the immediate area of Wetland 2 include drift deposits, saturation (beginning at a depth of 2 inches) and a high water table (beginning at a depth of 8 inches). Surface water was present within the immediate area of Wetland 2. Wetland 2 is located on an elevated terrace immediately upslope of the northern bank of San Simeon Creek resulting in a fringe wetland. Wetland 2 totals approximately 0.12-acre. Plant Species occurring within and adjacent to Wetland 2 include arroyo willow (FACW), broad-leaf cattail (OBL), and California bulrush (OBL).

One soil pit (Soil Pit 6) was dug within Wetland 2 to a depth of approximately 26 inches and consisted of two distinct layers. The surface layer continued to a depth of 4 inches and displayed a matrix color or 2.5Y 3/1 when moist. Redox features within the surface layer were noted along pore linings comprising 5% of the soil profile and displayed a color of 7.5YR 3/4 when moist. Layer two extended to a depth from 4-26 inches and displayed a matrix color of 5Y 3/2 when moist. Redox features were noted along pore linings comprising 5% of the soil profile and displayed a color of 7.5YR 3/2 when moist. The soil texture of both layers consisted of Clay Loam (0-26 inches). Soil Pit 6 was determined to display hydric soil characteristics (Redox Dark Surface [F6]). No other soil pits were dug in this location due to a dense vegetation layer, and local topography (terrace formation) immediately upslope from Soil Pit 6.

4.2.3 Wetland 3

Wetland 3 is located within the western portion of the project site on an elevated terrace adjacent to the southern bank of San Simeon Creek and open water. Primary indicators of wetland hydrology noted within the immediate area of Wetland 3 include drift deposits, saturation (beginning at a depth of 0 inches) and a high water table (beginning at a depth of 2 inches). Surface water was present within the immediate area of Wetland 3. Wetland 3 is located at the confluence of San Simeon Creek and an unnamed tributary. Wetland 3 totals approximately 0.26-acre. Plant Species occurring within and adjacent to Wetland 3 include broad-leaf cattail (OBL), California bulrush (OBL), silverweed (*Potentilla anserina* [OBL]), marsh baccharis (*Baccharis glutinosa* [FACW]) and marsh jaumea (*Jaumea carnosa* [OBL]).

Two soil pits (Soil Pit 7 and 8) were dug within and adjacent to Wetland 3. Soil Pit 7 was dug to a depth of approximately 18 inches. The soil consisted of a texture of Loamy Sand (0-18 inches) and displayed a matrix color of 2.5Y 3/2 when moist. No redox features were observed within the soil pit. Soil Pit 7 did not exhibit hydric soil characteristics. Soil Pit 8 was dug within Wetland 1 to a depth of approximately 20 inches. Soil Pit 8 consisted of a soil texture of Silt Loam (0-20 inches) and displayed a matrix color of 10YR 3/1 when moist. Covered or coated sand grain type (CS) redox features were identified within the matrix comprising approximately 15% of the soil profile and displayed a color of 10YR 3/6 when moist. Soil Pit 8 was determined to display hydric soil characteristics (Redox Dark Surface [F6]). No additional soil pits were dug in this location due to a change in vegetation and local topography (terrace formation) immediately upslope.

4.3 OTHER ON-SITE FEATURES (NON-JURISDICTIONAL)

4.3.1 San Simeon Well Field

The San Simeon Well Field is located at the eastern portion of the Project site. The property is a 92 acre, unimproved, open field vegetated with grass, shrubs and some trees varying in elevation from approximately 20 to 25 feet above sea level. This well field contains three municipal potable water wells, which are used to extract potable water from the San Simeon aquifer. An unimproved road connects the wells and traverses this portion of the property. An underground potable water supply pipeline, which generally parallels the northern and western site boundaries, is used to transport the potable water from the well field to Cambria. Within this area, evidence of a hydrological connection with San Simeon Creek could not be established and hydrophytic vegetation species were not noted. Therefore, this area was not considered to be within state or federal jurisdictional boundaries and no soil pits were dug to assess for the presence of hydric soils.

4.3.2 Well 9P7 and Discharge Pipeline

This gradient control well is located in a small stand of Monterey pine in the western portion of the Project site. An 8 inch PVC discharge pipeline is used to discharge pumped groundwater from existing Well 9P7 to Van Gordon Creek. This area is located within a raised portion within the effluent percolation ponds and no hydrological connection with San Simeon or Van Gordon Creek could be established. Therefore, this area was not considered to be within state or federal jurisdictional boundaries and no soil pits were dug to assess for the presence of hydric soils.

4.3.3 Percolation Pond System

The percolation pond system located at the southwestern portion of the Project site involves multiple effluent percolation ponds, which are used for percolation of the secondary effluent from Cambria's wastewater treatment plant (WWTP). Treated effluent from the WWTP is allowed to percolate to the groundwater basin through the ponds, in order to recharge the aquifer below, and ultimately the Simeon Creek lagoon that is located downstream. This area is bordered by a chain link fence and an access road. The percolation pond system consists of a series of constructed ponds bounded by dirt berms. No surface hydrological connection to San Simeon Creek or Van Gordon Creek could be established and therefore this area was not considered to be within state or federal jurisdictional boundaries and no soil pits were dug to assess for the presence of hydric soils.

4.3.4 Van Gordon Reservoir

The Van Gordon Reservoir is an evaporation pond originally constructed for percolation of the secondary effluent from the WWTP. The pond is trapezoidal, with a length and width of approximately 300 feet and a surface area between 105,000 square feet to 137,000 square feet, depending on the water level in the pond. Upland species predominantly including coyote brush were located within the Van Gordon Reservoir and no hydrophytic vegetation species could be identified. Additionally no evidence of a surface hydrological connection with San Simeon Creek or Van Gordon Creek could be established and therefore this area was not considered to be within state or federal jurisdictional boundaries and no soil pits were dug to assess for the presence of hydric soils.

Section 5 Findings

This delineation has been prepared for the CCSD in order to document the jurisdictional authority of the Corps, Regional Board, CDFW and CCC within the boundaries of the project site. This report presents RBF's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies.

5.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

5.1.1 Waters of the United States Determination

Evidence of an OHWM was noted within and adjacent to the project site, which totaled 6.71-acre. The onsite drainage features, San Simeon Creek and Van Gordon Creek, exhibit a hydrological connection to downstream waters (Pacific Ocean). Therefore, the onsite drainage features are considered "Waters of the United States," which falls within Corps' jurisdiction. Based on project design plans, approximately 0.001-acre of Corps jurisdiction will be temporarily impacted. Refer to Table 1 for a summary of the Corps jurisdictional areas on-site, and Exhibit 5, for an illustration of Corps on-site jurisdictional areas.

Table 1: Corps/Regional Board Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Non-Wetland		Wetland		Non-Wetland		Wetland	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	0.39	-	-	-	-	-
Van Gordon Creek	0.77	2,233	-	-	0.001	5	-	-
Total	**6.71**	**9,025**	**0.39**	**-**	**0.001**	**5**	**-**	**-**

5.1.2 Wetland Determination

As previously noted, an area must exhibit all three wetland parameters described in the Corps Regional Supplement to be considered a jurisdictional wetland. Based on the results of the site visit, it was determined that all three wetland parameters were met within Wetlands 1, 2 and 3 on the western portion of the project site. Therefore, approximately 0.39-acre of Corps jurisdictional wetlands is located within the boundaries of the project site. Impacts to Corps jurisdictional wetlands will not occur.

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Michael Baker INTERNATIONAL

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

Corps/Regional Board Jurisdictional Map

Exhibit 5

5.2 REGIONAL WATER QUALITY CONTROL BOARD DETERMINATION

No isolated or Rapanos conditions were observed within the boundaries of the project site; therefore, the Regional Board follows that of Corps jurisdiction (refer to Section 5.1 above).

5.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DETERMINATION

The on-site drainage features exhibited a bed and bank and qualify as CDFW jurisdictional streambed. Based on the results of the field investigation, approximately 6.71-acre of CDFW jurisdictional streambed occurs within the project site. In addition, approximately 53.76-acre of associated CDFW jurisdictional riparian vegetation is located within the project site. Based on design plans, approximately 0.01-acre of CDFW jurisdictional streambed will be impacted by the proposed project. Refer to Table 2 for a summary of the CDFW jurisdictional areas on-site, and Exhibit 6, for an illustration of CDFW on-site jurisdictional areas.

Table 2: CDFW Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Streambed		Associated Vegetation		Streambed		Associated Vegetation	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	45.17	-	-	-	-	-
Van Gordon Creek	0.77	2,233	8.59	-	0.01	5	-	-
Total	**6.71**	**9,025**	**53.76**	**-**	**0.01**	**5**	**-**	**-**

5.4 CALIFORNIA COASTAL COMMISSION DETERMINATION

The on-site coastal streams total 6.71 acres and the coastal wetlands total 54.65 acres, qualify as CCC jurisdiction pursuant to Section 30121 of the California Coastal Act. Thus, approximately 61.36 acres of CCC jurisdiction are located within the boundaries of the project site. Based on design plans, approximately 0.01-acre of CCC jurisdiction will be impacted by the proposed project. Refer to Table 3 for a summary of the CCC jurisdictional areas on-site, and Exhibit 7, for an illustration of CCC on-site jurisdictional areas.

Table 3: CCC Jurisdictional Areas and Impact Summary

Jurisdictional Feature	Total Onsite Jurisdiction				Impacted Jurisdiction			
	Stream		Wetland		Stream		Wetland	
	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet	Acreage	Linear Feet
San Simeon Creek	5.94	6,792	46.06	-	-	-	-	-
Van Gordon Creek	0.77	2,233	8.59	-	0.01	5	-	-
Total	**6.71**	**9,025**	**54.65**	**-**	**0.01**	**5**	**-**	**-**

Michael Baker INTERNATIONAL

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

CDFW Jurisdictional Map

Exhibit 6

Michael Baker INTERNATIONAL

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

CCC Jurisdictional Map

Exhibit 7

Section 6 Regulatory Approval Process

The following is a summary of the various permits, agreements, and certifications required before construction activities take place within the jurisdictional areas.

6.1 U.S. ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into WoUS and wetlands pursuant to Section 404 of the CWA, and navigable waters pursuant to Section 10 of the Rivers and Harbors Act. It will be necessary for the project applicant to acquire a Section 404 and/or Section 10 Permit authorization from the Corps prior to impacts occurring within Corps delineated jurisdictional areas.

6.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters under the Federal CWA and the California Porter-Cologne Water Quality Control Act. It will be necessary for the project applicant to obtain a CWA Section 401 Water Quality Certification from the Regional Board prior to impacts occurring within Regional Board jurisdictional areas.

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The CDFW regulates alterations to streambed under the California Fish and Game Code. It will be necessary for the project applicant to obtain a Section 1602 Streambed Alteration Agreement from the CDFW prior to impacts occurring within CDFW jurisdictional areas.

6.4 CALIFORNIA COASTAL COMMISSION

For those projects in or affecting the coastal zone, the federal Coastal Zone Management Act requires the applicant to obtain concurrence from the CCC that the project is consistent with the State's Coastal Zone Management Plan prior to issuing the Corps authorization for the project. Therefore, the CCC requires permittees to either receive a concurrence or waiver of consistency certification before the Corps permit is validated. Therefore, it will be necessary for the project applicant to obtain a Coastal Development Permit from the CCC prior to impacts occurring within CCC jurisdictional areas.

6.5 GLOBAL RECOMMENDATIONS

It is highly recommended that the delineation be forwarded to each of the regulatory agencies for their concurrence. The concurrence/receipt would be valid up to five years and would solidify findings noted within this report.

Section 7 References

The following resources were utilized during preparation of this Delineation of State and Federal Jurisdictional Waters:

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Appendix A Site Photographs

Overview 1 – Photograph locations within the project study area.

Photograph 1 – View of San Simeon Creek looking southwest in the northeastern portion of project site.

Photograph 2 – View looking west of riparian vegetation associated with San Simeon Creek in the northeastern portion of project site.

Photograph 3 – View looking west of San Simeon Creek in the eastern corner of the project site.

Photograph 4 – View of riparian vegetation on the southern bank of San Simeon Creek in the eastern portion of the project site.

Photograph 5 – View of San Simeon Creek looking northeast in the eastern portion of the project site.

Photograph 6 – View of drift deposits and associated riparian vegetation along the northern bank of San Simeon Creek in the eastern portion of the project site.

Photograph 7 – View of San Simeon Creek looking southwest in the central portion of the project site.

Photograph 8 – View looking west of San Simeon Creek and associated riparian vegetation from upland slopes in the southern portion of the project site.

Photograph 9 – View looking northwest of surface water within San Simeon Creek in the western portion of the project site.

Photograph 10 – View looking east of riparian vegetation and surface water within San Simeon Creek in the western portion of project site.

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Photograph 12 – View looking south of the confluence of Van Gordon Creek into San Simeon Creek in the western portion of the project site.

Photograph 13 – View looking northwest of San Simeon Creek flowing underneath Van Gordon Creek Road in the western portion of the project site.

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Photograph 16 – View looking southwest of San Simeon Creek and Highway 1 near the western boundary of the project site.

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Photograph 26 – View looking east of temporary trenching corridor across Van Gordon Creek.

Photograph 27 – View looking west of temporary trenching corridor across Van Gordon Creek.

Appendix B Regulations

U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the filling of "waters of the U.S.", including wetlands, pursuant to Section 404 of the CWA. The Corps has regulatory authority over the discharge of dredged or fill material into the waters of the United States (WoUS) under Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States." The term WoUS is defined as follows:[2]

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

(2) all interstate waters including interstate wetlands;

(3) all waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) which are used or could be used for industrial purpose by industries in interstate commerce;

(4) all impoundments of waters otherwise defined as WoUS under the definition;

(5) tributaries of waters identified in paragraphs (1)-(4) mentioned above;

(6) the territorial seas; and,

(7) wetlands adjacent to the waters identified in paragraphs (1)-(6) mentioned above.

Wetlands, a subset of jurisdictional waters, are jointly defined by the Corps and EPA as "*those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of*

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2 CWA regulations 33 CFR §328.3(a).

vegetation typically adapted for life in saturated soil conditions."[3] Wetlands generally include swamps, marshes, bogs, and similar areas.

The Corps' regulatory program continues to evolve due to court rulings associated with litigation. Sections 2.1.1 and 2.1.2, below, briefly discuss court cases that have impacted the Corps' jurisdiction over the past decade. The Corps does not regulate isolated waters and wetlands with no interstate or foreign commerce connection.[4]

The Corps will assert jurisdiction over traditional navigable waters (TNWs) and all wetlands adjacent to TNWs, as well as non-navigable tributaries of TNWs that are relatively permanent waters (RPW) (i.e., the tributaries typically flow year-round or have a continuous flow at least seasonally) and wetlands with a continuous surface connection that directly abut such tributaries; however, the agencies will evaluate jurisdiction over the following features based on a fact-specific analysis to determine whether they have a significant nexus with a TNW:[5]

- Non-navigable tributaries that are not relatively permanent (do not flow typically year-round or have a continuous flow at least seasonally);
- Wetlands adjacent to such tributaries; and,
- Wetlands adjacent to, but that do not directly abut, a relatively permanent non-navigable tributary.

A case-by-case "significant nexus" analysis is conducted to determine whether the waters noted above and their adjacent wetlands are jurisdictional. A "significant nexus" may be found where waters, including adjacent wetlands, affect the chemical, physical, or biological integrity of downstream TNWs. The significant nexus analysis also includes consideration of hydrologic and ecologic factors relative to TNWs.

REGIONAL WATER QUALITY CONTROL BOARD

Applicants for a federal license or permit for activities which may discharge to waters of the United States must seek Water Quality Certification from the state or Indian tribe with jurisdiction. [6] Such Certification is based on a finding that the discharge will meet water quality standards and other applicable requirements. In California, Regional Boards issue or deny Certification for discharges within their geographical jurisdiction. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which are defined as numeric and narrative objectives in each Regional

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[3] CWA regulations 33 CFR §328.3(b).
[4] *Solid Waste Agency of Northern Cook County v. United States Corps of Engineers* (SWANCC)
[5] *Rapanos v. United States* 547 U.S. 715 (2006) (Rapanos)
[6] Title 33, United States Code, Section 1341; Clean Water Act Section.

Board's Basin Plan. Where applicable, the State Water Resources Control Board has this responsibility for projects affecting waters within multiple Regional Boards. The Regional Board's jurisdiction extends to all waters of the State (includes SWANCC and Rapanos conditions) and to all WoUS, including wetlands.

Additionally, the California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Fish and Game Code Sections 1600-1616 establish a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;

(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or

(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. The Fish and Wildlife's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation.

Any of the below criteria could be applicable in determining what constitutes a stream depending on the potential for the proposed activity to adversely affect fish and other stream-dependent wildlife resources.

(1) The term “stream” can include intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams based on United States Geological Survey (USGS) maps, and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife.

(2) Biological components of a stream may include aquatic and riparian vegetation, along with all aquatic animals including fish, amphibians, reptiles, invertebrates, and terrestrial species which derive benefits from the stream system.

(3) As a physical system, a stream not only includes water (at least on an intermittent or ephemeral basis), but also a bed or channel, a bank and/or levee, in-stream features such as logs or snags, and various flood plains depending on the return frequency of the flood event being considered (i.e., 10, 50, or 100 years, etc.).

(4) The lateral extent of a stream can be measured in several ways depending on a particular situation and the type of fish or wildlife resource at risk. The following criteria are presented in order from the most inclusive to the least inclusive:

   (a) The flood plain of a stream can be the broadest measurement of a stream’s lateral extent depending on the return frequency of the flood event used. For most flood control purposes, the 100-year flood plain exists for many streams. However, the 100-year flood plain may include significant amounts of upland or urban habitat and therefore may not be appropriate in many cases.

   (b) The outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats and is therefore a reasonable and identifiable boundary for the lateral extent of a stream. In most cases, the use of this criterion should result in protecting the fish and wildlife resources at risk.

   (c) Most streams have a natural bank which confines flows to the bed or channel except during flooding. In some instances, particularly on smaller streams or dry washes with little or no riparian habitat, the bank should be used to mark the lateral extent of a stream.

(d) A levee or other artificial stream bank would also be used to mark the lateral extent of a stream. However, in many instances, there can be extensive areas of valuable riparian habitat located behind a levee.

CALIFORNIA COASTAL COMMISSION

The CCC was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976. The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the CCC or the local government.

The Coastal Act includes specific policies that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works. The policies of the Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the CCC and by local governments, pursuant to the Coastal Act.

Jurisdictional Areas within the Coastal Zone:

A comprehensive classification system of wetlands and deepwater habitats (also referred to as the "Cowardin Wetland Classification System") was developed for the U.S. Fish and Wildlife Service (USFWS) in order to create the National Inventory of Wetlands. Under this hierarchical system, classification is based on hydrologic regime, vegetative community, and to a lesser extent on water chemistry and soils. The classification includes both wetlands and deepwater habitats. The Cowardin system includes several layers of detail for wetland classification including: a subsystem of water flow, classes of substrate types, subclasses of vegetation types and dominant species, as well as flooding regimes and salinity levels within the system. Overall, the Cowardin system and the Corps Section 404 regulations define wetlands differently. The most significant difference is that the Cowardin system defines wetlands to include mudflats and other wet areas that lack vegetation.

According to the classification, the USFWS defines wetlands as follows: "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominately hydrophytes; (2) the substrate is predominately undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year."

At the State and regional levels, the CDFG and the CCC, accept the USFWS definition and use it as a guide in identifying wetlands and in implementing their wetland policies. The Coastal Act (PRC Section 30121) defines "wetlands" as "lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." In addition, the Coastal Act (PRC Section 30107.5) defines environmentally sensitive areas in a manner that would include rivers, streams or other aquatic habitat. The Coastal Act defines wetland fill (Section 30233(a)) as the following:

The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.

(2) Maintaining existing or restoring previously dredged depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.

(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland, provided, however, that in no event shall the size of the wetland area used for such boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, be grater than 25 percent of the total wetland area to be restored.

(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource-dependent activities.

Appendix C Methodology

WATERS OF THE U.S. AND STATE WATERS

The limits of the Corps' jurisdiction in non-tidal waters extend to the OHWM, which is defined as " . . . *that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*"[7] An OHWM can be determined by the observation of a natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and/or change in plant community. The Regional Board shares the Corps' jurisdictional methodology, unless SWANCC or Rapanos conditions are present. In the latter case, the Regional Board considers such drainages to be jurisdictional waters of the State. The CDFW's jurisdiction extends to the top of bank of the stream/channel or to the limit (outer dripline) of the adjacent riparian vegetation.

Drought conditions have developed over the past three years in California. Evaluation of temporal shifts in vegetation and periodic lack of hydrology indicators during periods of below-normal rainfall, drought conditions, and unusually low winter snowpack is needed. Different sampling and analytical approaches for evaluating both vegetation under extended drought conditions and hydrology in drought years has been identified. To the extent possible, the hydrophytic vegetation decision should be based on the plant community that is normally present during the wet portion of the growing season in a normal rainfall year. The evaluation of hydrology should consider the timing of the site visit in relation to normal seasonal and annual hydrologic variability, and whether the amount of rainfall prior to the site visit has been normal. In drought conditions, direct observation of plants and hydrology indicators may be misleading or problematic, so other methods of making wetland decisions may be appropriate. In general, wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or her professional experience and knowledge of the ecology of wetlands in the region. Wetland determinations are based on a preponderance of all available information, including in many cases remote sensing and longer term data, not just the field data collected under drought conditions.[8]

WETLANDS

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual:*

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7 CWA regulations 33 CFR §328.3(e).

8 Corps Sacramento District, Public Notice SPK-2014-00005, *Guidance on Delineations in Drought Conditions*, February 2014.

Arid West Region, Version 2.0 (Corps, 2008). This document is one of a series of Regional Supplements to the 1987 Corps Wetland Delineation Manual (Corps Manual). According to the Corps Manual, identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three (3) parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology have been examined using the methodology listed below and documented on Corps' wetland data sheets, when applicable. It should be noted that both the Regional Board and the CDFW jurisdictional wetlands encompass those of the Corps.

Vegetation

Nearly 5,000 plant types in the United States may occur in wetlands. These plants, often referred to as hydrophytic vegetation, are listed in regional publications by the U.S. Fish and Wildlife Service (USFWS). In general, hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during growing season. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Vegetation strata are sampled separately when evaluating indicators of hydrophytic vegetation. A stratum for sampling purposes is defined as having 5 percent or more total plant cover. The following vegetation strata are recommended for use across the Arid West:

- *Tree Stratum:* Consists of woody plants 3 inches or more in diameter at breast height (DBH), regardless of height;
- *Sapling/shrub stratum:* Consists of woody plants less than 3 inches DBH, regardless of height;
- *Herb stratum:* Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size; and,
- *Woody vines:* Consists of all woody vines, regardless of size.

The following indicator is applied per the test method below.[9] Hydrophytic vegetation is present if any of the indicators are satisfied.

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9 Although the Dominance Test is utilized in the majority of wetland delineations, other indicator tests may be employed. If one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present, then the Prevalence Test (Indicator 2) may be performed. If the plant community satisfies the

Indicator 1 – Dominance Test

Cover of vegetation is estimated and is ranked according to their dominance. Species that contribute to a cumulative total of 50% of the total dominant coverage, plus any species that comprise at least 20% (also known as the "50/20 rule") of the total dominant coverage, are recorded on a wetland data sheet. Wetland indicator status in California (Region 0) is assigned to each species using the *National Wetland Plant List, version 2.4.0* (Corps, 2012). If greater than 50% of the dominant species from all strata were Obligate, Facultative-wetland, or Facultative species, the criteria for wetland vegetation is considered to be met. Plant indicator status categories are described below:

- *Obligate Wetland (OBL):* Plants that almost always occur in wetlands;
- *Facultative Wetland (FACW):* Plants that usually occur in wetlands, but may occur in non-wetlands;
- *Facultative (FAC):* Plants that occur in wetlands and non-wetlands;
- *Facultative Upland (FACU):* Plants that usually occur in non-wetlands, but may occur in wetlands; and,
- *Obligate Upland (UPL):* Plants that almost never occur in wetlands.

Hydrology

Wetland hydrology indicators are presented in four (4) groups, which include:

Group A – Observation of Surface Water or Saturated Soils

Group A is based on the direct observation of surface water or groundwater during the site visit.

Group B – Evidence of Recent Inundation

Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features.

Group C – Evidence of Recent Soil Saturation

Prevalence Test, then the vegetation is hydric. If the Prevalence Test fails, then the Morphological Adaptation Test may be performed, where the delineator analyzes the vegetation for potential morphological features.

Group C consists of indirect evidence that the soil was saturated recently. Some of these indicators, such as oxidized rhizopheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period.

Group D – Evidence from Other Site Conditions or Data

Group D consists of vegetation and soil features that indicate contemporary rather than historical wet conditions, and include shallow aquitard and the FAC-neutral test.

If wetland vegetation criteria is met, the presence of wetland hydrology is evaluated at each transect by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pits. The lateral extent of the hydrology indicators are used as a guide for locating soil pits for evaluation of hydric soils and jurisdictional areas. In portions of the stream where the flow is divided by multiple channels with intermediate sand bars, the entire area between the channels is considered within the OHWM and the wetland hydrology indicator is considered met for the entire area.

Soils

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper 16-20 inches.[10] The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. It should also be noted that the limits of wetland hydrology indicators are used as a guide for locating soil pits. If any hydric soil features are located, progressive pits are dug moving laterally away from the active channel until hydric features are no longer present within the top 20 inches of the soil profile.

Once in the field, soil characteristics are verified by digging soil pits along each transect to an excavation depth of 20 inches; in areas of high sediment deposition, soil pit depth may be increased. Soil pit locations are usually placed within the drainage invert or within adjoining vegetation. At each soil pit, the soil texture and color are recorded by comparison with standard plates within a *Munsell Soil Chart* (2009). Munsell Soil Charts aid in designating color labels to soils, based by degrees of three simple variables – hue, value, and chroma. Any indicators of hydric soils, such as organic accumulation, iron reduction, translocation, and accumulation, and sulfate reduction, are also recorded.

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[10] According to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008), growing season dates are determined through on-site observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature.

Hydric soil indicators are present in three groups, which include:

All Soils

"All soils" refers to soils with any United States Department of Agriculture (USDA) soil texture. Hydric soil indicators within this group include histosol, histic epipedon, black histic, hydrogen sulfide, stratified layers, 1 cm muck, depleted below dark surface, and thick dark surface.

Sandy Soils

"Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Hydric soil indicators within this group include sandy mucky mineral, sandy gleyed matrix, sandy redox, and stripped matrix.

Loamy and Clayey Soils

"Loamy and clayey soils" refers to soil materials with a USDA soil texture of loamy very fine sand and finer. Hydric soil indicators within this group include loamy mucky mineral, loamy gleyed matrix, depleted matrix, redox dark surface, depleted dark surface, redox depressions, and vernal pools.

SWANCC WATERS

The term "isolated waters" is generally applied to waters/wetlands that are not connected by surface water to a river, lake, ocean, or other body of water. In the presence of isolated conditions, the Regional Board and CDFW take jurisdiction through the application of the OHWM/streambed and/or the 3-parameter wetland methodology utilized by the Corps.

RAPANOS WATERS

The Corps will assert jurisdiction over non-navigable, not relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a significant nexus to a TNW. The flow characteristics and functions of the tributary itself, in combination with the functions performed by any wetlands adjacent to the tributary, determine if these waters/wetlands significantly affect the chemical, physical, and biological integrity of the TNWs. Factors considered in the significant nexus evaluation include:

(1) The consideration of hydrologic factors including, but not limited to, the following:

- volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary
- proximity to the TNW

- size of the watershed average annual rainfall
- average annual winter snow pack

(2) The consideration of ecologic factors including, but not limited to, the following:

- the ability for tributaries to carry pollutants and flood waters to TNWs
- the ability of a tributary to provide aquatic habitat that supports a TNW
- the ability of wetlands to trap and filter pollutants or store flood waters
- maintenance of water quality

Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) and ditches (including roadside ditches) excavated wholly in, and draining only, uplands and that do not carry a relatively permanent flow of water, are generally not considered jurisdictional waters.

In the presence of Rapanos drainage conditions, the Regional Board and CDFW take jurisdiction via the OHWM and/or the 3-parameter wetland methodology utilized by the Corps.

Appendix D Documentation

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
San Luis Obispo County, California, Coastal Part

August 18, 2014

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 (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

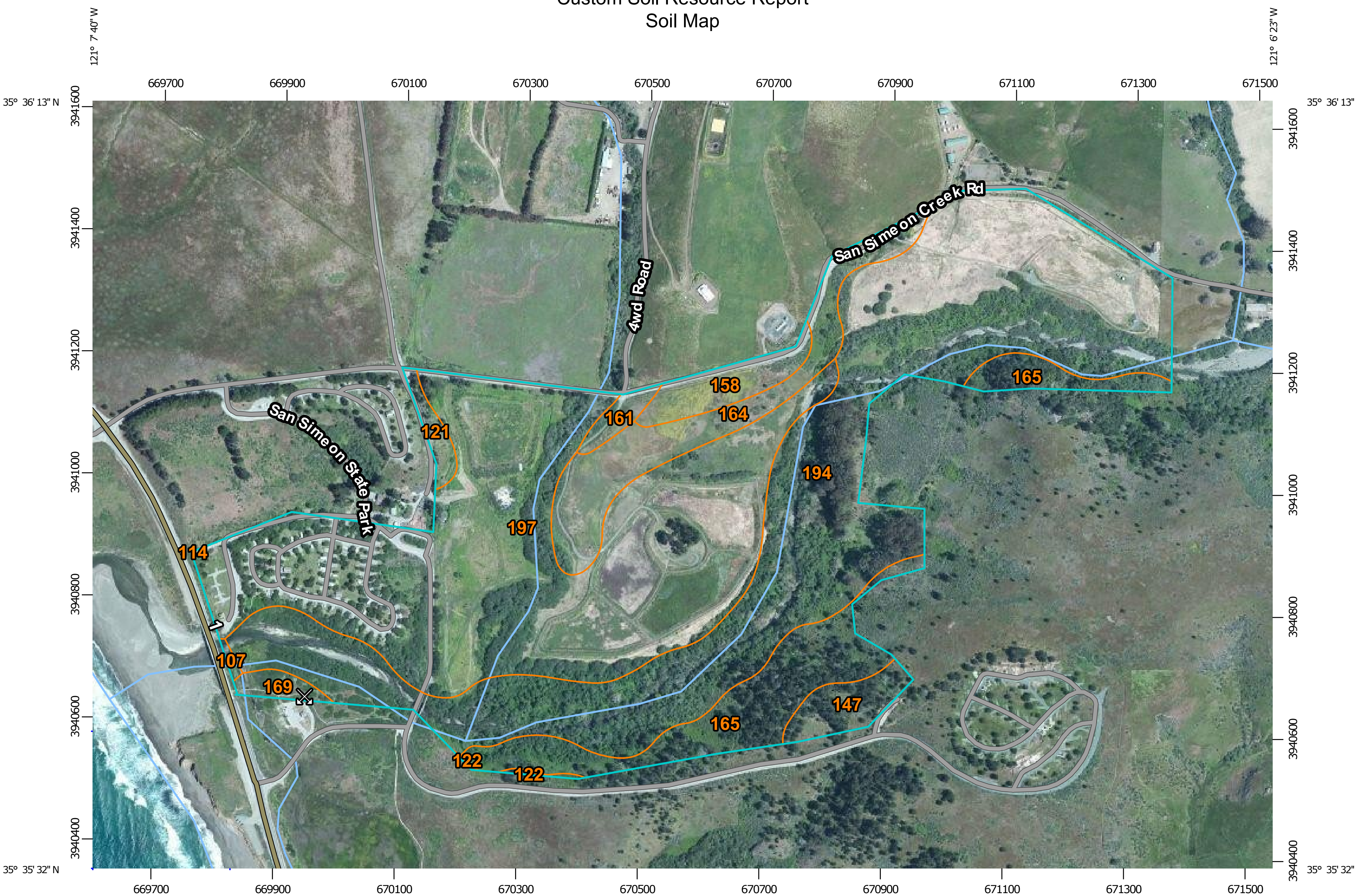
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

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

Soil Map

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

Soil Map



Map Scale: 1:8,880 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 100, 200, 400, 600

Feet: 0, 400, 800, 1600, 2400

N

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: http://websoilsurvey.nrcs.usda.gov
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: San Luis Obispo County, California, Coastal Part
Survey Area Data: Version 5, Dec 14, 2013

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

Date(s) aerial images were photographed: May 8, 2010—May 21, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Luis Obispo County, California, Coastal Part (CA664)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
107	Beaches	0.2	0.1%
114	Capistrano sandy loam, rolling	0.0	0.0%
121	Concepcion loam, 5 to 9 percent slopes	1.4	0.8%
122	Concepcion loam, 9 to 15 percent slopes	0.2	0.1%
147	Lodo clay loam, 5 to 15 percent slopes	3.5	1.9%
158	Los Osos loam, 5 to 9 percent slopes	4.1	2.3%
161	Los Osos loam, 30 to 50 percent slopes	1.4	0.7%
164	Los Osos-Diablo complex, 15 to 30 percent slopes	12.1	6.7%
165	Los Osos-Diablo complex, 30 to 50 percent slopes	15.9	8.8%
169	Marimel sandy clay loam, occasionally flooded	1.4	0.8%
194	Riverwash	72.2	39.9%
197	Salinas silty clay loam, 0 to 2 percent slopes	68.4	37.8%
Totals for Area of Interest		**180.9**	**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.

San Luis Obispo County, California, Coastal Part

107—Beaches

Map Unit Setting

National map unit symbol: hbmh
Elevation: 0 to 10 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 190 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beaches
Landform position (three-dimensional): Tread

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 72 inches
Frequency of flooding: Frequent
Salinity, maximum in profile: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 8w
Land capability classification (nonirrigated): 8w

Minor Components

Duneland

Percent of map unit: 3 percent

Rock outcroppings

Percent of map unit: 3 percent

114—Capistrano sandy loam, rolling

Map Unit Setting

National map unit symbol: hbmq
Elevation: 0 to 200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 330 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Capistrano and similar soils: 85 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Capistrano

Setting

Landform: Dunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits

Typical profile

H1 - 0 to 37 inches: sandy loam
H2 - 37 to 60 inches: sandy loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Coarse loamy bottom (R014XD103CA)

Minor Components

Concepcion, loam

Percent of map unit: 3 percent

Unnamed

Percent of map unit: 3 percent

Baywood, fine sand

Percent of map unit: 3 percent

121—Concepcion loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: hbmy
Elevation: 10 to 800 feet
Mean annual precipitation: 17 to 24 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 300 to 330 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Concepcion and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Concepcion

Setting

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

Typical profile

H1 - 0 to 19 inches: loam
H2 - 19 to 47 inches: clay
H3 - 47 to 63 inches: sandy clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: 10 to 21 inches to abrupt textural change
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R014XD105CA)

Minor Components

Tierra, loam
Percent of map unit: 3 percent

Cropley, clay
Percent of map unit: 3 percent

Los osos, loam
Percent of map unit: 3 percent

San simeon, sandy loam
Percent of map unit: 3 percent

122—Concepcion loam, 9 to 15 percent slopes

Map Unit Setting
National map unit symbol: hbmz
Elevation: 10 to 800 feet
Mean annual precipitation: 17 to 24 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 300 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition
Concepcion and similar soils: 85 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Concepcion

Setting
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile
H1 - 0 to 19 inches: loam
H2 - 19 to 47 inches: clay
H3 - 47 to 63 inches: sandy clay loam

Properties and qualities
Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 21 inches to abrupt textural change
Natural drainage class: Moderately well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R014XD105CA)

Minor Components

Diablo, clay
Percent of map unit: 3 percent

Los osos, loam
Percent of map unit: 3 percent

San simeon, sandy loam
Percent of map unit: 3 percent

147—Lodo clay loam, 5 to 15 percent slopes

Map Unit Setting
National map unit symbol: hbns
Elevation: 300 to 3,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 250 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Lodo and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lodo

Setting
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 12 inches: clay loam
H2 - 12 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 4 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: Shallow fine loamy (R015XD070CA)

Minor Components

Los osos, loam

Percent of map unit: 3 percent

Cibo, clay

Percent of map unit: 3 percent

Diablo, clay

Percent of map unit: 3 percent

Gazos, clay loam

Percent of map unit: 3 percent

158—Los Osos loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: hbp4
Elevation: 100 to 2,000 feet
Mean annual precipitation: 15 to 25 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 275 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Los osos and similar soils: 85 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountaintop, crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 32 inches: clay
H3 - 32 to 39 inches: sandy loam, loam, clay loam
H3 - 32 to 39 inches: weathered bedrock
H3 - 32 to 39 inches:
H4 - 39 to 59 inches:

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R015XD049CA)

Minor Components

Lodo, clay loam

Percent of map unit: 2 percent

Millsap, loam

Percent of map unit: 2 percent

Rock outcrop

Percent of map unit: 2 percent

Unnamed

Percent of map unit: 2 percent

Cibo, clay

Percent of map unit: 2 percent

Diablo, clay

Percent of map unit: 2 percent

Gazos, clay loam

Percent of map unit: 2 percent

161—Los Osos loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hbp7
Elevation: 100 to 3,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 275 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Los osos and similar soils: 85 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountaintop, crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 32 inches: clay
H3 - 32 to 39 inches: sandy loam
H4 - 39 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R015XD049CA)

Minor Components

Rock outcrop
Percent of map unit: 2 percent

Mcmullin
Percent of map unit: 2 percent

Gazos, clay loam
Percent of map unit: 2 percent

Lompico
Percent of map unit: 2 percent

Cibo, clay
Percent of map unit: 2 percent

Diablo, clay
Percent of map unit: 2 percent

Lodo, clay loam
Percent of map unit: 2 percent

164—Los Osos-Diablo complex, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: hbpb
Elevation: 200 to 3,000 feet
Mean annual precipitation: 15 to 28 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 275 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition
Los osos and similar soils: 35 percent
Diablo and similar soils: 30 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 14 inches: loam
H2 - 14 to 32 inches: clay

H3 - 32 to 39 inches: sandy loam
H4 - 39 to 59 inches: weathered bedrock

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups
Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R015XD049CA)

Description of Diablo

Setting
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Residuum weathered from mudstone, sandstone and/or shale

Typical profile
H1 - 0 to 38 inches: clay
H2 - 38 to 58 inches: clay
H3 - 58 to 62 inches: weathered bedrock

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 45 to 58 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.8 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey (R015XD001CA)

Minor Components

Lompico, loam
Percent of map unit: 5 percent

Rock outcrop
Percent of map unit: 5 percent

Gazos, clay loam
Percent of map unit: 5 percent

Lodo, clay loam
Percent of map unit: 5 percent

Mcmullin, loam
Percent of map unit: 5 percent

Unnamed
Percent of map unit: 5 percent

Cibo, clay
Percent of map unit: 5 percent

165—Los Osos-Diablo complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hbpc
Elevation: 200 to 3,000 feet
Mean annual precipitation: 15 to 28 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 275 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Los osos and similar soils: 40 percent
Diablo and similar soils: 35 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 32 inches: clay
H3 - 32 to 39 inches: sandy loam
H4 - 39 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: Loamy claypan (R015XD049CA)

Description of Diablo

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Residuum weathered from mudstone, sandstone and/or shale

Typical profile

H1 - 0 to 38 inches: clay
H2 - 38 to 58 inches: clay
H3 - 58 to 62 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 45 to 58 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Clayey (R015XD001CA)

Minor Components

Rock outcrop

Percent of map unit: 3 percent

Unnamed

Percent of map unit: 3 percent

Lompico
Percent of map unit: 3 percent

Mcmullin
Percent of map unit: 3 percent

Cibo, clay
Percent of map unit: 3 percent

Gaviota, sandy loam
Percent of map unit: 3 percent

Gazos, clay loam
Percent of map unit: 3 percent

Obispo, clay
Percent of map unit: 3 percent

169—Marimel sandy clay loam, occasionally flooded

Map Unit Setting

National map unit symbol: hbph
Elevation: 0 to 400 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Marimel and similar soils: 85 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marimel

Setting

Landform: Valleys, alluvial fans, flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 16 inches: sandy clay loam
H2 - 16 to 60 inches: stratified loam to clay loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups
Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: Fine loamy flat (R014XD037CA)

Minor Components

Marimel, buried
Percent of map unit: 3 percent

Tujunga, frequently flooded
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Camarillo, sandy loam
Percent of map unit: 3 percent
Landform: Alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Unnamed
Percent of map unit: 2 percent
Landform: Depressions

194—Riverwash

Map Unit Composition
Riverwash: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting
Landform: Channels

Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 8w
Land capability classification (nonirrigated): 8w

Minor Components

Fluvents, occasionally flooded

Percent of map unit: 3 percent

Corralitos

Percent of map unit: 3 percent

197—Salinas silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hbqd
Elevation: 0 to 40 feet
Mean annual precipitation: 14 to 22 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 275 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Salinas

Setting

Landform: Alluvial flats, alluvial fans
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 29 inches: silty clay loam
H2 - 29 to 72 inches: stratified loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Fine loamy bottom (R014XD109CA)

Minor Components

Cropley, clay

Percent of map unit: 3 percent

Marimel, silty clay loam

Percent of map unit: 3 percent

Mocho, loam

Percent of map unit: 3 percent

Mocho variant, fine sandy loam

Percent of map unit: 2 percent

Unnamed

Percent of map unit: 2 percent

Camarillo, drained

Percent of map unit: 2 percent
Landform: Depressions

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U.S. Fish and Wildlife Service

National Wetlands Inventory

Cambria Emergency Water Supply Project

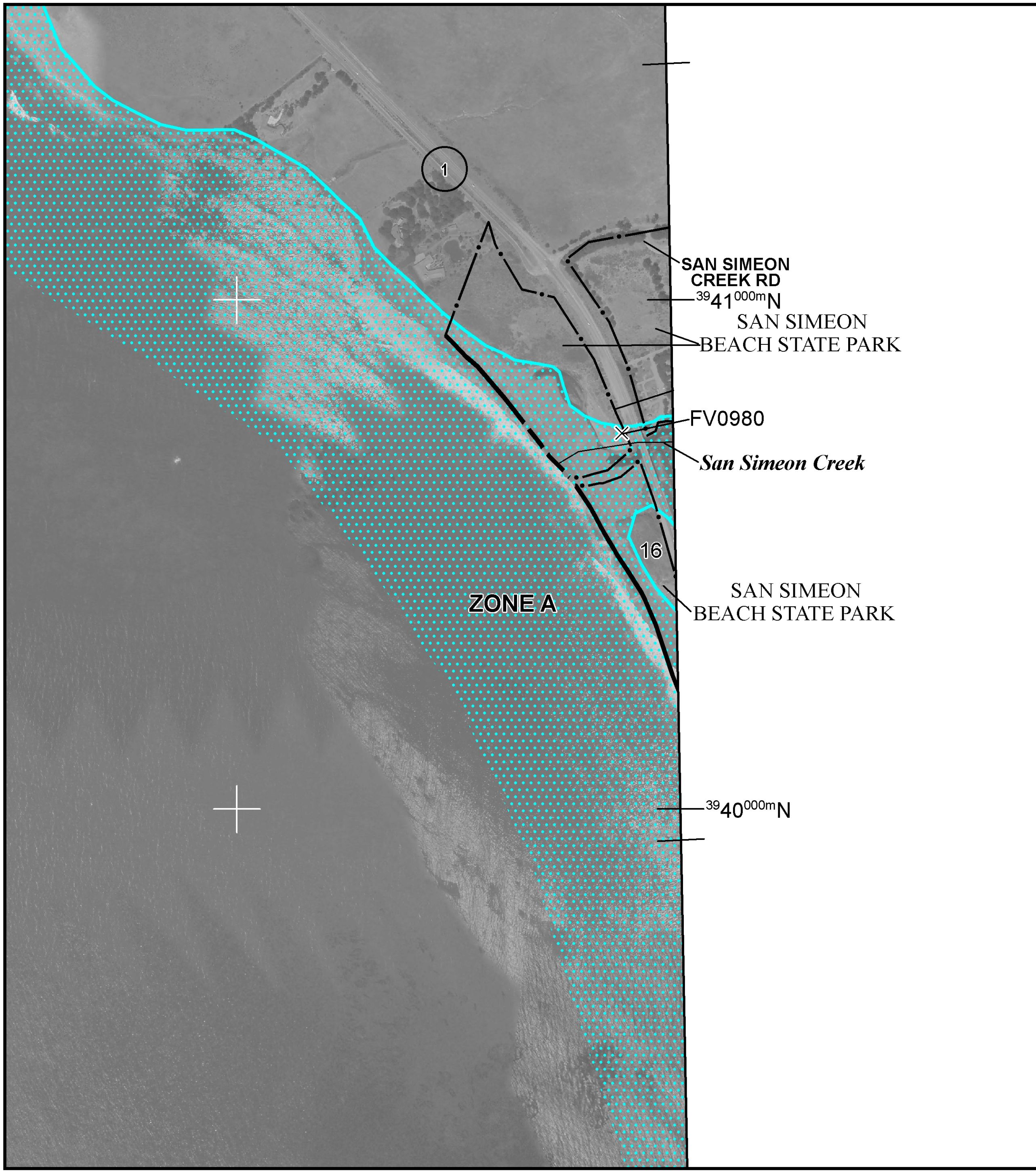
Aug 19, 2014

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:



MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0510G

FIRM

FLOOD INSURANCE RATE MAP

SAN LUIS OBISPO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 510 OF 2050

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

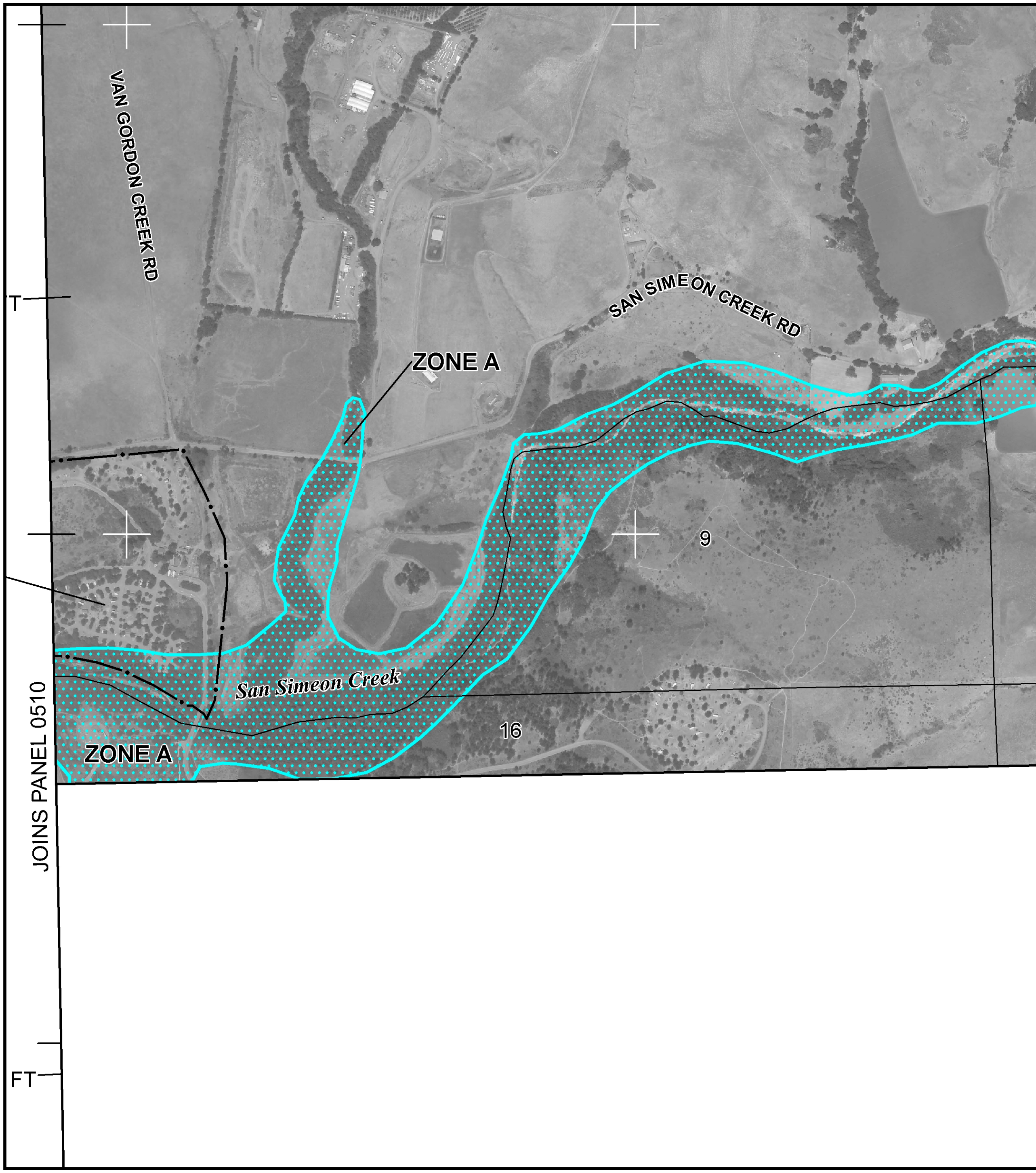
COMMUNITY	NUMBER	PANEL	SUFFIX
SAN LUIS OBISPO COUNTY	060304	0510	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06079C0510G

MAP REVISED
NOVEMBER 16, 2012

Federal Emergency Management Agency



MAP SCALE 1" = 1000'

500	0	500	1,000	1,500	2,000 FEET
0	0	300	600 METE		

NATIONAL FLOOD INSURANCE PROGRAM

NFIP

PANEL 0530G

FIRM

FLOOD INSURANCE RATE MAP

SAN LUIS OBISPO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 530 OF 2050

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN LUIS OBISPO COUNTY	060304	0530	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 06079C0530G

MAP REVISED NOVEMBER 16, 2012

Federal Emergency Management Agency

Appendix E Wetland Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-3-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-1

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 9, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench Local relief (concave, convex, none): None Slope (%): 0 - 1%

Subregion (LRR): C - Mediterranean Lat: 35° 36' 00.77" Long: 121° 06' 36.70" Datum: NAD 83

Soil Map Unit Name: Riverwash (194) NWI classification: PFOA

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.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	40	Yes	FACW
2. Platanus racemosa	30	Yes	FAC
3.			
4.			
= Total Cover	70		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	8		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	40	x 2 = 80
FAC species	30	x 3 = 90
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	70 (A)	170 (B)

Prevalence Index = B/A = 2.43

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: SP-1

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 12"	2.5Y 3/1	100					Sand	Cobbles mixed throughout
12" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** ✓

Remarks:

No hydric soil indicators present. Sandy soils with cobbles mixed throughout; no redoximorphic features.

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 Tilled 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:

Soil pit #1 is located on a terrace/bench adjacent to the northern bank of San Simeon Creek.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-3-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-2

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 9, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench Local relief (concave, convex, none): None Slope (%): 0 - 1%

Subregion (LRR): C - Mediterranean Lat: 35° 36' 01.18" Long: 121° 06' 38.21" Datum: NAD 83

Soil Map Unit Name: Riverwash (194) NWI classification: PFOA

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 ✓
Wetland Hydrology Present?	Yes ______	No ✓

Is the Sampled Area within a Wetland? Yes ______ No ✓

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	40	Yes	FACW
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	______ = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

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%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	40	x 2 =	80
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	40 (A)		80 (B)

Prevalence Index = B/A = 2.00

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: SP-2

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 22"	10YR 3/2	100					Sand	
22" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

Layer of leaf litter above soil surface. Sandy soils with roots noted throughout soil profile. No hydric soil indicators present and no redoximorphic features.

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 Tilled 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:

Soil pit #2 is located on a terrace/bench adjacent to the northern bank of San Simeon Creek.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-3

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 9, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench Local relief (concave, convex, none): None Slope (%): 0 - 1%

Subregion (LRR): C - Mediterranean Lat: 35° 35' 46.83" Long: 121° 07' 10.66" Datum: NAD 83

Soil Map Unit Name: Salinas silty clay loam, 0 to 2 percent slopes NWI classification: none

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 ______	**Is the Sampled Area within a Wetland?** Yes ______ No ✓
Hydric Soil Present?	Yes ______	No ✓	
Wetland Hydrology Present?	Yes ______	No ✓	

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	70	Yes	FACW
2.			
3.			
4.			
	70 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: ______)			
1. Urtica dioica	5	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	70	x 2 =	140
FAC species	5	x 3 =	15
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	75 (A)		155 (B)

Prevalence Index = B/A = 2.07

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

Dead grass and leaf litter covering bare ground surface.

SOIL

Sampling Point: SP-3

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 8"	2.5Y 3/2	100					Loamy Sa	
8" =	Bottom of pit							restrictive layer

[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 disturbed or problematic.

Restrictive Layer (if present):
Type: rock and cobble
Depth (inches): 8 inches

Hydric Soil Present? Yes ______ No ✓

Remarks:

Layer of leaf litter and dead grass above soil surface. Rocks and cobble restricting soil pit depth. No hydric soil indicators present and no redoximorphic features.

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 Tilled 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:

Soil pit #3 is located on a terrace/bench adjacent to the eastern bank of Van Gordon Creek.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-4

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 8, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench Local relief (concave, convex, none): None Slope (%): 1-3%

Subregion (LRR): C - Mediterranean Lat: 35° 35' 41.37" Long: 121° 07' 19.78" Datum: NAD 83

Soil Map Unit Name: Riverwash (194) NWI classification: Riverine Wetland

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.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Significant drought conditions present. Soil pit 4 located on slightly sloping bank.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	60	Yes	FACW
2. Platanus racemosa	20	Yes	FAC
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ___)			
1. Pluchea sericea	5	Yes	FACW
2. Toxicodendron diversilobum	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	65	x 2 =	130
FAC species	25	x 3 =	75
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	90 (A)		205 (B)

Prevalence Index = B/A = 2.28

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: SP-4

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 18"	10YR 3/2	98	7.5YR 3/4	2	CS	M	Silt loam	
18" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

No hydric soil indicators present.

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 Tilled 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:

Soil pit #4 is located on a terrace/bench adjacent to the northern bank of San Simeon Creek and open water.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project   City/County: Cambria/ San Luis Obispo   Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District   State: CA   Sampling Point: SP-5

Investigator(s): Lauren Mack, Tim Tidwell   Section, Township, Range: Section 8, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench   Local relief (concave, convex, none): None   Slope (%): 0-1%

Subregion (LRR): C - Mediterranean   Lat: 35° 35' 42.66"   Long: 121° 07' 20.81"   Datum: NAD 83

Soil Map Unit Name: Riverwash (194)   NWI classification: Riverine Wetland

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 ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	95	Yes	FACW
2.			
3.			
4.			
	95 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: ______)			
1. Pluchea sericea	10	Yes	FACW
2. Typha latifolia	5	Yes	FAC
3. Erigeron canadensis	1	No	FACU
4.			
5.			
6.			
7.			
8.			
	16 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 60   % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	105	x 2 = 210
FAC species	5	x 3 = 15
FACU species	1	x 4 = 4
UPL species		x 5 =
Column Totals:	111 (A)	229 (B)

Prevalence Index = B/A = 2.06

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks:

SOIL

Sampling Point: SP-5

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 20"	2.5Y 3/2	90	5YR 4/6	10	C	M	Silt loam	
20" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

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 Tilled 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): 20 inches
Saturation Present? (includes capillary fringe)	Yes ✓	No ______	Depth (inches): 16 inches

Wetland Hydrology Present? Yes ✓ No ______

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

Remarks:

Soil pit #5 is located on a terrace/bench adjacent to the northern bank of San Simeon Creek and open water.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-6

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 8, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Terrace/Bench Local relief (concave, convex, none): None Slope (%): 0-1%

Subregion (LRR): C - Mediterranean Lat: 35° 35' 45.56" Long: 121° 07' 29.61" Datum: NAD 83

Soil Map Unit Name: Riverwash (194) NWI classification: Estuarine and Marine

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 ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. Salix lasiolepis	80	Yes	FACW
2.			
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Schoenoplectus californicus	80	Yes	FACW
2. Pluchea sericea	5	No	FACW
3. Typha latifolia	2	No	OBL
4.			
5.			
6.			
7.			
8.			
	87	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	165	x 2 =	330
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	167 (A)		332 (B)

Prevalence Index = B/A = 1.99

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: SP-6

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 4"	2.5Y 3/1	95	7.5YR 3/4	5	C	PL	Silty clay	Silty clay loam
4-26"	5Y 3/2	95	7.5YR 3/2	5	C	PL	Silty clay	Silty clay loam
26"=	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks:

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 Tilled 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): 8 inches

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 2 inches

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

Soil pit #6 is located on a terrace/bench adjacent to the northern bank of San Simeon Creek and open water.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-7

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 8, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Bench Local relief (concave, convex, none): None Slope (%): 0-1%

Subregion (LRR): C - Mediterranean Lat: 35°35'42.66"N Long: 121° 7'30.05"W Datum: NAD 83

Soil Map Unit Name: Marimel sandy clay loam, occasionally flooded (169) NWI classification: Freshwater emergent

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 ____	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Hydric Soil Present?	Yes ____ No ✓		
Wetland Hydrology Present?	Yes ____ No ✓		

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Distichlis spicata	70	Yes	FAC
2. Jaumea carnosa	5	No	OBL
3. Baccharis glutinosa	2	No	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	77		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

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%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	2	x 2 =	4
FAC species	70	x 3 =	210
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	77 (A)		219 (B)

Prevalence Index = B/A = 2.84

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No ____**

Remarks:

SOIL

Sampling Point: SP-7

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 - 18"	2.5Y 3/2	100					Loamy sa+	Loamy sand
18" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No ✓

Remarks:

No redoximorphic features noted.

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 Tilled 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:

Soil pit #7 is located on a terrace/bench adjacent to surface water.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cambria Emergency Water Supply Project City/County: Cambria/ San Luis Obispo Sampling Date: 8-4-14

Applicant/Owner: Cambria Community Services District State: CA Sampling Point: SP-8

Investigator(s): Lauren Mack, Tim Tidwell Section, Township, Range: Section 8, Township 27 South, Range 8 East

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): 0-1%

Subregion (LRR): C - Mediterranean Lat: 35°35'42.58"N Long: 121° 7'30.12"W Datum: NAD 83

Soil Map Unit Name: Marimel sandy clay loam, occasionally flooded (169) NWI classification: Freshwater emergent

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 ____	Is the Sampled Area within a Wetland?	Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____		
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Potentilla anserina	60	Yes	OBL
2. Jaumea carnosa	30	Yes	OBL
3. Schoenoplectus californicus	10	No	OBL
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = 1.00

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: SP-8

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 %	Type[1]	Loc[2]	Texture	Remarks
0 - 20"	10YR 3/1	85	10YR 3/6	15	C	PL	Silt loam	
20" =	Bottom of pit							

[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 disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ✓ No ______

Remarks:

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 Tilled 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): 2 inches

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0 inches

Wetland Hydrology Present? Yes ✓ No ______

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

Remarks:

Soil pit #8 is located adjacent to surface water.

Appendix E3
Final Report - Biological Monitoring Services for Initial Ground-Disturbing Activities for San Simeon Creek Road Project

Cindy Cleveland and Julie Thomas
Senior Biologists
535 Cuesta Place
Arroyo Grande, CA 93420
805.234.3759

September 15, 2014

David Sansone
Sansone Company Inc.
P.O. Box 1429
San Luis Obispo CA 93406

RE: Final Report - Biological Monitoring Services for Initial Ground-Disturbing Activities for San Simeon Creek Road Project

Dear Mr. Sansone:

Thank you for the opportunity to provide biological monitoring services for the initial ground-disturbing activities of the San Simeon project. As discussed in our August 3, 2014 proposal, the following survey and monitoring tasks were completed for this project:

Task 1. Conduct pre-construction site surveys of approximately 85 acres for California red-legged frog (*Rana draytonii)* (BR-13 of Emergency Permit).

Mrs. Cleveland and Mrs. Thomas met with Sansome and CDM project supervisors the morning of Monday, August 25 to review the project site and schedule. Following this meeting, day and evening surveys of the site were conducted for California red-legged frog on August 25 and August 26. Results of these surveys are summarized below:

Table 1. California red-legged frog survey results.

Date	Species Present	Surveyor	Notes
August 25, 2014	No	Cindy Cleveland/Julie Thomas	No California red-legged frogs or any other sensitive amphibian or reptile species heard or observed.
August 26, 2014	No	Cindy Cleveland/Julie Thomas	No California red-legged frogs or any other sensitive amphibian or reptile species heard or observed.

Task 2. Conduct site surveys for sensitive plant species, including compact cobwebby thistle *Cirsium occidentale* var. *compactum*, Monterey pine *Pinus radiata*, and *Layia jonesii* Jones' layia (BR-23 of Emergency Permit).

On August 25, 2014, Kevin Merk of Kevin Merk & Associates, Inc. (on the SLO County list of qualified botanists), met Mrs. Cleveland and Mrs. Thomas at the project site to conduct a site survey for sensitive plant species. Mr. Merk did not find any sensitive plant species within the project area where ground disturbance would occur, as summarized below.

Table 2. Sensitive Plant Survey Results		
Date	Surveyor	Notes
August 25, 2014	Kevin Merk of Kevin Merk & Associates, Inc.	No sensitive plant species present within the project footprint

Task 3. Provide Worker Training to educate all construction personnel of the area's environmental concerns and conditions, including those regarding California red-legged frog, and relevant environmental protection measures (BR-14 of Emergency Permit).

Environmental education for workers was conducted by Mrs. Cleveland prior to start-up on the first morning of work on August 27, 2014.

Task 4. Monitor construction activities on-site until ground-disturbing activities which could impact CRLF are completed (BR-15 of Emergency Permit).

A biological monitor was on site during all ground disturbing activities until removal of surface vegetation in the project area was completed on September 4, 2014.

Task 5. Provide final report at completion of project clearing and grubbing, summarizing survey and monitoring activities.

Submitted herewith.

Please let me know if you would like any additional information. I can be reached at 805.234.3759.

Sincerely,

Cindy Cleveland

Appendix E4
Sensitive Habitats and Potentially Occurring Sensitive Plant and Wildlife Species | Flora and Fauna Compendium

Appendix A Sensitive Habitats and Potentially Occurring Sensitive Plant and Wildlife Species

Sensitive Habitats and Potentially Occurring Sensitive Plant and Wildlife Species

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Wildlife Species				
Ammodrammus savannarum grasshopper sparrow	Fed: None CA: CSC	Occur in grassland, upland meadow, pasture, hayfield, and old field habitats. Optimal habitat contains short- to medium-height bunch grasses interspersed with patches of bare ground, a shallow litter layer, scattered forbs, and few shrubs. May inhabit thickets, weedy lawns, vegetated landfills, fence rows, open fields, or grasslands.	No	**Low**. There is marginal nesting and foraging habitat for this species, particularly on the eastern side of the project site.
Antrozous pallidus pallid bat	Fed: None CA: CSC	Mostly found in desert habitats. Favors rocky outcrops near a source of water for roosting. Also found roosting in caves, rock crevices, mines, hollow trees, and buildings.	No	**Presumed absent**. There is no suitable habitat for this species.
Buteo regalis ferruginous hawk	Fed: None CA: WL	Frequents open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys, and fringes of pinyon-juniper habitats. Nests in foothills or prairies; on low cliffs, buttes, cut banks, shrubs, trees, or in other elevated structures, natural or human-made. Requires large, open tracts of grasslands, sparse shrub, or desert habitats.	No	**Moderate**. There is suitable nesting and foraging habitat. This species is a winter resident.
Corynorhinus townsendii Townsend's big-eared bat	Fed: None CA: CCE	Species is found in all but subalpine habitats, and may be found at any season throughout its range. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting.	No	**Presumed absent**. There is no suitable habitat for this species.
Danaus plexippus monarch butterfly	Fed: None CA: None	Occurs in open fields and meadows dominated by milkweed. In winter, species can be found on the coast of southern California in Eucalyptus groves and at high altitudes in central Mexico.	No	**Presumed absent**. There is no suitable habitat for this species.
Emys marmorata western pond turtle	Fed: None CA: CSC	Requires basking sites such as partially submerged logs, rocks, matts of floating vegetation, or open mud banks. Normally associate with permanent ponds, lakes, streams, irrigations ditches or permanent pools along intermittent streams.	No	**Present**. This species was observed on-site in San Simeon Creek Lagoon in 2014.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Eucyclogobius newberryi tidewater goby	Fed: **END** CA: CSC	Inhabit the fresh-saltwater interface (brackish) where salinity is less than 10 to 12 parts per thousand. Typically found at the upper edges of tidal bays near the entrance of freshwater tributaries and in coastal lagoons. These areas provide relatively shallow, and still, but not stagnant, water.	Yes	**Present**. This species was observed during the habitat assessment in San Simeon Creek Lagoon.
Falco mexicanus prairie falcon	Fed: None CA: WL	Inhabits dry, open terrain such as plains, grasslands, and marshes. Terrain can be flat or hilly, though breeding occurs on cliffs. May forage far from its typical nesting habitat or roosts, including to ocean shores.	No	**Moderate.** There is suitable foraging habitat but no suitable nesting habitat.
Myotis thysanodes fringed myotis	Fed: None CA: None	Roosts and colonizes in caves, mines, buildings, or other types of crevices. Can otherwise be found in a large number of habitat types, though the most optimal ones include pinyon-juniper, valley foothill hardwood, and hardwood-conifer areas.	No	**Moderate**. There is suitable roosting habitat within the survey area, particularly on the south side of San Simeon Creek.
Myotis volans long-legged myotis	Fed: None CA: None	Colonizes under bark and in hollow trees, as well as in crevices or buildings. Usually roosts in trees during the day and caves and mines at night. Typically found within woodland and forest habitats that are above 4,000 feet in elevation.	No	**Low**. There is suitable diurnal roosting habitat but the project area is far outside of this species' preferred elevation range.
Myotis yumanensis Yuma myotis	Fed: None CA: None	Roosts in buildings, mines, caves, or crevices and also has been observed roosting in abandoned swallow nests and under bridges. Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water. Open forest and woodlands are optimal habitat.	No	**Moderate**. There is suitable roosting habitat within the survey area, particularly on the south side of San Simeon Creek.
Oncorhynchus mykiss irideus steelhead – south/central California coast DPS	Fed: **THR** CA: CSC	Found in streams with gravelly bottoms. This distinct population segment is found from Santa Cruz County south to, but not including, the Santa Maria River. Adults spawn in coastal watersheds, while the young stay in freshwater or estuarine habitats for one to three years prior to migrating to the sea. After one to four years of maturing in the ocean, fish will return to their natal waters to spawn in freshwater.	No	**High**. There is suitable habitat for this species within San Simeon Creek and San Simeon Creek Lagoon and it has been previously documented on multiple occasions within the survey area.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Rana boylii foothill yellow-legged frog	Fed: None CA: CSC	Found in or near rocky streams in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types.	No	**Moderate**. There is suitable habitat for this species within San Simeon Creek.
Rana draytonii California red-legged frog	Fed: **THR** CA: CSC	Found mainly near ponds in humid forests, woodlands, grasslands, coastal scrub, and streamside's with plant cover. Most common in lowlands or foothills. Breeds in permanent or ephemeral waters sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps.	No	**Present**. This species was observed on-site in San Simeon Creek Lagoon in 2014.
Taricha torosa Coast Range newt	Fed: None CA: CSC	Found in both aquatic and terrestrial habitats, but typically in coastal drainages between San Diego and Mendocino Counties. Will migrate over 1 kilometer to reach breeding habitat in ponds, reservoirs, and slow-moving streams.	No	**Moderate**. There is suitable habitat for this species in San Simeon Creek, Van Gordon Creek, and San Simeon Creek Lagoon
Thamnophis hammondii two-striped garter snake	Fed: None CA: CSC	Occurs in or near permanent fresh water, often along streams with rocky beds and riparian growth up to 7,000 feet in elevation.	No	**High**. There is suitable habitat for this species within San Simeon Creek, Van Gordon Creek, and San Simeon Creek Lagoon. It has been documented at this site in the past.
Plant Species				
Abies bracteata bristlecone fir	Fed: None CA: None CNPS: 1B.3	Occurs in rocky areas within lower montane coniferous forest, broadleafed upland forest, and chaparral. From 591 to 5,249 in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Allium hickmanii Hickman's onion	Fed: None CA: None CNPS: 1B.2	Found in sandy loam, damp ground, and vernal swales within closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland, and cismontane woodland. It is most often found in grassland. From 16 to 656 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Arctostaphylos cruzensis Arroyo de la Cruz manzanita	Fed: None CA: None CNPS: 1B.2	Occurs in sandy soils in a variety of habitat types including broadleafed upland forest, coastal bluff scrub, closed-cone coniferous forest, chaparral, coastal scrub, and valley and foothill grassland. From 197 to 1,017 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Arctostaphylos hookeri* ssp. *hearstiorum Hearsts' manzanita	Fed: None CA: **END** CNPS: 1B.2	Typically found in sandy loam on terraces within chaparral, coastal prairie, coastal scrub, and valley foothill grassland. May also occur on stabilized dunes or on serpentine soils. From 180 to 656 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Baccharis plummerae* ssp. *glabrata San Simeon baccharis	Fed: None CA: None CNPS: 1B.2	Occurs in coastal scrub in areas where the habitat overlaps with grasslands. From 295 to 1,230 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Calochortus fimbriatus late-flowered mariposa lily	Fed: None CA: None CNPS: 1B.2	Found in dry, open coastal woodland and chaparral on serpentine soils. May also occur in riparian woodlands. From 902 to 6,250 feet in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Calochortus obispoensis San Luis mariposa lily	Fed: None CA: None CNPS: 1B.2	Most often found in serpentine grassland, but can also be found in chaparral and coastal scrub. From 164 to 2,395 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Calochortus simulans La Panza mariposa lily	Fed: None CA: None CNPS: 1B.3	Occurs in decomposed granite within valley and foothill grassland, cismontane woodland, chaparral, and lower montane coniferous forest. From 1,296 to 3,609 feet in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Calystegia subacaulis* ssp. *episcopalis Cambria morning-glory	Fed: None CA: None CNPS: 4.2	Found in chaparral and cismontane woodland from 197 to 1,640 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Carex obispoensis San Luis Obispo sedge	Fed: None CA: None CNPS: 1B.2	Usually found in transition zones on sand, clay, or serpentine soils, often in seeps. Associated with closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. From 33 to 2,690 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Castilleja densiflora* var. *obispoensis San Luis Obispo owl's-clover	Fed: None CA: None CNPS: 1B.2	Occurs in valley and foothill grassland and in meadows and seeps, sometimes on serpentine soils. From 33 to 1,312 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Ceanothus hearstiorum Hearsts' ceanothus	Fed: None CA: Rare CNPS: 1B.2	Found in maritime chaparral, coastal prairie, grassland, and coastal scrub. May co-occur with Arroyo de la Cruz manzanita. From 246 to 804 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Ceanothus maritimus maritime ceanothus	Fed: None CA: Rare CNPS: 1B.2	Occurs in coastal bluff scrub, chaparral, and valley and foothill grassland, but usually at the edges of coastal sage scrub or scattered throughout grassland. Some populations grow on serpentine soils. From 33 to 492 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Chorizanthe pungens* var. *pungens Monterey spineflower	Fed: **THR** CA: None CNPS: 1B.2	Found growing in sandy soils in coastal dunes, chaparral, cismontane woodland, and coastal scrub. From 0 to 492 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Cirsium fontinale* var. *obispoense San Luis Obispo fountain thistle	Fed: **END** CA: **END** CNPS: 1B.2	Occurs in serpentine seeps in chaparral and cismontane woodland from 115 to 1,198 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Cirsium occidentale* var. *compactum compact cobwebby thistle	Fed: None CA: None CNPS: 1B.2	Found on dunes and in clay soils in chaparral and grassland. May also occur in coastal prairies and coastal scrub. From 16 to 492 feet in elevation.	No	**Moderate**. There is suitable habitat for this species to occur, especially on the eastern and western ends of the survey area. This species was previously documented in a 1991 survey on a bluff overlooking San Simeon State Beach, in the northwestern section of the survey area.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Delphinium parryi* ssp. *blochmaniae dune larkspur	Fed: None CA: None CNPS: 1B.2	Occurs in maritime chaparral and coastal dunes from 0 to 656 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Delphinium parryi* ssp. *eastwoodiae Eastwood's larkspur	Fed: None CA: None CNPS: 1B.2	Found in serpentine soils in openings within chaparral and valley and foothill grassland. From 246 to 1,640 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Dudleya blochmaniae* ssp. *blochmaniae Blochman's dudleya	Fed: None CA: None CNPS: 1B.1	Occurs in rocky, clay, or serpentine soils within coastal bluff scrub, chaparral, coastal scrub, and valley and foothill grassland. From 16 to 1,476 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Eryngium aristulatum* var. *hooveri Hoover's button-celery	Fed: None CA: None CNPS: 1B.1	Found in alkaline depressions, vernal pools, roadside ditches, and other wet places near the coast. From 10 to 148 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Galium californicum* ssp. *luciense Cone Peak bedstraw	Fed: None CA: None CNPS: 1B.3	Occurs in forest duff or gravelly talus of broadleafed upland forest, lower montane coniferous forest, and cismontane woodland in areas dominated by pine and oak. Usually in partial shade. From 2,871 to 5,003 feet in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Galium hardhamiae Hardham's bedstraw	Fed: None CA: None CNPS: 1B.3	Found in serpentine soils in closed-cone coniferous forest. Often co-occurs with Sargent's cypress. From 1,280 to 3,199 feet in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Horkelia cuneata* var. *sericea Kellogg's horkelia	Fed: None CA: None CNPS: 1B.1	Occurs in closed-cone coniferous forest, coastal scrub, coastal dunes, and chaparral in sandy openings. From 33 to 656 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Layia jonesii Jones' layia	Fed: None CA: None CNPS: 1B.2	Found in clay or serpentine soils within chaparral and valley and foothill grassland from 16 to 1,312 feet in elevation.	No	**Moderate**. There is suitable habitat for this species to occur, particularly on the eastern side of the survey area.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Malacothamnus palmeri* var. *involucratus Carmel Valley bush-mallow	Fed: None CA: None CNPS: 1B.2	Occurs on serpentine soils on talus hilltops and slopes within cismontane woodland and chaparral. Requires burns. From 98 to 3,609 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Malacothamnus palmeri* var. *palmeri Santa Lucia bush-mallow	Fed: None CA: None CNPS: 1B.2	Found in chaparral on dry, rocky slopes. Usually found near summits but may occasionally be found growing in canyons down to sea level. From 197 to 1,198 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Microseris paludosa marsh microseris	Fed: None CA: None CNPS: 1B.2	Occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. From 16 to 984 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Monardella sinuata* ssp. *sinuata southern curly-leaved monardella	Fed: None CA: None CNPS: 1B.2	Occurs in sandy soils in coastal dunes, coastal scrub, chaparral, and cismontane woodland from 0 to 984 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Monolopia gracilens woodland woolythreads	Fed: None CA: None CNPS: 1B.2	Found in sandy to rocky soils within grassy openings in chaparral, valley and foothill grasslands, cismontane woodland, broadleafed upland forests, and north coast coniferous forest. Often seen on serpentine soils after burns. From 328 to 3,937 feet in elevation.	No	**Low**. There is marginal habitat for this species to occur.
Pedicularis dudleyi Dudley's lousewort	Fed: None CA: Rare CNPS: 1B.2	Occurs in deep, shady woods of older coast redwood forests, including chaparral, north coast coniferous forest, and valley and foothill grassland. From 197 to 2,953 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Pinus radiata Monterey pine	Fed: None CA: None CNPS: 1B.1	Found on dry bluffs and slopes within closed-cone coniferous forest and cismontane woodland. From 82 to 607 feet in elevation.	Yes	**Present**. There is a small stand of Monterey pine in the center of the percolation ponds and a thicket of them on the south side of San Simeon Creek.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Streptanthus albidus* ssp. *peramoenus most beautiful jewel-flower	Fed: None CA: None CNPS: 1B.2	Occurs on serpentine outcrops on ridges and slopes, typically associated with chaparral, valley and foothill grassland, and cismontane woodland. From 394 to 2,395 feet in elevation.	No	**Presumed absent**. There is no suitable habitat.
Triteleia ixioides* ssp. *cookie Cook's triteleia	Fed: None CA: None CNPS: 1B.3	Found on streamsides and in wet ravines on serpentine soils and serpentine seeps. Associated with cismontane woodland and closed-cone coniferous forest. From 492 to 2,297 feet in elevation.	No	**Presumed absent**. The site is below the known elevation range of this species.
Sensitive Habitats				
Monterey Pine Forest	CDFW Sensitive Habitat	Only three natural stands occur in California, one of which is in Cambria. This community is dominated by Monterey pine (up to 80%), with coast live oak usually the next most abundant tree. Understories are variable. The canopy may be nearly 100 feet tall. Limited to well-drained, sandy soils within the limits of summer marine fog incursion.	Yes	**Present**. There is a Monterey pine forest located on the south side of San Simeon Creek. This is in the survey area but not within the boundaries of the project site. There are isolated Monterey pines located in the project site.
Valley Oak Woodland	CDFW Sensitive Habitat	Usually found below 2,000 feet in the Sacramento and San Joaquin valleys adjacent to the Sierra Nevada foothills or in the Coast Range valleys between Lake County and western Los Angeles County. Typically consists of relatively open woodland with a grassy understory and an open canopy typically less than 30-40% canopy cover. Valley oak is typically the only tree present within the community. Occurs on deep, well-drained alluvial soils, usually in valley bottoms.	No	**Absent**.

U.S. Fish and Wildlife Service (USFWS) - Federal
END- Federal Endangered
THR- Federal Threatened

California Department of Fish and Wildlife (CDFW) - California
END- California Endangered
CCE- California Candidate Endangered
CSC- California Species of Concern
WL- Watch List
Rare

California Native Plant Society (CNPS)
California Rare Plant Rank
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
4 Plants of Limited Distribution – A Review List

Threat Ranks
0.1- Seriously threatened in California
0.2- Moderately threatened in California
0.3- Not very threatened in California

Appendix B Flora and Fauna Compendium

Flora Compendium

Scientific Name	Common Name
Anagallis arvensis	scarlet pimpernel
Artemisia douglasiana	mugwort
Avena fatua	wild oat
Baccharis pilularis	coyote brush
Brassica nigra	black mustard
Bromus catharticus	rescue grass
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess
Carduus pycnocephalus	Italian thistle
Conium maculatum	poison hemlock
Convolvulus arvensis	field bindweed
Cyperus eragrostis	tall cyperus
Equisetum telmateia ssp. *braunii*	giant horsetail
Erodium sp.	filaree
Eschscholzia californica	California poppy
Festuca perennis	Italian rye grass
Foeniculum vulgare	fennel
Geranium dissectum	wild geranium
Helminthotheca echioides	bristly ox-tongue
Hirschfeldia incana	shortpod mustard
Hordeum brachyantherum	meadow barley
Hordeum murinum	mouse barley
Hotia macrostachya	California hemp
Lotus corniculatus	Bird's foot trefoil
Lupinus sp.	lupine
Malva parviflora	cheeseweed
Medicago polymorpha	bur clover
Mentha sp.	wild mint
Narcissus sp.	narcissus
Phalaris aquatic	canary grass
Pinus radiate	Monterey pine
Plantago sp.	plantain
Raphanus raphanistrum	wild radish
Rubus sp.	blackberry
Rubus sp.	raspberry
Rumex sp.	dock
Salix lasiandra	Pacific willow
Salix lasiolepis	arroyo willow

Scientific Name	Common Name
Sambucus nigra	Mexican elderberry
Senecio vulgaris	common groundsel
Silybum marianum	milk thistle
Sonchus asper	sowthistle
Taraxacum officinale	dandelion
Toxicodendron diversilobum	poison oak

Fauna Compendium

Scientific Name	Common Name
Amphibians	
Pseudacris sierra	Sierran chorus frog
Rana draytonii	California red-legged frog
Birds	
Agelaius phoeniceus	red-winged blackbird
Anas platyrhynchos	mallard
Aphelocoma californica	western scrub-jay
Ardea alba	great egret
Ardea herodias	great blue heron
Bombycilla cedrorum	cedar waxwing
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
Butorides virescens	green heron
Callipepla californica	California quail
Calypte anna	Anna's hummingbird
Carduelis psaltria	lesser goldfinch
Cathartes aura	turkey vulture
Chamaea fasciata	wrentit
Charadrius vociferus	killdeer
Colaptes auratus	northern flicker
Corvus brachyrhynchos	American crow
Cyanocitta stelleri	Steller's jay
Egretta thula	snowy egret
Empidonax difficilis	Pacific-slope flycatcher
Euphagus cyanocephalus	Brewer's blackbird
Fulica americana	American coot
Geothlypis trichas	common yellowthroat
Haemorhous mexicanus	house finch
Icterus bullockii	Bullock's oriole
Larus californicus	California gull
Larus occidentalis	western gull
Megaceryle alcyon	belted kingfisher
Melanerpes formicivorus	acorn woodpecker
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Mergus merganser	common merganser
Molothrus ater	brown-headed cowbird
Myiarchus cinerascens	ash-throated flycatcher
Oreothlypis celata	orange-crowned warbler
Parkesia noveboracensis	northern waterthrush
Passerina amoena	lazuli bunting
Petrochelidon pyrrhonota	cliff swallow
Phalacrocorax auritus	double-crested cormorant
Pheucticus melanocephalus	black-headed grosbeak
Picoides nuttallii	Nuttall's woodpecker

Pipilo maculatus	spotted towhee
Piranga ludoviciana	western tanager
Poecile rufescens	chestnut-backed chickadee
Psaltriparus minimus	bushtit
Quiscalus mexicanus	great-tailed grackle
Selasphorus sasin	Allen’s hummingbird
Setophaga petechial	yellow warbler
Sialia Mexicana	western bluebird
Spinus tristis	*American goldfinch*
Stelgidopteryx serripennis	northern rough-winged swallow
Sturnus vulgaris	European starling
Tachycineta thalassina	violet-green swallow
Thalasseus elegans	elegant tern
Thryomanes bewickii	Bewick’s wren
Troglodytes aedon	house wren
Turdus migratorius	American robin
Vireo gilvus	warbling vireo
Wilsonia pusilla	Wilson’s warbler
Zenaida macroura	mourning dove

Fish

Eucyclogobius newberryi	tidewater goby
Gasterosteus aculeatus	threespined stickleback

Mammals

Mephitis mephitis	striped skunk
Odocoileus hemionus	mule deer
Sus scrofa	feral pig

Reptiles

Emys marmorata	western pond turtle
Sceloporus occidentalis	western fence lizard
Thamnophis elegans terrestris	coast garter snake

Appendix E5
Report of Dr. Winston Vickers Regarding Restriction of Wildlife Access to Evaporation Pond Associated With Cambria Community Services District's Emergency Water Supply Project

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Report of Dr. Winston Vickers regarding restriction of wildlife access to evaporation pond associated with Cambria Community Services District's Emergency Water Supply Project

Date report submitted: December 16, 2015

Introduction:

The University of California Davis's School of Veterinary Medicine includes a wildlife veterinary medicine division called the Karen C. Drayer Wildlife Health Center (WHC). One program of that Center is the Oiled Wildlife Care Network (OWCN) that is tasked with responding to oil spill impacts on wildlife throughout the state. Dr. Winston Vickers is an associate wildlife veterinarian at the WHC and is in charge of the statewide wildlife hazing and deterrence component of the OWCN's spill response. He has several years of wildlife hazing and deterrence experience, and trains all of the staff at UC Davis or other response organizations who might be called upon to haze and deter wildlife in an oil spill in California. Dr. Vickers brings a wide knowledge of the tools available to situations where reduction of potential for harm is the goal.

Various methods are utilized to haze and deter wildlife from areas where they can be harmed. Hazing refers to scaring animals out of an area where harmful substances occur, or utilizing fear-inducing stimuli to reduce the likelihood of animals entering such an area. Deterrence refers to utilizing tools of different sorts to make a harmful area less attractive to an animal entering it, or utilizing physical barriers to prevent entry.

Dr. Vickers was asked by Michael Baker International (MBI) and the Cambria Community Services District (CCSD) to examine the evaporation pond that is part of the CCSD's Emergency Water Supply Project and advise them of methods to reduce negative wildlife impacts of the pond. To that end, Dr. Vickers conducted background research and in-person communications and a site visit to inform his thinking on the issue being addressed.

Methods:

As per contract agreement # A22652 between the University of California (Oiled Wildlife Care Network) and MBI, Dr. Vickers:

- Reviewed the Administrative Draft EIR relating to the CCSD's Emergency Water Supply Project that was provided by Rita Garcia of MBI.
- Discussed the current and projected operation of the Advanced Water Treatment plant and the associated evaporation pond by phone with Bob Gresens of CCSD, Rita Garcia of MBI, and biologist Cindy Cleveland.
- Visited the site of the plant and evaporation pond on September 17, 2015, and discussed the current and projected future operational parameters with Bob Gresens and Justin Smith of CCSD. Cindy Cleveland also attended the site visit.

Observations at the evaporation pond site included:

- The evaporation pond contained a shallow body of water covering approximately half of the pond's overall surface area (Figure 1).
- Exposed areas of the pond's dark liner that had previously had water present exhibited deposits of light colored dried material (Figure 1).
- A single cable that stretches across the pond had previously had mylar flagging attached to it, but that flagging had mostly been shortened to minimal lengths by deterioration in the wind (Figure 2).
- No birds were utilizing the body of water or water's edge for feeding or resting at the time I was present, but according to biologist Cindy Cleveland and CCSD's Bob Gresens, both water and shore birds are periodically present.
- Operation of the pond and its spray-generating mechanism for evaporation enhancement was explained to me.
- Previous observations of birds in and around the pond were discussed, as well as bird mortalities that had been retrieved from the area previously.
- Various options for hazing of wildlife and deterrence / restriction of access to the water in the pond by wildlife (both birds and terrestrial animals) were discussed at length.
- Alternative methods of enhancing evaporation of the water in the ponds were also discussed in the context of issues that have arisen with the current sprayer system, and how various spraying methods might impact the ability to reduce wildlife impacts of the evaporation pond.

A number of physical characteristics of the evaporation pond and associated water sprayers used for enhancing evaporation make the task of reducing wildlife impacts challenging. These include:

- Width and overall size of the pond

- The pond's immediate proximity to public parklands, making the use of loud audible hazing tools impractical. The tools being referenced would include pyrotechnics, projected bird distress and predator calls, air horns, etc.
- The pond liner, which ideally would not be disturbed in any way due to concerns about increasing the potential for leaks.
- The need to completely, or nearly completely, eliminate any exposure of birds and other wildlife to the water in the evaporation pond.
- The current sprayer system's characteristics in relation to height of spray and wind distribution of spray
- The angle of the bank of the evaporation pond (relatively shallow versus vertical) which allows foraging by shorebirds at the edge of the water

Results:

Though many different hazing tools are available to reduce attractiveness of a body of water to wildlife (Table 1), and these individually and in groups can be very effective for variable periods of time, no hazing methods or groups of methods are typically effective for extended periods (months to years) if not continuously varied. Due to the proximity of public parkland and resultant noise restriction, the tools that could be deployed are limited primarily to non-audible tools such as flagging, balloons, effigies, "Air Ranger" type blow-up scare devices (scary man), radio controlled boats, physical human presence on the bank or in boats, live falcons, drones, projectiles fired near the animals (ie paint balls), lasers, etc. (Figure 3). These tools would have to be varied and monitored and maintained on a nearly constant basis, and would likely lose effectiveness over time even when continuously tended.

In contrast, some deterrence or exclusion methods can be effective for longer periods (or indefinitely), but may be more expensive to install and / or maintain long term. In this case, deterrence via exclusion is the approach that is most likely to be successful in accomplishing the goal of near complete reduction in risk to wildlife over long periods. Exclusion is already being employed at the evaporation pond (via fencing) to eliminate entry of amphibians and reptiles to the pond area.

Strategies that in Dr. Vickers' view could be considered that have the advantage of expected longer effectiveness include:

1. Black floating balls covering the entire water surface.

Pro: Balls would exclude access to the water surface over the long term with little maintenance as long as water level is maintained so that it reaches the banks of the pond all the way around.

Con: Balls would likely become coated with water from spray and become white in color over time. This would have an unknown effect on how birds perceived the balls. It is possible but untested that birds might perceive them as a solid surface, prompting landing on them. Balls would also reduce evaporation from the pond surface they are floating on, but might enhance evaporation by providing more surface area for evaporation when coated with spray from the spray guns. Balls would also not exclude shorebirds from foraging at the edges of the pond where they could walk on the bank surfaces and access the water edge between or adjacent to the balls. Terrestrial animals capable of getting over the low fence currently present could also still access the water's edge and drink it.

2. Water sprayers that operate continuously or on an intermittent schedule whose spray is horizontal across the water surface with some force, and encompasses the entire surface of the pond. These could be mounted around the sides of the pond, on floating platforms anchored in some way, or otherwise engineered to accomplish the purpose of disturbing birds with water spray on a regular basis.

Pro: Sprayers could enhance water evaporation from the pond at the same time as keeping birds disturbed on a continuous or intermittent basis, thereby reducing their likelihood of landing in the pond or staying in the pond for significant periods of time. Sprayers could be turned on and off dependent on their location relative to water levels at the time – ie if the pond were only partially full some sprayers could be inactivated.

Con: It is uncertain whether sprayers could be operated frequently enough to accomplish bird disturbance goals given energy costs related to operation of a large number of pump units.

3. A combination of chain link fencing installed outside the upper edges of the pond bank and buried 2 feet in the ground, with attached netting stretched across the entire pond surface; or netting stretched across the pond and anchored at the ground surface, combined with silt or other fencing buried 2 feet in the ground.

Pro: Fencing and netting, or netting combined with silt fencing, would fully restrict access of both shore and water birds and terrestrial wildlife to both the water surface and the water edge, including the entirety of the banks. This would not only protect wildlife, but also reduce the potential for damage to the exposed portions of the pond liner from possible damage by terrestrial animals such as deer, ground squirrels, etc. over time. Chain link fencing would be expected to last decades, and netting could be maintained over similar time frames via periodic replacement. Strand size and mesh sizes can be chosen to minimize accidental entanglements or collisions by smaller birds or bats.

Con: This option is likely to be the most extensive and expensive in regards to engineering and construction cost. Larger strand sizes that would potentially minimize accidental collisions by bats but would increase weight of the netting. Netting would have to be supported by a network of cables stretching across the enclosure. Cables would have to be anchored to strong structures of some sort along the sides of the enclosure. Netting can be damaged by wind, and if extended all the way to the ground could be damaged by terrestrial animals, and have to be repaired or replaced periodically. If water from the evaporation-enhancing sprayers currently in place contacts the netting and dries, the residue may cause deterioration of the netting over time. Netting mesh size would have to be carefully chosen to exclude the primary target species (shore and water birds) without being of such a small size as to potentially ensnare or tangle smaller birds and bats that might encounter it. Consultation with wildlife agencies would be important prior to choosing netting materials and mesh sizes.

4. Wire type fencing material extended across the entire enclosure in a similar way to netting, and buried at the edges.

Pro: Like netting, would be a physical barrier to wildlife accessing the water surface.

Con: Spray from water sprayers could also cause rusting / deterioration of wire fencing. Weight of the wire may be greater than netting, and require more substantial cabling, anchoring, and probably supports of some kind within the pond itself – potentially damaging the lining.

5. Physical covers (sheets or panels) over the pond and / or dry edges and banks.

Pro: Like netting, would be a physical barrier to wildlife accessing the water surface

Con: Would restrict evaporation of pond water, unless the design of the cover allowed evaporation in some way via its design. Dependent on design, sheets or panels might only restrict access to the water surface but still allow access to water edges.

6. Allow no effluent water from the plant to accumulate in the evaporation pond via utilizing alternate disposal methods.

Pro: This option is included here as an obvious way of removing the need for excluding wildlife from the evaporation pond area.

Con: However, in this case rainwater would likely accumulate in the unused pond and be a wildlife attractant. Mixing of rainwater with residues currently present in the bottom of the pond could potentially still be a wildlife hazard.

Summary / conclusions:

It is Dr. Vickers' judgement that option 3 above, a combination of buried fencing and netting, affords the best likelihood of maximum wildlife restriction from the evaporative pond over long periods of time. Other options have functional shortcomings when compared to the total exclusion expected with option 3, however they could be chosen for financial reasons with acceptance of lower effectiveness.

Figure 1. Evaporation pond

Figure 2. Evaporation pond with cable and mylar flag remnants

Figure 3 – Examples of flagging, mylar, and “Air Ranger” (scary man) type visual scaring devices

Figure 4. “Bird balls” – black floating balls

Figure 4. Netting example #1

Figure 5. Netting example #2

Table 1.

Possible hazing or exclusion approaches	**Pros**	**Cons**
Scary men ("Air Ranger") type on timers or constant	one of most effective visual tools	would likely require multiple units on platforms in the pond area to be adequately effective, and would require electricity at their sites, would only work for a certain period of time, should be brought in if rains
Mylar and other flagging - kites - effigies etc	Effective if extensive enough	would require large numbers of lines across the expanse of the pond and regular monitoring, materials would have to be replaced frequently, would only work for a certain period of time unless mylar is kept quite densely placed, would need lines on pullies for regular replacement, birds might

		occasionally collide with lines
Rotating mirrors	Inexpensive, relatively passive dependent on design	Not very effective
Lasers	Effective on certain species, and in the case of green lasers of sufficient power, effective even during many daylight conditions	Have to be deployed by a human patrolling the perimeter and would be useful mostly dusk through dawn
Human being with falcon	Very effective, could be only used during couple of months of operation - though dependent on total time water present	would likely require multiple visits per day to maintain effect
Human being on foot deploying visual devices	personnel could vary devices and deploy only when birds approach or land, and / or be present to contantly maintain, may be cheapest approach if plant only operating a couple of months per year - though dependent on total period that water is present	Tools available limited to blowy men, kites, heli kites, lasers, and other temporary visual measures due to restriction on use of sound generating devices at that location
Bird balls	Would physically exclude birds from water surface, might increase evaporative effect of sprayers by increasing surface area where balls sprayed	Balls would turn from black to white with water residue, balls would not exclude shorebirds from foraging at the water's edge, "stranded" balls left on solid surface as water recedes would be subject to being blown around
Exclusion netting and/or fencing combination	If combined with fencing at edges or anchored on ground at edge, would physically exclude both waterbirds and shorebirds from water / residue both within the enclosure and at the edges	Would likely have to be repaired or replaced periodically due to aging and weather damage, would require adequate supports at edges with cabling across pond, would possibly entangle small birds or bats dependent on material and design. Collisions

Exclusion wire mesh	Would physically exclude birds from both water and residue areas, and if combined with fencing or anchored on ground at edge would exclude shorebirds at edge.	Difference in costs versus netting for installation and maintenance is not known. Would require adequate supports at edges with cabling across pond. Size of mesh would determine potential for collisions with bats or smaller birds.
Floating or anchored sprayers scattered in pond or along edge - intermittent or constant spraying, rotating or fixed	Would enhance evaporation while startling birds off surface of water or preventing them landing, could be placed closely enough to together to cover essentially all of enclosure, including edges	Engineering and installation and / or operating costs may be high dependent on number required, and if operating a lot of the time in order to have continuous bird control
Pool cover-type cover on water and / or residue surface	Would physically exclude birds from all covered areas	Would eliminate most evaporation unless designed with small openings to allow evaporative process, would not accommodate use with sprayers

Appendix E6
Technical Memorandum – San Simeon Creek Flows (Technical Memorandum)

DRAFT Memorandum

To: *Rita Garcia –Michael Baker International*
Bob Gresens – Cambria Community Services District

From: *Gregg Cummings*
Michael Smith

Date: *October 16, 2015*

Subject: *Technical Memorandum - San Simeon Creek Flows*

The California Coastal Commission (CCC) provided a number of comments related to surface water flows in San Simeon Creek in their letter dated April 6, 2015 relative to environmental flows necessary to support critical habitat in the lower portion of San Simeon Creek. The CCC comments also requested additional documentation on mitigation discharges to the lagoon near the mouth of San Simeon Creek. The CCC comments recommended the EIR include an instream flow analysis. This document summarizes historical information on flows in San Simeon Creek and documents the basis for the recommended mitigation discharges to the San Simeon lagoon.

Historical Background

The CCC comments reference the analysis documented in the report titled " San Luis Obispo County Regional Instream Flow Assessment" (Stillwater Sciences, 2014). The Stillwater Sciences report develops minimum required flows for supporting steelhead during critical spring and summer periods for multiple streams in the county, including the lower portion of San Simeon and Van Gordon Creeks. Comments from the CCC rely on the Stillwater Sciences report to identify the minimum environmental flow requirement of 0.5 cubic feet/second (cfs) for the lower portion of San Simeon Creek during the critical summer season.

One of the objectives of the Stillwater Sciences report was the estimation of Environmental Water Demand (EWD) for various stream reaches in San Luis Obispo County. EWD is defined as the amount of water needed in an aquatic ecosystem, or released into it, to sustain aquatic habitat and ecosystem processes based on the South-Central California Coast steelhead requirements. Their analysis was targeted at stream segments that were identified as likely to have perennial flow based on watershed characteristics and the results of a 2006 study by NOAA that cited in the 2014 Stillwater Sciences report. The 2006 NOAA analysis did not use any information specific to San Simeon Creek in developing their identification of perennial streams, but rather covered a large area extending from Monterey Bay to San Diego. The NOAA report indicated that lagoon areas were not considered in the analysis. The 2014 Stillwater Sciences report stated:

> *We recognize that there is no value in predicting summer flow requirements for steelhead in the portion of a creek that is naturally dry during part of the year. Therefore results from a National Oceanic and Atmospheric Administration (NOAA) analysis (Boughton and Goslin 2006) were used to limit analysis of EWD to portions of each watershed determined to have a high potential for steelhead rearing to occur based on intrinsic watershed characteristics, including perennial flows.*

The Stillwater Sciences report also utilized information from the USGS San Simeon basin report (Yates and Van Konyenburg, 1998), which included evaluation of stream flows in San Simeon Creek. An additional source of historical information is available in a draft manuscript from the California Department of Fish and Game (Titus, et. al., 2010) which summarizes flow conditions on San Simeon Creek.

The USGS report summarized flow monitoring at the San Simeon gaging station at Palmer Flats, which is located about 3.8 miles upstream of the discharge to the ocean. This gage was monitored from 1971 to 1988, when it was replace by the current gage operated by San Luis Obispo County, located approximately one mile upstream of the discharge to the ocean. The upstream gage at Palmer Flats is located where more persistent flow has been noted. The 2011 draft manuscript from the Department of Fish and Game (Titus and Erman, 2011) referenced past analyses indicating that the stream frequently dries up during the summer and the staff therefore recommended discontinuing stocking in 1933, but no information of earlier stocking operations. This manuscript does note that steelhead were observed in San Simeon Creek during times when water was present and also stated that stocking continued after 1933, contrary to the earlier staff recommendation. The analysis of streamflow at the Palmer Flats stream gage on San Simeon Creek by Yates is consistent with past observations of stream flows during the summer dry period. The USGS analysis indicated that over the 1971 to 1988 period of record at the Palmer Flats gaging station, no surface water flow was observed 47 percent of the time. This upstream station at Palmer Flats was located closer to higher elevation portions of the watershed where springs provide more baseflow to the channel. The USGS modeled the impacts of agricultural and municipal pumping on the water budget and water levels in the San Simeon basin. The USGS report concluded that the water level declines in the San Simeon basin were primarily the result of drainage of the alluvium after the rainy season, rather than a result of the pumping. The report further noted that the water level declines occurred due to water in the basin moving downgradient as subsurface flow.

NOAA used an environmental envelope approach to the identification of stream reaches that had a high potential to provide potential steelhead habitat. This method first identified streams where steelhead were successful and estimated quantitative parameters to identify characteristics that could be extended to other locations with more limited data. The parameters selected for this characterization include:

- Mean summer discharge
- Channel gradient
- Valley width index
- Temperature
- Presence of alluvium

Mean summer discharge was based on a regression developed for 28 stream gage locations, relating drainage area and mean annual precipitation to the summer (August and September) mean discharge over the 1961 to 1990 period. Data from the San Simeon watershed was not used in this analysis. The developed regression was statistically significant, however, the regression accounted for only 33 percent of the observed variance in the data set. The regression was then used to estimate mean summer flows at streams with observed successful steelhead occurrence. Channel gradient was estimated for reaches using GIS data. The valley width index is the ration of the valley width to the mean discharge. Mean air temperature was used as a surrogate for the stream temperature. The presence of alluvial materials in the valley was based on available geologic maps. Values for each of the predictor variables were overlain on the confirmed steelhead occurrences. Ranges of each of the predictor variables were quantified for areas with steelhead to identify potential suitable habitat for summer conditions. Their analysis did not include potential interactions between the variables used in the analysis. The most significant variable for purposes of assesments in the San Simeon watershed is the mean summer flow, since this largely controlled the identification of the entire San Simeon watershed as having a high potential for steelhead habitat. The Figure 2 from the NOAA report shows a graph of successful steelhead habitat based on mean summer flow, along with a summary of the relative frequency of stream reaches in the South-Central California area, which includes the San Simeon watershed. This same figure is annotated on Figure 1. The red line added onto this figure shows the 0,5 cubic feet/second (cfs) (0.014 meters cubed/second) value that was selected in the Stillwater Sciences report to represent the Summer EWD for Lower San Simeon Creek. It is notable that all of the successful steelhead habitat used in the NOAA analysis required higher mean summer flow rates. For example, the flow corresponding to the lowest portion of the steelhead occurrence had a flow rate of about 0.03 meters cubed/second (1.06 cfs).

The NOAA classification described above provided the basis for inclusion of Lower San Simeon Creek in the Stillwater Sciences report. No specific studies were conducted on San Simeon Creek, estimates of EWD were based on correlations with drainage areas developed from streams that were investigated. Two locations most relevant to the EIR included in the Stillwater Sciences analysis include Lower San Simeon Creek and Van Gordon Creek. The identified EWDs for Lower San Simeon Creek were 1.6 cfs in the spring (April and May) and 0.5 cfs for the summer (August and September) period. The Van Gordon Creek EWDs were 0.4 and 0.2 cfs for spring and summer periods. The Stillwater Sciences report noted that they did not analyze stream gaging data from San Simeon Creek due to difficulties in the data organization. The flow gaging data for the current monitoring station located about one mile upstream of the discharge to the ocean was obtained from San Luis Obispo County and is summarized in the following section.

San Simeon Surface Water Flow

A gaging station is located on Lower San Simeon Creek that was operated by the USGS for a basin specific study and was subsequently managed by San Luis Obispo County (San Simeon Sensor 718 http://www.slocountywater.org/weather/alert/stream/sansimeon.htm). Available data for the period of record through 2013 were obtained from the County and processed into a suitable format for analysis of flows. This processing included deletion of records that were noted as not representative due to equipment problems. Stage data were processed based on County developed rating curves to convert stream stage to flow.

Table 1 shows the data availability over the period of operation through 2013. The critical periods for EWD are the spring and summer periods. The available data from 1988 through 2013 for these critical periods is summarize also summarized on Table 1, indicating that 18 years of record with flow records for at least 90 percent of 61 possible days during the 1987 through 2013 period. Table 2 summarizes the average flow during spring and summer seasons for the 18 years with adequate records available. During the spring season, the EWD of 1.6 cfs was met during 15 of 18 years, or 83 percent of the years. The summer season average flow met the EWD of 0.5 cfs during 3 (2008, 2009 and 2011) of the 18 years, or 17 percent of the years. The mean flows are dominated by short term runoff associated with infrequent storms during August and September. During 2008, 13 days during the 61 day summer period exceeded the flow of 0.5 cfs: 3 out of 61 days exceeded 0.5 cfs during 2009; and 27 out of 61 days had flows above 0.5 cfs during 2011.

Lower San Simeon Creek is dry during a significant portion of the year outside of the rainy season. During the 18 years of available adequate data records, 53 percent of the time, San Simeon Creek did not have any flow at the Lower San Simeon Creek gaging station. Based on the recommendation in the Stillwater Sciences to assess in-stream flow at stations for which they did not analyze data, Lower San Simeon Creek should not be designated as steelhead critical habitat, due to predominant dry conditions during the critical summer season. During the 18 years of available records during the summer season, a total of 42 out of 1098 days, or 3.8 percent of the time during the summer season met the criteria for summer EWD flows.

In addition to the County's gaging station data, the CCSD had commissioned a 2000 baseline water supply study, which included a data summary from 1972 to 1997 indicating periods when there was no flow at the lamer Flats meter location on San Simeon Creek. Except for the period of 1995-1997 when there were apparent data collection problems, each of these years had substantial dry periods. It is noteworthy that this included the years 1971 through 1978, which preceded the CCSD's completion of its San Simeon Creek well field and disposal facilities. This table is included as Table 3 in this memorandum.

Lagoon Mitigation Flow

The San Simeon lagoon occurs on the beach area and upstream for a distance of up to about 2,000 feet. During periods of the year when there is little or no flow entering the area from upstream, the lagoon is isolated from the ocean by a beach berm that develops due to wave action. This beach berm can be breached temporarily during the dry season by high waves, when seawater can enter the lagoon. During periods when surface water flows exceed seepage and evaporation rates, water may discharge to the ocean when the water level in the lagoon rises sufficiently to breach the beach berm. This surface water flow occurs during the rainy season, which typically occurs between December and April. Figure 2 shows an aerial photograph of this condition in March 2010, when flows observed in San Simeon Creek averaged 226 cfs at the Lower San Simeon gage. After surface water flow in San Simeon creek ceases during the dry season, the beach berm is re-established by wave action and discharge to the ocean ceases. Figure 3 is an aerial photograph showing this condition in September 2010, where a lack in flow in the creek has allowed development of a berm and isolation from the ocean. Stagnant water conditions persist in the lagoon for a significant portion of the year when it is isolated from the ocean, allowing abundant accumulation of organic deposits on the lagoon floor. In addition, during periods of runoff, fine grain deposits can settle in the lagoon when flow velocities are low. These factors result in limited connectivity between groundwater and the lagoon in its upper reaches.

During periods when surface water is not flowing, water in the lagoon is maintained by discharge of groundwater to the channel of San Simeon creek in the area downstream of percolation ponds that are operated by the District for disposal of secondary treated effluent from their waste water plant in Cambria. The source of this groundwater includes both basin groundwater flowing in the subsurface toward the ocean and the local recharge from the District percolation ponds. During periods when surface water inflow is insufficient to maintain the connection through the beach berm, water levels in the lagoon will stabilize at a level determined by the balance between inflowing groundwater in the upper reaches, and seepage to the aquifer in the beach area. A groundwater gradient is present in the alluvial fill materials toward the ocean during periods when discharge to the ocean is occurring in the subsurface. The nature of the alluvial deposits changes in the area west of the confluence of Van Gordon Creek and San Simeon Creek, where a greater percentage of low permeability material is present in the subsurface downstream of this confluence. This results in a higher hydraulic gradient in these lower hydraulic conductivity materials. In the sections of San Simeon Creek where the channel invert elevation is lower than the adjacent groundwater level, seepage from the aquifer to the channel occurs. In cases where water levels in the lagoon are higher than groundwater levels, seepage from the lagoon to groundwater will occur.

The presence of lower permeability bed materials in the lagoon, consisting of fine grain sediments and the organic debris, limits the connectivity between the lagoon and groundwater. Detailed monitoring of water levels in the aquifer and stage in the lagoon was conducted for a one week period in April, 2014 during a period when a brief runoff event resulted in a rise in water levels in the lagoon of about 0.83 feet. Water levels in the lagoon dropped subsequent to this event, allowing an estimate of the seepage rate. The loss rate, lagoon area and the change is head were used to estimate the permeability of the lagoon bed for use in modeling analyses. During the monitoring period, the water level in the lagoon declined by 7.3 inches, indicating a loss rate of 77 gpm.

The estimated permeability for the lagoon was used to update the calibrated groundwater model to assess lagoon levels with and without the emergency water supply project in operation, under normal years where surface water flows during the rainy season recharge the upper groundwater basin; and, extreme drought conditions where no surface water inflow occurs over a two year period. Simulations were conducted for baseline conditions, representing conditions prior to implementation of the project with the following operating assumptions:

- Using the same maximum permitted capacity as the emergency water supply project, the CCSD well field operated at a production rate of 454 gpm during dry season
- Percolation pond seepage 353 gpm

- Without the emergency water supply project in operation, gradient control pumping at 25 gpm during drought years, with no gradient control pumping during normal years
- Without the emergency water supply project in operation, gradient control well discharge to Van Gordon Creek
- Irrigations wells operate at historic rates during the dry season for both normal and drought conditions
- Beach berm elevation assumed at 7.5 feet
- No breaching of the berm occurred due to high surf conditions.

The proposed water supply alternative was simulated for both normal and the extreme drought conditions considering lagoon mitigation discharge rates of 0, 50, 100 and 150 gpm during the 6 month dry season. Assumptions for the water supply alternative were:

- CCSD well field operated at 454 gpm during dry season, the maximum permitted capacity of the emergency water supply project
- Percolation pond seepage 353 gpm
- RIW-1 recharging at 454 gpm between the CCSD well field and the percolation ponds to maintain the required protective gradient
- Well 9P7 pumping at rates sufficient to supply mitigation flow, recharge water to RIW-1 and treatment losses
- Project operates only during the typical dry season
- Irrigation wells pump at historic rates during dry season
- Beach berm assumed at 7.5 feet
- Mitigation water is discharged directly to the lagoon
- No breaching of the berm occurred due to high surf conditions.

Figure 6 shows the results of the simulation for normal climatic conditions, compared to results without implementation of the water supply alternative. Under the normal climatic conditions, mitigation flows of 50 gpm during the proposed water supply alternative operation are sufficient to maintain lagoon levels similar to conditions without the water supply alternative. Figure 7 shows the results of simulations for extreme drought conditions comparing the water supply alternative with mitigation flows of 0, 50 and 100 gpm with conditions without the water supply alternative. During the first year of simulated drought, the mitigation flow of 100 gpm is able to maintain lagoon levels similar to those for no implementation of the water supply alternative. During the second year of simulated drought, both 50 and 100 gpm of mitigation flows would result in higher lagoon levels than would exist without the water supply alternative. Under the extreme drought conditions the CCSD well field would not be capable of producing the permitted quantities, while with the water supply alternative, production at these rates could continue.

Conclusions

Historical information available from monitoring and from the USGS 1988 study indicate that the lower reaches of San Simeon Creek do not have surface water flows during the critical summer period. Recharge to the basin occurs during the rainy season when San Simeon Creek flows, however, drainage of the basin occurs as subterranean flow, rather than as surface water flow. The 0.5 cfs environmental water demand recommended in the 2014 Stillwater Sciences report is not justified.

The cited 2014 Stillwater and 2006 NOAA studies did not include specific analysis of the San Simeon Lagoon. CCSD anticipated the need to protect the sensitive habitat of the lagoon and incorporated a provision in their plan to provide mitigating flows to maintain the lagoon. Detailed analysis of required supplemental water to support the lagoon concluded that 100 gpm will improve protection of this area when the project is in operation, compared to a no project scenario.

References

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Yates, E. B. and K. M. Van Konyenburg. 1998. Hydrology, water quality, water budgets, and simulated responses to hydrologic changes in Santa Rosa and San Simeon Creek ground-water basins, San Luis Obispo County, California. U.S. Geological Survey Water Resources Investigations Report 98-4061

San Simeon Figures

Tables

Table 1 - Summary of Available Stream Flow - Lower San Simeon Creek

Calendar Year		Percentage of Days with Flow Record	Percentage of Days with Flow Records (Spring Season)	Percentage of Days with Flow Records (Summer Season)
1987		25%		
1988		100%	100%	100%
1989		78%	100%	0%
1990		100%	100%	100%
1991		90%	51%	100%
1992		100%	100%	100%
1993		100%	100%	100%
1994		100%	100%	100%
1995		100%	100%	100%
1996		92%	80%	100%
1997		55%	75%	100%
1998		96%	100%	100%
1999		100%	100%	100%
2000		96%	100%	100%
2001		100%	100%	100%
2002		100%	100%	100%
2003		22%	0%	7%
2004		1%	100%	95%
2006		25%	98%	97%
2007		97%	100%	100%
2008		93%	93%	100%
2009		97%	100%	100%
2010		99%	100%	100%
2011		99%	100%	100%
2012		100%	0%	0%
2013		100%	0%	0%

Table 2 - Summary of Seasonal Flow Statistics

Year	Mean Spring Flow (cfs)	Mean Summer Flow (cfs)
1988	0.59	0.00
1990	0.00	0.00
1992	4.96	0.00
1993	12.26	0.00
1994	0.81	0.00
1995	21.45	0.00
1998	39.86	0.01
1999	19.92	0.00
2000	7.34	0.00
2001	5.69	0.00
2002	6.64	0.00
2007	2.11	0.00
2008	55.40	7.20
2009	23.61	7.78
2010	159.12	0.00
2011	200.02	32.70
2012	198.65	0.00
2013	37.01	0.00
EWD	**1.60**	**0.50**

EWD met

Table 3 – Palmer Flats Dry Periods

TABLE A-2

SAN SIMEON CREEK: START AND END DATES FOR HISTORICAL DRY SEASONS

Water Year[a]	Start Date[b]	End Date[c]	Duration (days)
1971	25-Jun	22-Dec	180
1972	25-Apr	11-Nov	200
1973	23-Jul	12-Nov	112
1974	3-Jun	3-Dec	183
1975	1-Jul	29-Feb	243
1976	16-Mar	31-Dec	290
1977	17-Jan	17-Dec	334
1978	7-Aug	16-Dec	131
1979	16-Jun	24-Dec	191
1980	11-Jun	23-Jan	226
1981	3-Jun	14-Nov	164
1982	5-Jul	9-Nov	127
1983	25-Aug	10-Nov	77
1984	23-Apr	24-Nov	215
1985	20-May	29-Nov	193
1986	26-Jun	9-Feb	228
1987	28-May	4-Dec	190
1988	21-Mar	17-Dec	271
1989	17-May	12-Jan	240
1990	27-Mar	28-Feb	338
1991	26-May	28-Dec	216
1992	31-May	6-Dec	188
1993	9-Jun	15-Dec	189
1994	30-May	3-Jan	218

Notes:

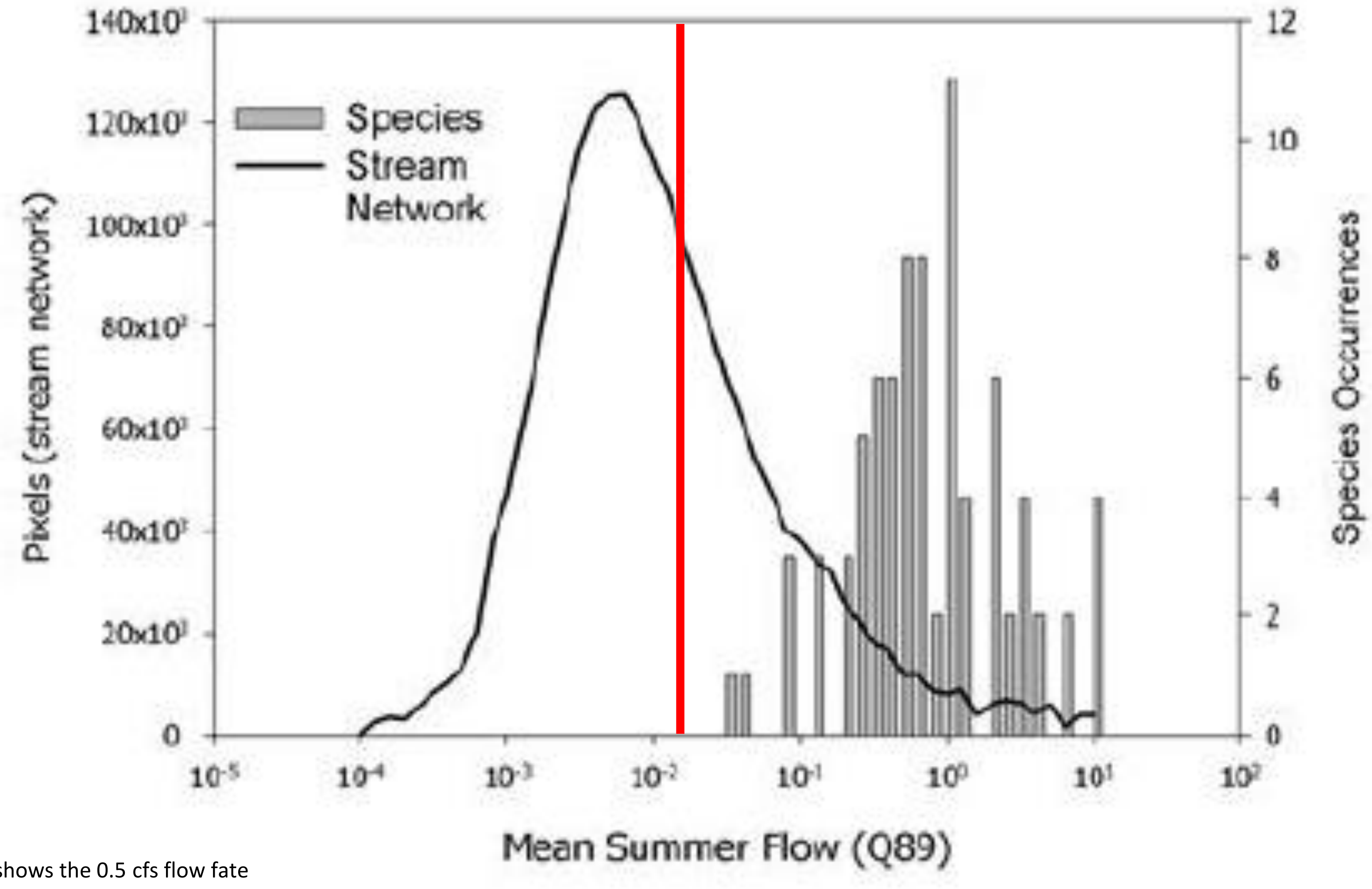
(a) Water Year defined as October 1 through September 30.
Data for 1971-1991 were obtained from Jones & Stokes (1995).
Data for 1992-1994 were developed using the same assumptions as those used by Jones & Stokes.

(b) Start Date of Dry Season beginning in the current water year.

(c) End Date of the Dry Season beginning in the current water year; usually occurs in the subsequent water year.

From: Kennedy/Jenks, 2000

Figures



Note: Vertical red line shows the 0.5 cfs flow fate

Figure 1 – Steelhead Occurrence and Mean Summer Flow (NOAA, 2006)

Figure 2 – March 2010 Aerial Photo Showing Discharge to Ocean

Figure 3 - September 2010 Aerial Photo Showing isolation from the Ocean

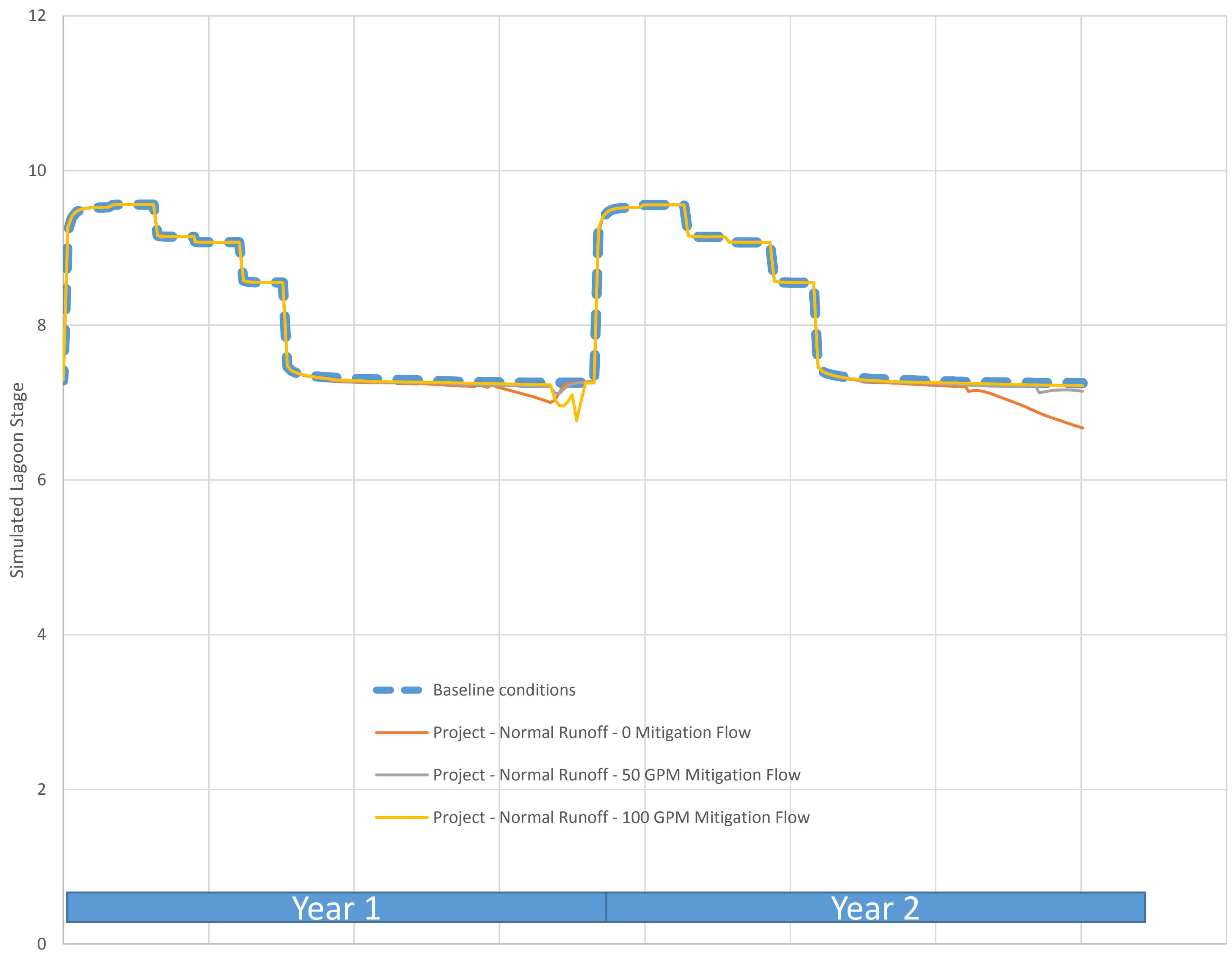


Figure 6 – Simulated Lagoon Levels, Normal Climatic Conditions

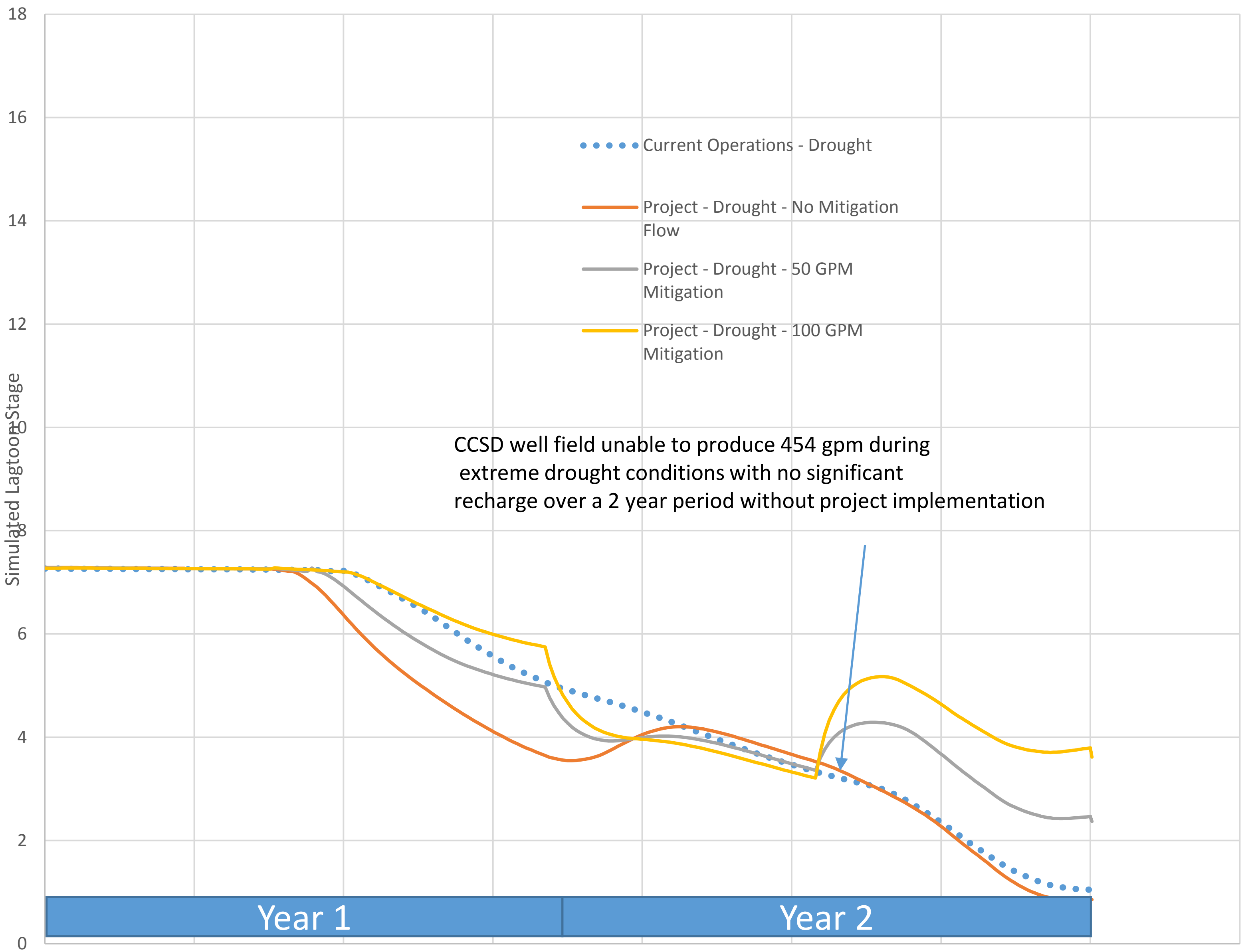


Figure 7 – Simulated Lagoon Levels, Extreme Drought Conditions

Appendix E7
Cambria Sustainable Water Facility Project Delineation of State and Federal Jurisdictional Waters - Update

August 25, 2016 JN 144828

Cambria Community Services District
Attention: Mr. Robert. C. Gresens, P.E.
1316 Tamsen Street, Suite 201
Cambria, CA 93428
(805) 927-6623

SUBJECT: Delineation of Jurisdictional Waters Update for the Cambria Sustainable Water Facility Project, City of Cambria, County of San Luis Obispo, California

Robert Gressens:

This delineation update was prepared for Cambria Community Services District, in order to evaluate impacts to the U.S. Army Corps of Engineers' (Corps), Regional Water Quality Control Board's (Regional Board), California Department of Fish and Wildlife's (CDFW) and California Coastal Commission's (CCC) jurisdictional areas within the proposed modified portion of project site. The project site, is generally located east of the State Route 1, south of the City of San Simeon, and north of the Community of Cambria in unincorporated San Luis Obispo County, California. Michael Baker International has prepared this delineation update to incorporate the Project Modification components of the Cambria Sustainable Water Facility.

Our original delineation was prepared in September 2014. The project boundaries and site conditions for the project site are generally the same as the previous delineation report dated September 2014. San Simeon Creek would be the only jurisdictional feature to be affected by the proposed modification, due to a pipe relocation.

Current conditions

San Simeon Creek enters the project site along the eastern boundary as a natural earthen feature and generally flows southwest along the southern boundary of the site towards the San Simeon Creek Estuary and its terminus at the Pacific Ocean. Vegetation associated with San Simeon Creek is characterized by Central Coast Arroyo Willow Riparian Forest. Associated vegetation included a mixture of native and non-native species. The downstream reach (approximately the western half within project limits, within the area of proposed modification) of San Simeon Creek exhibited evidence of an OHWM which included surface water below the OHWM, vegetation bent in the flow direction, drift and debris deposits at the OHWM and bench formation above the OHWM.

The jurisdictional delineation report documents the jurisdictional authority of the Corps, Regional Board, CDFW and CCC within the boundaries of the project site. Total onsite Jurisdiction is summarized below:

- **Corps/Regional Board Jurisdictional Areas**: 5.94 acres/6,792 linear ft. of non-wetland areas and 0.39 acres of wetland area;

- **CDFW Jurisdictional Areas**: 5.94 acres/6,792 linear ft. of streambed and 45.17 acres of associated vegetation; and,

- **CCC Jurisdictional Areas**: 5.94 acres/6,792 linear ft. of stream and 46.06 acres of wetland area.

Modification

The project's Advanced Water Treatment (AWTP) currently surface discharges membrane filtration effluent/de-chlorinated and oxygenated AWTP product water near San Simeon Creek in efforts to protect San Simeon Creek Lagoon during dry weather conditions. However with current design, product water is unable to reach the Simeon Creek Lagoon. Thus, modifications to the project was proposed to allow for successful flows of product water into the Lagoon.

This proposed Project modification involves extending the filtrate pipeline to relocate the discharge point further south to the San Simeon Creek bank. The filtrate pipeline would be routed/placed by hand to protect the riparian habitat. At the relocated discharge point, articulating concrete block (ACB) (Armorflex pad) lining or similar erosion prevention measures would be installed at the bottom of the creek floor protect the San Simeon Creek channel bank. The Armorflex pad would allow for the continued growth of riparian vegetation, further protecting the channel from any potential erosion. A temporary 10' access path would be created to allow access for installation in and around San Simeon Creek. As a result some vegetation may be removed, but the area would be revegetated upon pipe/outlet construction.

Modification Impacts

Proposed modification to extend and relocate the filtrate pipeline and to install Armorflex pad is expected to have impacts to Corps/Regional Board, CDFW and California Coastal Commission jurisdictional areas of this portion of the San Simeon Creek. (See attached Exhibits 1, 2, and 3)

The proposed pipeline, temporary access path, and Amorflex pad is expected to impact a total of 0.003 acres of Corps/Regional Board jurisdictional areas. The proposed Impacts are summarized below:

Table 1: Corps/Regional Board Jurisdictional Impact Summary

Modification	**Impacted Corps/Regional Board Jurisdiction**			
	Non-Wetland		**Wetland**	
	Acreage	**Linear Feet**	**Acreage**	**Linear Feet**
Filtrate pipeline/ Temporary Access Road	0.001	-	-	-
Armorflex Pad	0.002	-	-	
Total	**0.003**	**-**	**-**	**-**

The proposed pipeline, temporary access path, and Amorflex pad is expected to impact a total of 0.042 acres of CDFW Jurisdictional Area. The proposed impacts are summarized below:

Table 2: CDFW Jurisdictional Impact Summary

Modification	Impacted CDFW Jurisdiction			
	Streambed		Associated Vegetation	
	Acreage	Linear Feet	Acreage	Linear Feet
Filtrate pipeline/ Temporary Access Road	0.04	-	-	-
Armorflex Pad	0.002	-	-	-
Total	**0.042**	**-**	**-**	**-**

The proposed pipeline, temporary access path, and Amorflex pad is expected to impact a total of 0.042 acres of California Coastal Commission Jurisdictional Area. The proposed impacts are summarized below:

Table 3: CCC Jurisdictional Impact Summary

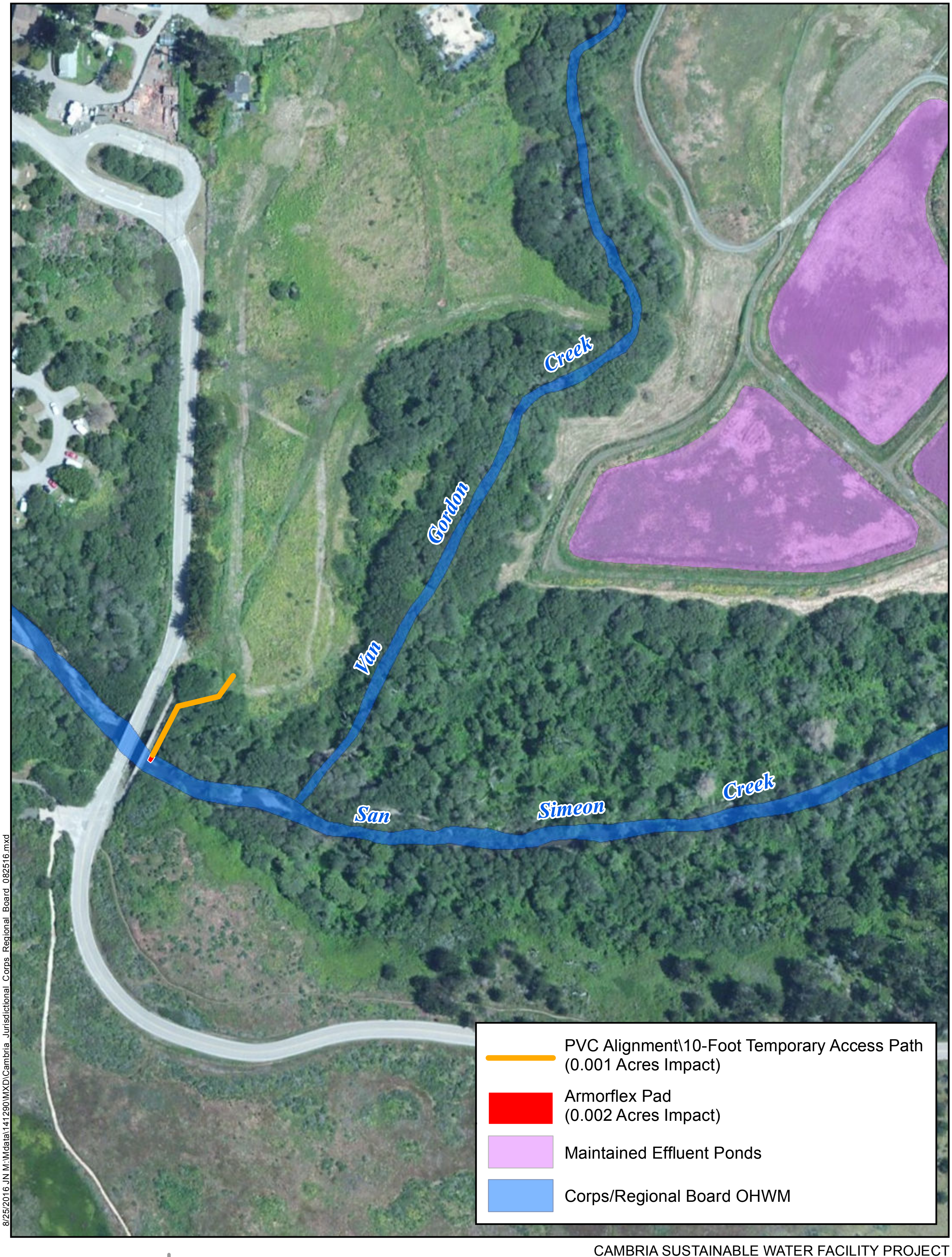
Modification	Impacted California Coastal Commission Jurisdiction			
	Stream		Wetland	
	Acreage	Linear Feet	Acreage	Linear Feet
Filtrate pipeline/ Temporary Access Road	-	-	0.04	-
Armorflex Pad	-	-	0.002	-
Total	**-**	**-**	**0.042**	**-**

Recommendations

Please note that based on a detailed review of the current site conditions and proposed project, our research has indicated that it will be necessary for Cambria Community Services District to obtain the following permits prior to commencement of any construction activities within the delineated jurisdictional areas: a Corps Section 404 Nationwide Permit and Regional Board Section 401 Water Quality Certification, and a CDFW Section 1602 Streambed Alteration Agreement, and a California Coastal Commission Permit. Please do not hesitate to contact me at (949) 472-3505 or RBECK@mbakerintl.com should you have any questions or require further information.

Sincerely,

Richard Beck
Regulatory Specialist
Natural Resources/Regulatory Permitting



8/25/2016 JN M:\Mdata\141290\MXD\Cambria_Jurisdictional_Corps_Regional_Board_082516.mxd

Michael Baker INTERNATIONAL

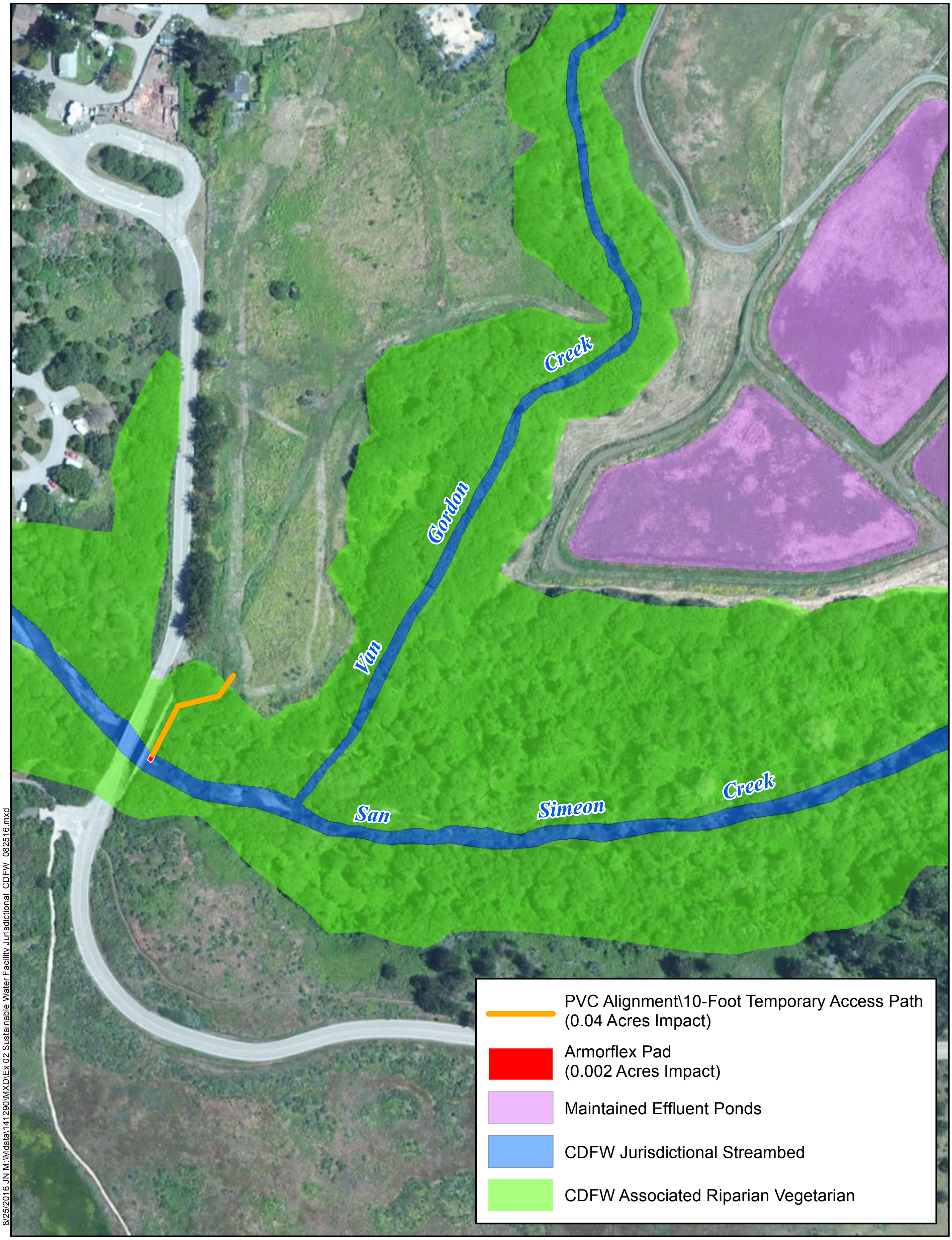
Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA SUSTAINABLE WATER FACILITY PROJECT

DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS ADDENDUM

Corps/Regional Board Jurisdictional Map

Exhibit 1



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Michael Baker INTERNATIONAL

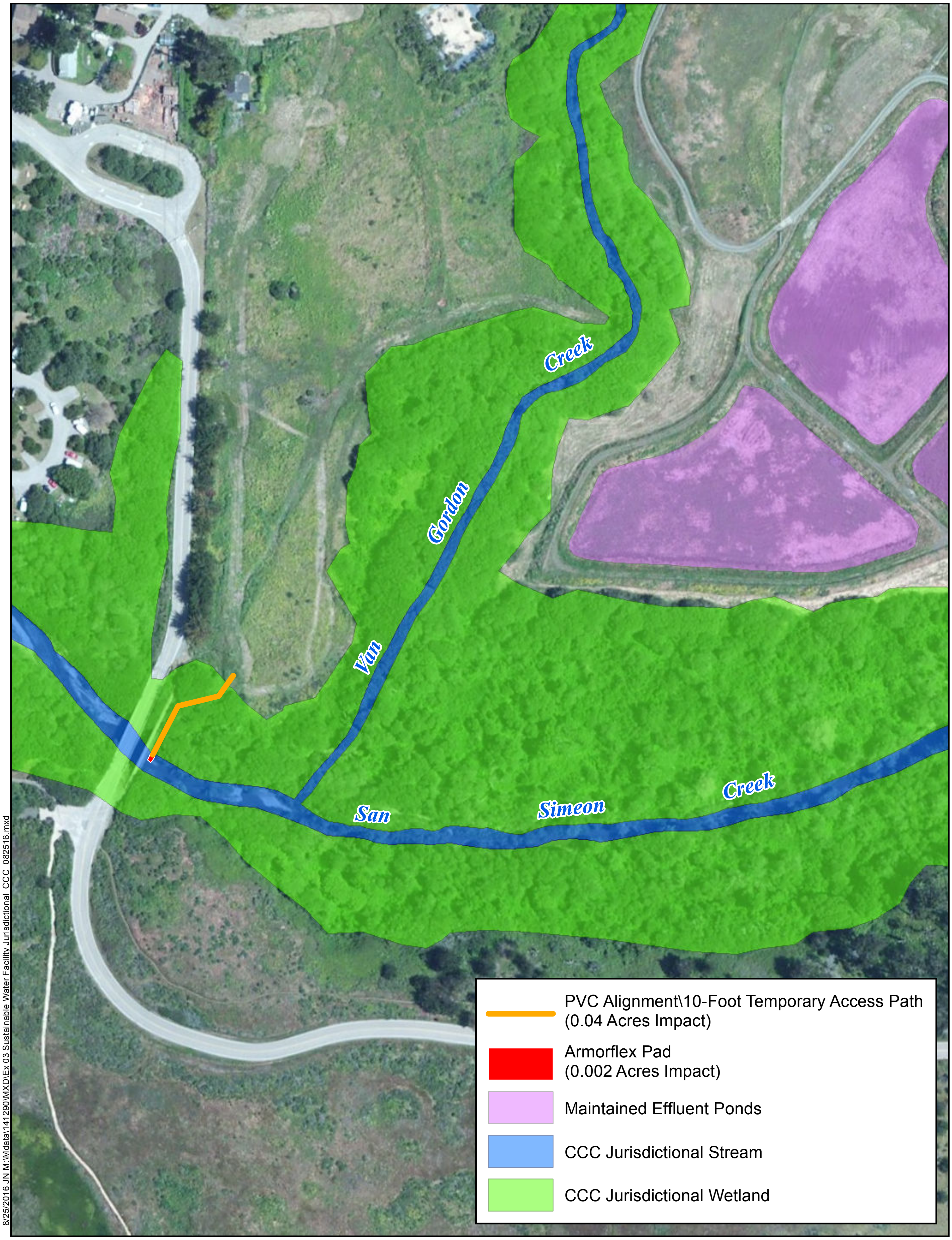
0 100 200 Feet

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA SUSTAINABLE WATER FACILITY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS ADDENDUM

CDFW Jurisdictional Map

Exhibit 2



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Michael Baker INTERNATIONAL

0 100 200 Feet

Source: CDM Smith, ESRI World Imagery Basemap 2010

CAMBRIA SUSTAINABLE WATER FACILITY PROJECT
DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS ADDENDUM

CCC Jurisdictional Map

Exhibit 3