CUYAMA VALLEY GROUNDWATER BASIN – GROUNDWATER INVESTIGATION REPORT FOR THE SANTA BARBARA CANYON FAULT AND RUSSELL FAULT

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Cuyama Valley Groundwater Basin Groundwater Investigation Report for the Santa Barbara Canyon Fault and Russell Fault

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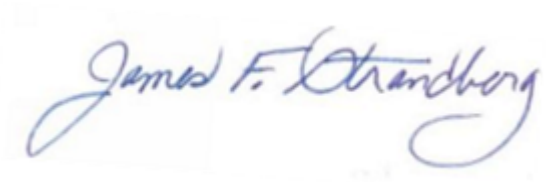

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Date

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1. INTRODUCTION

The Cuyama Basin Groundwater Sustainability Agency (CBGSA) authorized Woodard & Curran to perform a groundwater fault investigation under Task 9 of Task Order Number 11 dated May 3, 2023. The investigation focused on the Santa Barbara Canyon (SBC) Fault and the Russell Fault in the Cuyama Valley Groundwater Basin (Basin) in Santa Barbara County, California (**Figure 1-1**). This Groundwater Investigation Report for the Santa Barbara Canyon Fault and Russell Fault (Groundwater Fault Investigation Report) was prepared for the CBGSA by Woodard & Curran. The Groundwater Fault Investigation Report provides supplemental information for the hydrogeologic conceptual model presented in the 2025 Groundwater Sustainability Plan prepared by Woodard & Curran on behalf of the CBGSA (Woodard & Curran, 2025).

The objective of the investigation was to evaluate the potential impacts of the faults on localized groundwater flow conditions. The investigation approach included evaluating available existing data, measuring water levels in wells near the faults, collecting groundwater samples for laboratory analysis, and conducting a surface geophysical investigation. The original approach for the geophysical investigation included conducting four to six transects perpendicular to and across each fault, constructing new monitoring wells on both sides of the faults, and conducting pumping tests while monitoring water levels in existing and new wells. Based on feedback from the CBGSA, the number of transects across each fault was reduced to two and construction and testing of new monitoring wells was eliminated. The streamlined investigation was thought to provide a qualitative evaluation of the potential impact of the faults on localized groundwater flow.

2. EVALUATION OF AVAILABLE DATA

2.1 Fault Locations and Characteristics

As depicted in Figure 1-1, the northeast-southwest trending SBC Fault is located in the southeastern portion of the Basin. The northwest-southeast trending Russell Fault is located in the northwestern portion of the Basin. These faults were mapped by the United States Geological Survey (USGS) in 1970 (Singer and Swarzenski, 1970) in whole or part as "concealed" due to burial by alluvium and no surface expression. The depth of alluvium above the buried faults was unknown.

The location of the SBC Fault was suggested by the USGS to be the cause of a steep horizontal hydraulic gradient in the southeastern part of the Basin. Based on water level changes of at least 100 feet over a distance of roughly 1.9 miles, USGS maps indicate the northeast-southwest trending SBC Fault that originates in the Sierra Madre Mountains bends to the east-southeast as it approaches the Cuyama River and continues east of Highway 33 south of Ballinger Canyon Road. The reportedly normal fault (i.e., vertical offset) could be a zone of subparallel faults rather than a single fault (i.e., fault zone). The full length off the fault is mapped as concealed.

The USGS (2013) indicates that changes in groundwater levels across the SBC Fault are perhaps the result of distinct fault zone properties rather than the juxtaposition of units of differing water transmitting ability. In subsequent work, the USGS (2015) considered the SBC Fault to be a barrier to groundwater flow.

In contrast to the SBC Fault, the location of the Russell Fault is known based on mapping by USGS geologists and seismic geophysical investigations and other studies conducted during development of the Russell Ranch oil field. Yeats et. al (1989) reported the Russell Fault is thought to be an older fault with little to no offset of the alluvium or the underlying Morales Formation. The USGS (2013) reported that the Russell Fault is northwest-southeast trending, with both right lateral strike-slip and normal senses of motion when it was active from 4 to 23 million years ago. Near the Cuyama River, the fault is mapped as concealed beneath an unknown thickness of alluvium.

2.2 Groundwater Levels

2.2.1 Santa Barbara Canyon Fault

Woodard & Curran obtained the location of water wells near the faults from the GSA's OPTI Data Management System (OPTI). Wells and private landowner wells near the SBC Fault are shown in **Figure 2-1**. Well construction information and groundwater levels are available for only a few of these wells. Groundwater levels are available for nested monitoring wells 903, 904, and 905 located south of the SBC Fault near the Cuyama River on private property west of Highway 33. These wells were constructed in July 2021 by the California Department of Water Resources (DWR) under its Technical Support Services (TSS) program. DWR measured groundwater levels in these wells in July 2021. The GSA has monitored groundwater levels quarterly from July 2022 through April 2025. Deep nested wells 915-916 (formerly known as MW-H) and deep well 921 (formerly known as MW-D) were constructed north of the SBC Fault adjacent to Highway 33 by Woodard & Curran in 2024 to address data gaps in groundwater levels in these areas. The wells were added to the quarterly groundwater level monitoring program following construction and development in mid- to late 2024.

Woodard & Curran corresponded with private landowners and conducted a field reconnaissance in May 2024. The following information was obtained for wells located south and north of the SBC Fault (**Figure 2-1**):

- South: well 287 was covered inaccessible.
- South: domestic well 40 was dry at 111 feet below ground surface (bgs).
- South: well 279 was covered and inaccessible.
- South: well 278 had a water level of 107 feet bgs.
- South: well 277 was not observed.
- South: domestic well 276 is reportedly a shallow well that is dry during the irrigation season.
- South: domestic well 92 had a water level of 51 feet bgs (total well depth [TD] is 80 feet bgs).
- North: inactive production well 1032 had a water level of 610 feet bgs in February 2022.
- North: production well 639 was constructed to 700 feet bgs and is dry.
- North: production well 1029 is 1,240 feet deep and had a water level of 683 feet bgs in February 2022.

Groundwater level measurements for these wells are summarized in **Table 2-1**. Hydrographs of groundwater elevations and static water levels for wells 903-905, 915-916, and 921 for July 2022 to April 2025 are shown in **Figure 2-2**, **Figure 2-3**, **and Figure 2-4**, respectively. The vertical survey datum is North American Vertical Datum of 1988. These monitoring wells are constructed with the following 20- to 40-foot-long screen intervals:

- Wells 903-905: 265-305 feet, 360-400 feet, and 540-570 feet, respectively.
- Wells 915-916: 660-680 feet and 880-900 feet, respectively.
- Well 921: 820-840 feet.

During the approximate 3-year period of record, static water levels in wells 903-905 ranged from approximately 110 feet to 120 feet bgs corresponding to groundwater elevations of approximately 2,590 feet to 2,600 feet. The available information from water wells in the vicinity of the SBC Fault indicates that aquifers exist primarily in alluvium south of the fault in the Ventucopa area, and primarily in the Upper Morales north of the fault. The vertical hydraulic gradient is consistently upward but variable, possibly due to seasonal changes in irrigation pumping.

In wells 915-916, static water levels are approximately 600 feet bgs in well 915 and 500 feet bgs in well 916 with corresponding groundwater elevations of approximately 2,080 feet and 2,180 feet, respectively. The consistently upward vertical hydraulic gradient over the short period of record is significantly higher than at wells 903-905. At well 921, static water levels were approximately 780 feet bgs corresponding to groundwater elevations of approximately 1,797 feet. Depth to water at private wells located north of the fault reportedly range from approximately 610 feet to greater than 700 feet bgs, as noted above. The groundwater level data indicate that groundwater elevations south of the SBC Fault are significantly higher than elevations north of the fault. For wells 905 and 915 with comparable depths of 580 feet and 690 feet bgs, the groundwater elevation decrease is nearly 400 feet over a distance of approximately 0.9 miles. An

increase in irrigation pumping north of the fault in the past 50 years has apparently caused the hydraulic gradient to steepen significantly since 1970.

2.2.2 Russell Fault

OPTI wells and private landowner wells near the Russell Fault are shown in **Figure 2-5**. Well construction information and groundwater levels are available for only a few of these wells. Well construction details and groundwater levels are available for monitoring wells 900, 901, and 902 located approximately 2,100 feet east of the fault on the Russell Ranch. These wells were constructed in July 2021 by DWR under its TSS program approximately 2,100 feet east of the fault. Well 900 is a single completion well immediately adjacent to nested wells 901 and 902. DWR measured groundwater levels in these wells in July 2021. The GSA has monitored groundwater levels quarterly from July 2022 through April 2025.

Information in the DMS, correspondence with private landowners, and a field reconnaissance in May 2024 produced the following information for private wells located near the SBC Fault:

- East: Well 581 is located adjacent to and north of Highway 166. No information is available for this well in the DMS.
- East: Well 582. No construction information is available for this well in the DMS but there are two water level measurements from 1966.
- West: NF-20 is a 130-foot well located approximately one-half mile west of the fault at a distinctly higher elevation than wells 900-902. In May 2024, a water level of 53 feet bgs was measured.
- West: Representatives of the North Fork Ranch provided water levels measurements recorded in 2015 for 11 irrigation wells located one to three miles west of the Russell Fault. Depths of these wells reportedly range from 380 to 900 feet bgs.

Groundwater level measurements for these wells are summarized in **Table 2-1**. Quarterly water level measurements at wells 900-902 are the most relevant indication of groundwater conditions near the Russell Fault. Hydrographs of groundwater elevations and static water levels for these wells for July 2022 to April 2025 are shown in **Figure 2-6**. Well 900 is a 60-foot well with a 10-foot-screen from 50 to 60 feet bgs. Wells 901 and 902 are constructed with 40-foot screens from 165 to 205 feet bgs and 325 to 365 feet bgs, respectively.

During the approximate 3-year period of record, static water levels in wells 900-902 ranged from approximately 40 feet to 44 feet bgs corresponding to groundwater elevations of approximately 1,761 feet to 1,765 feet. This information indicates presence of groundwater in saturated alluvium east of the fault. The vertical hydraulic gradient is consistently upward but variable, possibly due to seasonal changes.

2.3 Lithologic and Borehole Geophysical Logs from Water and Oil & Gas Wells

In addition to water level measurements from 2015, representatives of the North Fork Ranch provided a geologic cross-section with well screen intervals and electrical resistivity logs for 11 irrigation wells located one to three miles west of the fault. They also provided the locations of 12 deep oil wells constructed east of the fault on the Russell Ranch for lithologic and geophysical logs (CalGEM Well Finder), and its interpretation of top of shale based on the data. These wells were drilled in the 1950s and 1960s to depths greater than 4,000 feet bgs. Lithologic logging typically started at 100 or more feet bgs.

2.4 Airborne Electromagnetic Data

In 2021, DWR conducted a geophysical survey of the Basin by collecting airborne electromagnetic (AEM) data along 23 survey lines (**Figure 2-7**). One line was flown generally parallel to the Cuyama River along the axis of the Basin; the remaining lines were flown perpendicular to the river valley with a northeast-southwest orientation. The survey lines ranged from roughly 1.5 miles to 3.5 miles apart near the SBC and Russell faults.

DWR analyzed the AEM data and generated 3-dimensional (3-D) representations of the subsurface electrical resistivity data. **Figure 2-8** shows several flight lines in the southeastern portion of the Basin in the vicinity of the SBC Fault as red lines on an aerial photograph. The 3-D representation of resistivity along these lines to the depth of investigation of roughly 1,000 feet bgs is shown. The color scale indicates low resistivity readings in blue and high readings in red. Woodard & Curran reviewed lithologic and borehole geophysical logs for wells near the AEM survey lines close to the faults to correlate the resistivity and associated lithology in the subsurface. However, the AEM data is too coarse and regional in scale to adequately correlate subsurface geologic conditions.

3. SURFACE GEOPHYSICAL SURVEY

3.1 Approach

Woodard & Curran retained Spectrum Geophysics (Spectrum) of Huntington Beach, California to assist in the design of and implmentation of a surface geophysical survey of the SBC and Russell Faults. Based on the objectives of the investigation, Spectrum recommended two-dimensional (2-D) direct current (DC) electrical resistivity (resistivity or ER) and induced polarization (IP) data collection. It was anticipated that two transects at a minimum would be sufficient to verify the trend of the faults/fault zones and correlate structural features across the faults in the resistivity and IP profiles. The optimal orientation of the parallel/sub-parallel transects would be perpendicular to and centered on the inferred location of each fault, to the extent practicable. The transects were designed to be approximately 3,000 to 3,600 feet in length to achieve the desired depth of investigation of 600 to 800 feet bgs. This depth of investigation was thought to be sufficient to detect the faults given the unknown burial depths. Based on the transect length, 100 to 112 electrodes were spaced 10 meters (approximately 33 feet) apart.

The resistivity and IP data collection methods were employed to provide 2-D (both lateral and vertical) profiles of the resistivity and chargeability variation in the subsurface geologic units along each transect. The resistivity of a material is a measure of the ease with which an electrical current can flow through that material. The IP chargeability of a material is a measure of its ability to polarize, or hold charge, after current has been applied. DC resistivity and IP were chosen for this survey as these methods are effective for the delineation of changes in the lithology of sediments and rocks in the subsurface. These methods are sensitive to changes in grain size, chemistry or mineralogy, saturation (particularly of permeable materials), and changes in the competency/density of sediments and rocks. DC resistivity and IP methods provide high quality, high resolution 2-D imaging of subsurface stratigraphy and structure in areas where there is a contrast in resistivity and/or IP across an interface or geologic contact, such as the contrasts between dry, coarse alluvium and saturated alluvium, or the contrast between coarse sand/gravel and clay.

The interpretation of these data may indicate the continuity or contrast of geologic units and presence of groundwater across the faults/fault zones. To prevent losses of data, the transects were located to avoid cultural features that could interfere with the ER and IP data (e.g., barbed wire fences, pipelines, steel-cased wells, and power lines). Variations in the topography were also avoided. A California licensed Professional Geophysicist with Spectrum led the finalization of the investigation approach, field data collection, data processing, and reporting.

3.2 Methods and Equipment

The resistivity and IP field equipment consisted of the Advanced Geosciences SuperSting R8/IP system, passive electrodes, and associated cables. This equipment is designed such that the data are collected in units of meters and then converted to feet during the data processing stage. The Schlumberger and dipole-dipole geometrical arrays were used to collect resistivity and IP data. Utility locators and a Fisher M-Scope shallow focus metal detector were used to confirm the absence of utilities and other shallow metallic features along the transects. A Garmin 66S Handheld GPS unit was used to map the endpoints and key features along each transect. Advanced Geosciences, Inc. (AGI) EarthImager® software package (AGI, 2015) was used to process the resistivity and IP data. Additional information on these methods and the equipment used for the surveys is available in the Report of Geophysical Investigation (Spectrum, 2024; **Appendix A**).

3.3 Permitting

The inferred location of the northeast-southwest trending SBC Fault bends to the east-southeast as it approaches the Cuyama River and extends east of Highway 33. Most of the inferred location of the fault is on private property. Attempts to locate the transects on private property, with much of it dedicated to agricultural use, were unsuccessful. As a result, Transect (Line) 1 was located on the eastern shoulder of the right-of-way (ROW) of Highway 33. On July 5, 2023, and on behalf of the CBGSA, Woodard & Curran submitted a Policy Variance Request and Standard Encroachment Permit Application DOT TR-0100 to the State of California Department of Transportation (Caltrans) District 5 to conduct the survey on Line 1. As part of preparing the permit application, Woodard & Curran retained Bess Testlabs, Inc. of Los Angeles, California to prepare the required Traffic Control Plan. On October 26, 2023, the Caltrans District Permit Engineer issued Encroachment Permit 0523 NSV 0472 to the CBGSA in care of its Authorized Agent, Woodard & Curran (Caltrans, 2023: **Appendix B**).

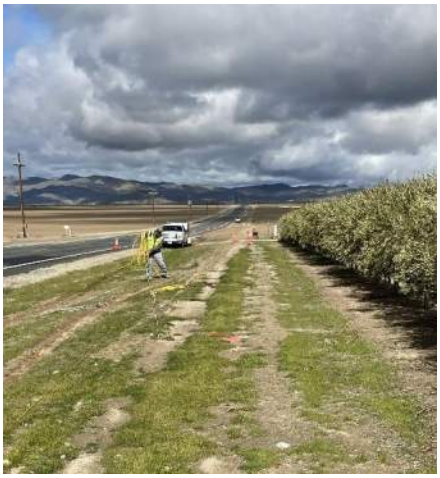
Line 2 for the SBC Fault was located on a parcel of land owned by the U.S. Bureau of Land Management (BLM). The isolated parcel, surrounded by private property, includes a portion of the Cuyama River floodplain and current riverbed. Based on information provided by Woodard & Curran, BLM prepared a Proposed Action (i.e., statement) to describe the survey. As part of its evaluation of the Proposed Action, the BLM Bakersfield Field Office required an approved qualified wildlife biologist to conduct a wildlife and botanical desktop review and reconnaissance-level field survey of the proposed location of Line 2. Woodard & Curran retained Rincon Consultants, Inc. (Rincon) of San Luis Obispo, California to provide a BLM-approved wildlife biologist for these services. Woodard & Curran and Spectrum accompanied a Rincon wildlife biologist to conduct a field survey on November 27, 2023. On behalf of the CBGSA, Woodard & Curran submitted a Biological Resources Assessment Technical Letter prepared by Rincon (2024) to the BLM on January 11, 2024. No observations of special status species were observed during the field survey.

On January 22, 2024, BLM issued Categorical Exclusion DOI-BLM-CA-C060-2023-0099-CX (BLM, 2024; **Appendix C**). The Categorical Exclusion included a statement that the Proposed Action is categorically excluded from further documentation under the National Environmental Policy Act (NEPA). It included an Extraordinary Circumstances Review, Decision Record, and notification that a summary of the Proposed Action was published on the BLM's national register for Land Use Planning and NEPA documents on September 20, 2023 to notify the public on the project and invite comments. No comments were received. The Categorical Exclusion included requirements for a qualified biological monitor to be onsite during the survey and to submit a detailed survey report to the BLM Bakersfield Field Office within 15 calendar days of survey completion.

3.4 Santa Barbara Canyon Fault Survey

The geophysical survey of the SBC Fault was conducted on February 12 to 16, 2024. The transects shown in **Figure 3-1** could not be oriented perpendicularly to the inferred location of the fault due to land access constraints. Line 1 was 1,110 meters (3,642 feet) in ground length and trended south-southeast to north-northwest in the public ROW along the east side of Highway 33. The location of Line 1 was intended to verify the eastern bend and extent of the SBC Fault inferred by the USGS. Line 1 also overlapped with the location of deep nested wells 915-916. The overlap allowed a direct correlation of resistivity data measured to a depth of 800 feet on Line 1 with resistivity data measured by geophysical logging of the 900-foot deep borehole. While Line 1 (see photograph below) was oriented somewhat oblique (not perpendicular) to the inferred trend of the SBC Fault, its orientation was considered acceptable to detect it. There is a generally

accepted window of about 40 degrees (plus or minus) perpendicular to a linear feature to detect it with a geophysical survey.



Line 2 (see photograph below) was 920 meters (3,018 feet) in ground length and trended south to north. The southern end began on the northern side of the unpaved Big Pine Road and was truncated in the Cuyama River bed before a steep embankment at the northern edge of the river. Line 2 was oriented perpendicular/sub-perpendicular and centered on the inferred location of the SBC Fault. The ground was adequately level with sparse to dense vegetation.

The Schlumberger and dipole-dipole geometrical arrays were used to collect resistivity and IP data on Line 1. Due to the challenging terrain and vegetation in the floodplain of the Cuyama River, only the Schlumberger array was used to collect resistivity and IP data on Line 2.

3.5 Russell Fault Survey

The geophysical survey of the Russell Fault was conducted on March 18 to 22, 2024. The transects shown in **Figure 3-2** could not be oriented perpendicular to the inferred location of the fault due to bedrock outcrops, the deeply incised and meandering Cuyama River bed, and oil field operations at the Russell Ranch. The presence of outcrops south of the river bed limited the location of transects to the north side of the river, and the steep river bank and heavy vegetation in the river bed prevented locating a transect in

the river bed. As a result, the subparallell transects were established a short distance apart between the Cuyama River and Whiterock Bluff oblique rather than perdendicular to the inferred location of the fault beneath alluvium adjacent to the river. The northeast-southwest oriented transects extend from the North Fork Ranch east of the fault to the Russell Ranch west of the fault. The private properties are separated by a barbed wire fence and cattle guard across a dirt road.

Line 1 was established adjacent to the southern edge of a generally flat unpaved road. It extended to about 330 feet northwest of an abandoned well known as "Cuyama-1" to the northwest into a vegetated area on the North Fork Ranch. Line 2 was established between 300 and 600 feet south/southwest of and subparallel to Line 1 just northeast of the Cuyama River bank through vegetated areas on both properties. It began about 350 feet southeast of Cuyama-1 and continued to the southeast of a well pad containing wells with API # 07900946 and # 07900942. Line 1 and Line 2 were 1,110 meters (3,642 feet) in ground length. Wells 900-902 are located roughly 1,500 feet east-southeast of, and about 8 feet lower in elevation, than the southeastern end of Line 1.

The Schlumberger and dipole-dipole geometrical arrays were used to collect resistivity on Line 1. Due to heavy vegetation, only the Schlumberger array was used to collect resistivity data on Line 2. IP data was not collected on Line 1 or Line 2.

Line 1 at Russell Ranch
(View to the Northwest)

3.6 Data Processing

As reported by Spectrum (2024), the Schlumberger and dipole-dipole data files for each transect were entered into the industry standard software program EarthImager® (AGI, 2015). The data files were reviewed separately and edited appropriately to remove noisy or erroneous data points (e.g., near a barbed wire fence). Afterwards, the Schlumberger and dipole-dipole data sets were merged together, and an appropriate model solution was generated. For each transect, the final products of the processing are two color-contoured model sections, one for resistivity and one for IP. The resolution of the resistivity/IP method decreases with increasing depth. Because two different arrays of resistivity data were collected along each transect and then merged during processing, the loss in resolution of the resistivity data was minimized. The data with the highest resolution and most accurate depths are in the upper two-thirds of the model sections, where the lateral resolution is approximately one-half of the electrode spacing. Therefore, one-half of the electrode spacing (10 meters) corresponds to five meters (about 16 feet) of lateral resolution.

The resistivity profiles developed by Spectrum contain the inverted resistivity distribution which best represents the actual lateral and vertical variation of earth resistivity beneath the ground surface along the transects. Colored contours on the profiles are associated with variations in resistivity values (low resistivity values in blue grade to high resistivity values in purple). Spectrum also correlated resistivity values with lithological interpretations and presence of groundwater based on any nearby wells. Further information on data processing and correlation of resistivity values with lithology are provided in **Appendix A**.

3.7 Interpretations of Resistivity Data for the Santa Barbara Canyon Fault

The resistivity profiles for Line 1 and Line 2 are shown in **Figure 3-3** and **Figure 3-4**, respectively. IP profiles for both transects are provided in **Appendix A**. For the SBC Fault, the resistivity color scale ranges from 4 Ohm-meters for the lowest resistivity to 1,500 Ohm-meters for the highest resistivity. The data were of high quality and reliabilty for both lines (Spectrum, 2024). The resistivity interpretations for lithology were made from review of the following:

- Well Completion Report and borehole geophysical logs for wells 903-905.
- Lithologic and borehole geophysical logs for wells 915-916.
- *Construction of 3-D Geologic Framework and Textural Models for Cuyama Valley Groundwater Basin, California (USGS, 2013).*
- Dibblee Foundation Geologic maps for the Ballinger Canyon, Cuyama, Cuyama Peak and Fox Mountain quadrangles (Dibblee and Minch, 2005a and 2005b; Dibblee and Minch, 2006; Dibblee and Minch, 2007).

According to Spectrum (2024), the geologic units present near the SBC Fault have similar resistivity values to those obtained in other areas in Santa Barbara, San Luis Obispo, and Ventura counties with primarily non-marine deposition in fluvial sedimentary environments. The lowest resistivity values measured range from 4 to 20 Ohm-meters and correspond to finer grained materials such as clays and silts in unconsolidated sediments, and shales and claystones (likely Lower Morales) in consolidated/lithified materials. As the grain size of the materials increases in unconsolidated sediments or alluvium the resistivity value increases. For this investigation, Spectrum (2024) assumed that fractured shale or claystone ranges from roughly 4 to 20 Ohm-meters, and as the rock changes from siltstone to sandstone the resistivity increases from roughly 25 to 75 Ohm-meters to 400 or 500 Ohm-meters (cemented, dense dry sandstone). The highest resistivity values (1,000 to 1,500 Ohm-meters) are interpreted to correspond to large amounts of cobbles or boulders in dry alluvium. Resistivity values ranging from 40 to 70 Ohm-meters are considered ideal for the presence of saturated zones of alluvium (Spectrum, 2024).

The resistivity profile for Line 1 is shown in **Figure 3-3**. Resistivity values associated with the various colors are indicated in the color bar. Spectrum's lithological interpretations of the resistivity values for Line 1 and Line 2 are presented in Table I of its report (**Appendix A**). The numbers across the top of the profile represent ground distance along Line 1 in units of feet as measured from Station 0 at the southern end of the line. The tie-in to wells 915-916 is also indicated in **Figure 3-3**. The numbers along the vertical axis of the profile represent elevations relative to Station 0, which was arbitrarily assigned an elevation of zero. The relative elevations also represent depth in feet bgs relative to Station 0. The profile for Line 1 extends to 823 feet bgs.

Key interpretations of the resistivity profile in **Figure 3-3** are:

- Lithology is relatively laterally continuous across the profile.
- Dry sand with cobbles and gravels is present from approximately 150 feet to 550 feet bgs.
- A sonic log for wells 915-916 indicated saturation (water table) at 610 feet bgs. Based on this information, the water table beneath Line 1 ranges from approximately 550 feet to 650 feet bgs.

- A buried stream channel/tributary may be present below the water table in the central portion of the profile.

Based on lateral continuity in resistivity layers across the profile to a depth of at least 700 feet bgs, this profile does not exhibit significant or sharp lateral contrast in resistivity, or significant (100 feet or greater) vertical offset in layers across a vertical or subvertical boundary which would be expected based on the sense (i.e., buried vertical/subvertical fault with normal offset) of the SBC Fault. This profile indicates the SBC Fault inferred by the USGS is not present beneath Line 1.

The resistivity profile of Line 2 is shown in **Figure 3-4**. The information shown is consistent with that described above for **Figure 3-3**. The shorter length of Line 2 resulted in the profile extending to about 600 feet bgs. Unlike **Figure 3-3**, a number of features are evident in the resistivity profile in **Figure 3-4**. Key interpretations are:

- Resistivity values and interpreted lithology are laterally discontinuous across the profile.
- Heavy black dashed lines delineate interpreted faults or fault splays.
- An abrupt lateral change in resistivity at about station 1830 at roughly 212 feet bgs and extending to at least 600 feet bgs indicates a steep, apparently north-dipping vertical to subvertical linear anomaly interpreted as the SBC Fault.
- Based on the interpreted geologic units shown on the profile, the SBC Fault appears to exhibit normal offset where a lower/older unit of Upper Morales is present immediately south of it and a higher/younger unit of the Upper Morales is present immediately north of it.
- Resistivity values indicate the presence of a younger unnamed thrust fault that appears to be thrusting Lower Morales over the Upper Morales based on a south dipping feature with variable dip between Stations 1680 and 1080. This feature may be related to a splay of the South Cuyama Fault or other unnamed fault.
- Spectrum (2024) refers to these faults as the SBC Fault System. Resistivity data indicate the Morales is offset by the SBC Fault, and the deeper alluvium is offset by the SBC Fault System.
- The younger unnamed thrust fault appears to create a subvertical/steeply south dipping offset in alluvium that may be affecting the presence and flow of groundwater.
- The dashed light blue line from station 0 to about station 1,600 delineates a gradually deepening water table from about 50 feet to 100 feet bgs.
- The depth of saturation apparently drops to about 300 feet bgs from station 1600 to 1800 within the SBC Fault System and may be confined in this zone.
- Water bearing zones were not observed north of station 1800 to a depth of about 600 feet bgs.

The indication of saturated alluvium at 50 feet to 100 feet bgs south of the SBC Fault generally correlates with static water levels measured in wells in this area. The absence of water bearing zones above 600 feet bgs north of the SBC Fault also generally correlates with static water levels measured in wells in that area. Depth to groundwater appears to be offset by the SBC Fault System.

Resistivity values measured along Line 2 indicate the SBC Fault is buried by more than 200 feet of alluvium. The location of the SBC Fault on Line 2 suggests the fault continues its inferred northeast-southwest trend

and together with resistivity values on Line 1, does not bend to the east-southeast under the Cuyama River as inferred by the USGS. However, without a second location for the SBC Fault and younger unnamed thrust fault, the trends are unknown. The SBC Fault System extends to depths greater than 600 feet bgs along Line 2.

3.8 Interpretations of Resistivity Data for the Russell Fault

The resistivity profiles for Line 1 and Line 2 are shown in **Figure 3-5** and **Figure 3-6**, respectively. IP profiles for both transects are provided in **Appendix A**. The data were of good quality and reliabilty for both lines (Spectrum, 2024).

Spectrum's interpretations of resistivity for lithology were made based on review of the following documents and maps:

- Well Completion Report and borehole geophysical logs for wells 900-902.
- Boring logs for oil wells in the investigation area (CalGEM Well Finder).
- *Changing Tectonic Regimes in the Southern Salinian Block: Extension, Strike-Slip Faulting, Compression and Rotation in the Cuyama Valley, California (Ellis, 1994).*
- *Construction of 3-D Geologic Framework and Textural Models for Cuyama Valley Groundwater Basin, California (USGS, 2013).*
- *Top of Shale, Russell Fault Vicinity* (interpretations provided by Cleath-Harris Geologists [CHG] to Woodard & Curran).
- *Cuyama Valley Groundwater Basin Boundary Modification Request* (CHG, 2018).
- Dibblee Foundation Geologic map for Caliente Mountain quadrangle (Dibblee and Minch, 2005c).

Based on this review, correlations with measured resistivity values, and Spectrum's general experience from similar projects in Santa Barbara, San Luis Obispo and Ventura Counties, a key of resistivity values and their associated lithologic interpretation for the Russell Fault area was generated. Spectrum's assumptions and lithological interpretations of the resistivity values for Line 1 and Line 2 are presented in Table II of its report (**Appendix A**). Once this was completed, a standard resistivity color scheme ranging from 0.5 Ohm-meters to 2,000 Ohm-meters was created and used for various ranges of resistivity in the profiles generated for both Line 1 and Line 2.

The resistivity profile of Line 1 shown in **Figure 3-5** extends to a maximum depth of 823 feet bgs. Key interpretations of the resistivity profile are:

- Resistivity data values were of good to high quality and provided reliable measurements to about 800 feet bgs. There were some areas of electromagnetic noise caused by utilities, abandoned oil wells or other surface cultural features (e.g., barbed wire fence). Line 1 crossed a barbed wire fence at the property boundary. During data processing, the data were carefully edited to remove erroneous measurements and reduce artifacts in the data caused by these features. As a result, the resistivity profile shown in **Figure 3-5** is a smoothed representation of the actual geologic and structural features present along Line 1.
- Heavy black dashed lines delineate interpreted faults or fault splays.

- An abrupt lateral change in resistivity between stations 1840 and 1850 at approximately 380 feet bgs and extending to a depth greater than 823 feet indicates a near-vertical linear anomaly interpreted to be the Russell Fault. The Russell Fault appears to extend to depths as shallow as 50 feet bgs and may have subvertical splays on either side.
- The resistivity values and associated geologic units appear to represent normal offset across a vertical fault with the Monterrey Formation to the west juxtaposed with the Lower Morales immediately east of it. The base of the Morales appears to be offset at least 500 feet vertically across the fault (west side up).
- Between stations 2520 and 3150, another, apparently younger, east-dipping thrust fault east of the Russell Fault, interpreted to be the Turkey Trap Ridge Fault. The younger fault is overprinting and interacting with the Russell Fault. Spectrum refers to these faults as the Russell Fault Zone (2024).
- The Russell Fault offsets the Morales and appears to offset deeper alluvium. The Turkey Trap Ridge Fault appears to be thrusting Monterrey Shale over the Lower Morales and offsets deep alluvium.
- The Russell Fault Zone appears to be buried by 100 feet or more. Groundwater appears to be approximately 50 feet bgs across the profile. The presence of brackish groundwater at wells 900-902 located roughly 1,500 feet east-southeast of Line 1 is not thought to affect the data.

The resistivity profile for Line 2 shown in **Figure 3-6** also extends to a depth of 823 feet bgs. Key interpretations of this profile are:

- The resistivity data collected along Line 2 were of moderate to good quality and provided reliable measurements to about 800 feet bgs. However, there were areas of significant noise in the data caused by utilities, existing and abandoned steel-cased oil wells, and barbed-wire fence in the vicinity of Line 2. The data were carefully edited to remove erroneous measurements and reduce artifacts in the data caused by these features. Similar to Line 1, the resistivity profile is a smoothed representation of the actual geologic and structural features present along Line 2.
- The presence of the Russell Fault is evident in the data at about Station 2160, based on a sharp lateral contrast in resistivity across a near-vertical feature that begins at a depth of about 570 feet bgs and appears to extend to depth beneath this area of Line 2. The fault appears to represent normal offset where the Monterey Formation appears to be present immediately to the west and the Lower Morales present immediately to the east.
- The east-dipping younger thrust fault between Stations 1900 and 2400, interpreted to be the Turkey Trap Ridge Fault, is thrusting the Lower Morales over the Russell Fault and Monterrey Shale. The Turkey Trap Ridge Fault also offsets the alluvium and the Morales. Another thrust fault with variable dip and nearly vertical beneath Station 2400 may extend to within about 100 feet of ground surface.
- The shallow resistivity data indicate a relatively continuous first layer of variable resistivity that varies in thickness from 120 to 300 feet bgs. This layer appears to be alluvium with lithology varying from silts to gravels to cobbles to boulders and higher in resistivity than the alluvium on Line 1. Line 2 is closer to the Cuyama River, a possible explanation for the coarser materials.
- Depth to the water table is interpreted to be about 40 feet bgs east and west of the Russell Fault Zone.
- Beneath the alluvium west of the Russell Fault, the undulating lower contact of the Lower Morales may be an indication of folding.

3.9 Limitations

As reported by Spectrum (2024), there are inherent limitations in the interpretation of resistivity and IP data. For this study, interpretations were made primarily on resistivity data because the IP data did not respond as sharply to the geologic features and lithologic contacts evident in the resistivity data. Spectrum reviewed available lithologic, borehole geophysical, and water level data from wells that either tied directly to the resistivity transects or were within a few hundred feet of them, if possible. For the SBC Fault, wells 915-916 provided a direct tie-in for Line 1. This well location was the only point available for verification of lithology, resistivity, and water level data on the transects for this fault and for the Russell Fault. Most available lithologic logs did not specify the presence or depth of contacts between lithologic units of interest (i.e., alluvium, Upper Morales, Lower Morales, and Monterey Shale).

The lateral resolution, and accuracy, for resistivity/IP surveys is determined by data quality and electrode spacing. The 10-meter (33-foot) electrode spacing used for data collection provided a 5-meter (about 16-foot) lateral and vertical resolution of features in the upper third of the resistivity/IP profiles. The vertical resolution of features decreased with further depth, ranging from about six meters (20 feet) at 200 feet bgs to about 15 to 20 meters at 600 to 800 feet bgs.

4. GROUNDWATER SAMPLING AND GEOCHEMICAL ANALYSIS

4.1 Groundwater Sampling and Analysis

Woodard & Curran obtained water quality data for wells 900-902 and 903-905 from DWR. The data consisted of field water quality parameters measured during well development and subsequently prior to sample collection in July 2021. DWR also portions of analytical laboratory reports for samples collected in July 2021. Analytical results were provided by the landowner for well 1029 near the SBC Fault which was sampled on April 25, 2024. The owner of NF-20 located west of the Russell Fault provided analytical results for a sample collected on August 19, 2020.

Woodard & Curran retained Blaine Tech Services (Blaine Tech) of Carson, California to purge and sample certain OPTI wells and two private wells near the SBC Fault and Russell Fault in May and September 2024. Blaine Tech purged and sampled the wells using low-flow techniques generally consistent with the *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (USEPA, 2017). Depth to water was measured using an electronic water level interface probe. A bladder pump was connected with HDPE tubing to an in-line flow cell that contained a multi-parameter instrument designed to continuously measure field water quality parameters during purging. The field parameters consisted of temperature, pH, specific conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity. The HDPE tubing was positioned at the mid-point of the screen interval. Groundwater samples were filtered in the field and collected directly into sample containers provided by the analytical laboratory. Sample containers were labeled, stored on ice, and recorded on a chain-of-custody form. Samples were transported to the analytical laboratory under chain-of-custody procedures.

Woodard & Curran retained Pace of Bakersfield, California, a California Environmental Laboratory Accreditation Program (ELAP) accredited laboratory to analyze the samples for general minerals including major cations and anions, and total dissolved solids. Laboratory reports are provided in **Appendix D**.

4.2 Santa Barbara Canyon Fault

Field water quality parameters for wells 903-905, 915-916, and 921 are provided in **Table 4-1**. Parameter values provided in the table are the final measurements recorded by DWR during development of wells 903-905 in June 2021 and prior to sampling in July 2021. The field parameters were consistent following development and prior to sampling.

On May 13, 2024, Blaine Tech purged wells 903-905. The field water quality parameters were consistent with those recorded by DWR in June and July 2021. Therefore, a groundwater sample was collected from the mid-depth well 904 rather than from all three wells to reduce analytical costs.

During the development of wells 915 and 916, well 915 recharged slowly relative to well 916. As result, water extracted from well 915 during purging and sampling on May 15, 2024 had a significantly higher turbidity than well 916. Well 915 had a turbidity greater than 1,000 Nephelometric Turbidity Unit (NTU) whereas the turbidity for well 916 was 3 NTU. Similarly, slow recovery during the development of well 921 resulted in a turbidity of 707 NTU when the well was sampled on September 5, 2024.

Analytical laboratory results for wells 903-905, 915-916, 921, and 1029 are provided in **Table 4-2**. Samples collected from wells 904, 915, and 916 were filtered in the field prior to preservation in the laboratory-supplied containers. The sample from well 921 was filtered in the laboratory prior to preservation. Therefore, the analytical data for these wells reflect dissolved concentrations. It is unclear whether the analytical data provided by DWR and the owner of well 1029 are dissolved or total concentrations. The analytical results for the seven wells located south and north of the SBC Fault are generally similar except for well 915. Groundwater from well 915 had notably higher concentrations of bicarbonate, aluminum, sodium, and TDS than in the other six wells.

Two methods were used to graphically display groundwater quality data, Stiff diagrams and Trilinear (or Piper) diagrams. Stiff diagrams provide distinctive polygon shapes that are useful for making rapid visual comparisons between water from different sources. Major cations (sodium plus potassium, calcium, and magnesium) are plotted to the left of a zero line. Major anions (chloride, carbonate plus bicarbonate, sulfate, and nitrate) are plotted to the right of the zero line. Water consisting of similar percentages of cations and anions will have similar shapes. This method allows a well-by-well comparison of general mineral content. Trilinear diagrams permit the general mineral compositions of numerous samples to be displayed on a single graph allowing groupings or trends in water quality at different wells to be compared. The lower left graph displays relative amounts of cations. The lower right graph displays relative amounts of anions. The graph in the center shows both.

Figure 4-1 displays stiff diagrams for wells 903-905 located south of the SBC Fault and well 1029 located north of the fault. The similar shapes of the stiff diagrams indicate that groundwater quality at wells 903-905 with depths of 265 feet to 570 feet bgs is very similar to groundwater quality at well 1029 with a depth of 1,240 feet bgs located approximately 1.6 miles to the northwest.

Stiff diagrams for four wells, 915-916, 921, and 1029 located north of the SBC Fault are shown in **Figure 4-2**. Except for well 915, the shapes are similar and indicate that the water quality at these locations north of the fault is similar to the water quality south of the fault at wells 903-905. The influence of high turbidity in well 915 (> 1,000 NTU) at the time of sampling may have an influence on the water quality results. However, the stiff diagram shows significantly higher sodium, potassium, and bicarbonate compared to the other wells. The Trilinear diagram in **Figure 4-3** for these seven wells shows a fairly tight grouping except for well 915. For six of the wells, the water type is calcium-magnesium-sulfate. At well 915, the water type is sodium-potassium-sulfate-bicarbonate.

4.3 Russell Fault

Field water quality parameters for wells 900-902 and NF-20 are provided in **Table 4-3**. Parameter values shown are the final measurements recorded by DWR during well development and prior to sampling wells 900-902 in July 2021. The field parameters were relatively consistent for these wells following development and prior to sampling.

On May 14, 2024, Blaine Tech purged wells 900-902. The field water quality parameters were relatively consistent with those recorded by DWR in July 2021. Therefore, samples were collected from two of the three wells, 901 and 902, to reduce analytical costs. Well NF-20 was also purged and sampled on May 14, 2024. Samples from these wells were filtered in the field prior to preservation in the laboratory-supplied containers. Therefore, the analytical results are dissolved concentrations. It is unclear whether the analytical

data provided by DWR are dissolved or total concentrations. Field parameter measurements recorded by the CBGSA for wells 900-902 in August 2024 are also provided in **Table 4-3**.

The field water quality parameters for wells 900-902 indicate an increasing trend of water temperature and specific conductivity with depth. The average temperature of 24 degrees Celcsius (C) for deep well 902 is 1.6 degrees higher than the average of 22.4 C for shallow well 900. The average specific conductivity for the shallow, mid-depth, and deep wells increases from 9,426 microsiemens per centimeter (µS/cm) for well 900 to 10,812 µS/cm for well 901 to 13,578 µS/cm for well 902. The temperature of groundwater in well NF-20 on May 14, 2024 was comparable to wells 900-902 on the same day. However, groundwater at well NF-20 is significantly fresher with a specific conductivity of 1,322 µS/cm. The elevated specific conductivity in wells 900-902 may potentially be related to the decades of oil and gas production in the immediate vicinity of these wells.

Analytical laboratory results for wells 900-902 and NF-20 are provided in **Table 4-4**. The results are relatively similar for wells 900-902 except for higher concentrations of chloride and TDS in deep well 902. The water quality for well NF-20 is very different and significantly better than in wells 900-902. One exception is the nitrate concentration of 12.60 milligrams per liter (mg/L) in August 2020. However, nitrate was below the reporting limit of 0.048 mg/L in May 2024. The largest difference in concentrations of cations and anions between shallow well 900 and well NF-20 is the concentration of chloride which is approximately 20 times lower in NF-20. Other constituents that are approximately 10 times lower in well NF-20 compared to well 900 are sulfate, magnesium, sodium, and TDS.

The graphical methods described above were used to display the cation and anion compositions of samples collected from wells 901, 902, and NF-20 in May 2024 and well 900 in 2021. The Stiff diagrams in **Figure 4-4** indicate a similar groundwater composition for wells 900 and 901 and a notably different composition for well 902 which is enriched in sodium, potassium, and chloride. As expected, the significantly lower concentrations of general minerals in groundwater from well NF-20 result in a distinctly different pattern. The Trilinear diagram in **Figure 4-5** shows no dominant cations in groundwater from wells 900, 901, and NF-20 whereas groundwater from well 902 is sodium-potassium dominant. Groundwater from wells 901 and 902 are chloride dominant, particularly for well 902. Groundwater from well 900 is sulfate dominant. Groundwater from well NF-20 also has no dominant anion. Groundwater from wells 900-902 have a sodium-potassium-chloride-sulfate water type.

4.4 Stable and Radioactive Isotopes

Woodard & Curran retained ISOTECH of Champaign, Illinois for analysis of stable and radioactive isotopes of hydrogen, oxygen, and carbon. The stable isotopes of hydrogen (deuterium) and oxygen (oxygen 18) mainly serve as indicators of groundwater source areas and, therefore potentially different recharge areas. These isotopes reflect the average composition of precipitation in a region. The radioactive isotopes of hydrogen (tritium) and carbon (carbon 14) are used as a guide to the age of groundwater. In normal circumstances, groundwater with detectable tritium indicates the groundwater has received recent recharge (i.e., since the 1950s). Laboratory reports are provided in **Appendix D**.

Analytical results for stable and radioactive isotopes for wells 904, 915-916, and 1029 are summarized in **Table 4-5**. Values of the stable isotopes deuterium and oxygen 18 for well 904, located south of the SBC Fault, are similar to values of these stable isotopes in wells north of the fault. The percentages of deuterium and oxygen 18 in well 904 are within the ranges for wells located north of the fault. The tritium content of

water (TU) in well 904 (<1.16) is marginally lower than the range in other wells (1.13 to 1.26 TU). The primary difference in the isotope data is for the radioactive isotope carbon 14 which is measured in percent of modern carbon (pMC). The reported value for groundwater from well 915 is 29.47 pMC. This low percent of modern carbon in groundwater from the screen interval of 660 to 680 feet bgs is significantly lower than 83.66 pMC for groundwater from well 916 which is screened from 880 to 900 feet bgs. The value of 1.13 TU for well 915 indicates recent recharge and appears to be inconsistent with the low percent of modern carbon reported. Values of carbon 14 in wells 904 and 1029 of 68.88 pMC and 78.59 pMC, respectively, are more similar to well 916 (83.66 pMC).

Analytical results for stable and radioactive isotopes for wells 901, 902, and NF-20 are summarized in **Table 4-5**. Percentages of the stable isotopes deuterium and oxygen 18 in wells 901 and 902 located east of the fault were similar and not significantly different in groundwater from well NF-20. The tritium content of water in wells 901 and 902 was also apparently similar at <1.18 and <1.17 TU, respectively. In contrast, tritium was detected in groundwater from well NF-20 at 0.80 TU. The percentages of carbon 13 in groundwater from wells 901 and 902 (-16.4 and -18.8) were also similar and marginally different than for well NF-20 (-11.6). The primary difference in the isotope data for these wells is also for the radioactive isotope carbon 14. The reported value of 62.32 pMC in groundwater from well 901 is notably higher than 43.61 pMC reported for well 902.

5. RECOMMENDATIONS

Woodard & Curran recommends additional investigation of the SBC Fault by conducting a surface geophysical survey using electrical resistivity and IP. The purpose of the survey would be to identify a second location of the SBC Fault to confirm its trend. It is possible that the SBC Fault continues the northeasterly trend from the Sierra Madre Mountains under the Cuyama River and potentially crosses Highway 33 near the Ballinger Canyon Wash south of Ballinger Canyon Road. In addition, the significant change in groundwater elevations between wells 903-905 and 915-916 indicates a high probability of a fault between these locations.

Figure 5-1 shows the preliminary locations of two roughly 3,500-foot-long transects adjacent to Highway 33, one north of Line 1 and the other to the south. Transects of this length will provide an investigation depth of approximately 800 feet. As shown in the profiles of the other transects, the full depth of investigation cannot be achieved close to the ends of the transects. Therefore, the new transects would overlap each end of Line 1 by roughly 500 to 700 feet. Access across the bridge over the Ballinger Canyon Wash will be required for the northern transect. Alternate transect locations on private property, particularly west of Highway 33, should be explored to avoid costs associated with securing an encroachment permit from Caltrans and conducting the required traffic control during the work.

As part of this recommendation, groundwater levels will be measured in accessible wells in the area. Additional groundwater sampling is not recommended.

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TABLES

Table 2-1: Groundwater Levels Near the Santa Barbara Canyon and Russell Faults

Cuyama Basin Groundwater Fault Investigation Report

Date	Santa Barbara Canyon Fault							Russell Fault			
	903	904	905	915	916	921	1032	900	901	902	NF-20
7/7/2021									44.64		
7/15/2021								43.63	42.49	44.82	
7/22/2021	122.34	121.47	120.61								
2/26/2022							610				
7/15/2022	121.86	121.66	119.9					44.12	42.91	42.16	
10/12/2022	122.2	122	120.2								
10/13/2022								46.2	43.9	43.1	
1/23/2023	119.13	118.55	116.36								
4/24/2023	112.2	111.9	110.5								
7/24/2023	115	114.4	112.3								
7/25/2023								42.6	40.9	39	
10/25/2023								42.7	41.3	40.1	
1/17/2024	117.1	116.5	114.3								
1/18/2024								42.6	41.1	40.2	
4/24/2024								40.9	38.7	39.1	
4/25/2024	114.2	113.5	111.7								
5/13/2024	113.85	113.1	110.85								
5/14/2024								40.29	38.9	37.9	55.26
5/15/2024				574.67	507.82						
8/1/2024	113.6	112.8	110.7								
8/2/2024								41.4	40.0	38.8	
9/3/2024						769					
10/16/2024								42.2	40.7	39.6	
10/17/2024	113.88	113.06	110.8	602.3	498.7	782.3					
10/24/2024	116.9	116.2	114.3								
1/16/2025									40.2	39.9	
1/15/2024						778.7					
1/20/2025	111.9	111.1	108.6	602.2	499						
4/9/2025	109.0	108.0	105.4	598.8	494.9	778.1					
4/10/2025								41.2	39.8	38.9	

Note: Depth to water below top of casing

Table 4-1: Groundwater Quality Field Paramaters Near the Santa Barbara Canyon Fault

Cuyama Basin Groundwater Fault Investigation Report

Field Groundwater Quality Parameters									
Well ID	**Date**	**Intake Depth (Feet BGS)**	**Depth to Water (Feet BGS)**	**Temperature (C)**	**pH**	**Specific Conductivity (µS/cm)**	**Oxidation-Reduction Potential (mV)**	**Dissolved Oxygen (mg/L)**	**Turbidity (NTU)**
903	8/21/2024	NA	NA	20.15	6.24	1,740	NA	NA	NA
	5/13/2024	285	113.85	19.30	7.41	1,728	95.3	4.26	24
	7/22/2021	180	122.34	17.96	7.38	1,930	195	3.80	18.5
	6/9/2021	143	124.19	18.26	7.75	2,050	131	4.08	42.9
904	8/21/2024	NA	NA	19.19	7.08	1,780	NA	NA	NA
	5/13/2024	380	113.10	20.00	7.68	1,771	59.1	4.49	3
	7/21/2021	180	121.47	18.30	7.39	2,030	165	2.04	2.2
	6/15/2021	180	123.76	18.66	8.13	2,110	115	4.22	84.7
905	8/21/2024	NA	NA	20.26	8.75	1,820	NA	NA	NA
	5/13/2024	555	110.85	18.90	7.37	1,746	67.6	5.12	2
	7/22/2021	180	120.61	18.28	7.22	1,840	207	4.96	0
	7/16/2021	NA	122.26	20.45	8.13	2,100	96	4.34	0
915	5/15/2024	670	574.67	22.40	8.27	2,313	71.9	0.38	>1,000
916	5/15/2024	890	507.82	20.10	7.56	1,842	48.1	4.59	3
921	9/5/2024	NA	768	24.01	7.77	2,100	NA	NA	707
1029	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA: Not Available
Feet BGS: Feet Below Ground Surface
C : Degrees Celsius
L: Liter
µS/cm : microSiemens per Centimeter
mg/L : Milligrams per Liter
mV : Millivolt
NTU: Nephelometric Turbidity Unit
µg/L: Micrograms per Liter

Table 4-2: Groundwater Quality Near the Santa Barbara Canyon Fault

Cuyama Basin Groundwater Fault Investigation Report

Laboratory Analysis														
Well ID	**Sample Date**	**Bicarbonate (mg/L)**	**Bromide (mg/L)**	**Chloride (mg/L)**	**Nitrate (mg/L)**	**Phosphate (mg/L)**	**Sulfate (mg/L)**	**Aluminum (µg/L)**	**Arsenic (µg/L)**	**Calcium (mg/L)**	**Magnesium (mg/L)**	**Potassium (mg/L)**	**Sodium (mg/L)**	**Total Dissolved Solids (TDS) (mg/L)**
903	7/22/2021	150	NA	18	1.2	NA	910	140	1.2	210	87	6.1	99	1,600
904	7/22/2021	150	NA	33	0.81	NA	990	98	1.6	200	80	7.5	150	1,700
	5/13/2024	150	< 0.14	17	1.6	< 0.018	920	37* J	< 9.2*	230*	91*	4.1*	90*	1,500
905	7/22/2021	160	NA	42	1.2	NA	1,200	17	0.9	200	78	5.0	120	1,600
915	5/15/2024	910	< 0.14	17	1.4	11	940	480*	< 9.2*	37*	12*	8.8*	490*	13,000
916	5/15/2024	180	< 0.14	10	3.0	0.79	970	40* J	< 9.2*	270*	99*	5.1*	71*	1,700
921	9/5/2024	170	NA	22	14	NA	990	28*	< 9.2*	260*	93*	7.6	130*	1,800
1029	4/25/2024	214.5	NA	17.6	0.7	NA	1,072.3	NA	NA	234.0	94.4	4.1	78.7	1,610

Notes:

J: Estimated Value (CLP Flag)

*: Dissolved Constituent

<: Analyte not detected above the laboratory reporting limit

NA: Not Available

L: Liter

µS/cm : microSiemens per Centimeter

mg/L : Milligrams per Liter

µg/L: Micrograms per Liter

Table 4-3: Groundwater Quality Field Paramaters Near the Russell Fault

Cuyama Basin Groundwater Fault Investigation Report

Field Groundwater Quality Parameters									
Well ID	**Date**	**Intake Depth (Feet BGS)**	**Depth to Water (Feet BGS)**	**Temperature (C)**	**pH**	**Specific Conductivity (µS/cm)**	**Oxidation-Reduction Potential (mV)**	**Dissolved Oxygen (mg/L)**	**Turbidity (NTU)**
900	8/21/2024	NA	NA	20.80	7.03	10,300	NA	NA	NA
	5/14/2024	55	40.29	23.00	7.02	9,264	-80.4	0.38	3
	7/15/2021	NA	43.63	22.35	6.93	8,860	-66	1.32	0
	7/14/2021	NA	43.63	23.38	7.02	9,280	6	2.78	14.3
901	8/21/2024	NA	NA	19.47	6.73	15,400	NA	NA	NA
	5/14/2024	185	39.01	22.80	6.98	8,717	-128	0.33	0
	7/15/2021	NA	42.49	23.92	6.78	9,700	-118	0.11	25.8
	7/7/2021	NA	44.64	25.94	7.49	9,430	-131	4.97	41.8
902	8/21/2024	NA	NA	20.85	6.77	16,900	NA	NA	NA
	5/14/2024	345	37.90	23.40	7.17	13,013	-131.3	0.39	2
	7/15/2021	150	44.82	25.20	6.76	10,300	-104	0.15	0
	7/9/2021	NA	45.47	26.50	7.23	14,100	-1.18	2.42	40.9
NF-20	5/14/2024	110	55.23	20.30	7.21	1,322	-93.9	0.82	4

Notes:

NA: Not Available

Feet BGS: Feet Below Ground Surface

C : Degrees Celsius

L: Liter

µS/cm : microSiemens per Centimeter

mg/L : Milligrams per Liter

mV : Millivolt

NTU: Nephelometric Turbidity Unit

µg/L: Micrograms per Liter

Table 4-4: Groundwater Quality Near the Russell Fault

Cuyama Basin Groundwater Fault Investigation Report

Laboratory Analysis														
Well ID	Sample Date	Bicarbonate (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Aluminum (µg/L)	Arsenic (µg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Total Dissolved Solids (TDS) (mg/L)
900	7/15/2021	370	NA	1,800	ND	NA	2,900	11 J	4.7	610	350	7.9	1,200	7,900
901	7/15/2021	380	NA	2,200	ND	NA	2,400	830	4.0	800	360	18	1,200	8,400
	5/14/2024	360	5.6	1,800	< 0.24	0.17	2,300	64*	20*	690*	280*	20*	1,100*	6,800
902	7/15/2021	260	NA	3,500	ND	NA	2,000	61	7.4	860	240	32	1,800	9,500
	5/14/2024	310	11	3,600	< 0.48	0.019 J	2,200	77*	11 J*	880*	250*	48*	1,900*	9,800
NF-20	8/19/2020	280	NA	90	12.60	NA	279	NA	NA	101	37	2	95	910
	5/14/2024	280	0.32	99	< 0.048	0.041 J	290	< 23*	< 9.2*	97*	37*	2.2*	160*	900*

Notes:

J: Estimated Value (CLP Flag)

*: Dissolved Constituent

< # analyte not detected above the laboratory reporting limit

NA: Not Available

L: Liter

µS/cm : microSiemens per Centimeter

mg/L : Milligrams per Liter

µg/L: Micrograms per Liter

Table 4-5: Isotope Distribution Near the Santa Barbara Canyon and Russell Faults

Cuyama Basin Groundwater Fault Investigation Report

Laboratory Isotope Analysis									
Well ID	Sample Date	Field Remarks	$\delta D\ H_2O$	$\delta^{18}O\ H_2O$	Tritium	Tritium Std. Dev.	$\delta^{13}C$ DIC	^{14}C DIC	Carbon Std. Dev.
			‰	‰	TU		‰	pMC	
Santa Barbara Canyon Fault									
904	5/13/2024	Field-Filtered	-69.6	-9.7	<1.16	-	-9.7	68.88	0.25
915	5/15/2024	Not Field-Filtered	-71.0	-9.9	1.13	0.28	-	29.47	0.11
916	5/15/2024	Field-Filtered	-69.2	-9.7	1.26	0.24	-12.3	83.66	0.30
1029	5/13/2024	Not Field-Filtered	-65.5	-9.3	1.18	0.27	-9.9	78.59	0.28
Russell Fault									
901	5/14/2024	Field-Filtered	-66.4	-8.7	<1.18	-	-16.4	62.32	0.23
902	5/14/2024	Field-Filtered	-64.0	-8.1	<1.17	-	-18.8	43.61	0.16
NF-20	5/14/2024	Field-Filtered	-56.7	-7.9	0.80	0.22	-11.6	70.78	0.26

Notes:

<: Analyte not detected above the laboratory reporting limit

‰: Percentage relative to Vienna Standard Mean Ocean Water (VSMOW)

$\delta D\ H_20$: Deuterium

$\delta 18\ H_20$: Oxygen 18

$\delta^{13}C$ DIC: Dissolved Inorganic Carbon 13

$\delta^{14}C$ DIC: Dissolved Inorganic Carbon 14

$_pMC$: Percent of modern carbon

Std. Dev.: Standard Deviation

TU: Tritium content of water

FIGURES

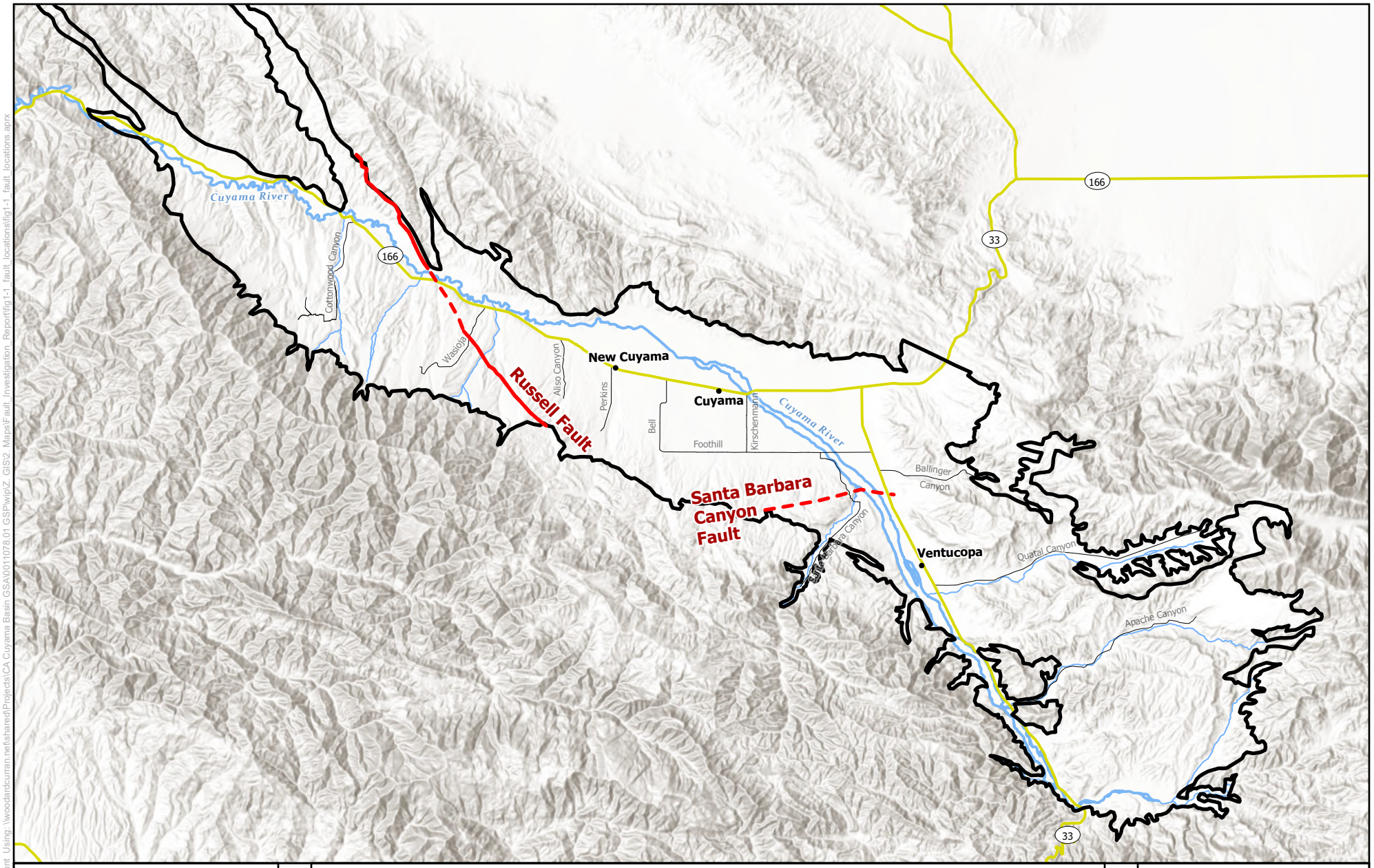

Figure 1-1: Fault Locations

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Fault (Dashed where Inferred by USGS)
- Highway
- Local Road
- Town
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 1.5 3 6 Miles

Map Created: May 2025

Figure Exported: 5/2/2025 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\Fault_Investigation_Report\fig1-1_fault_locations\fig1-1_fault_locations.aprx

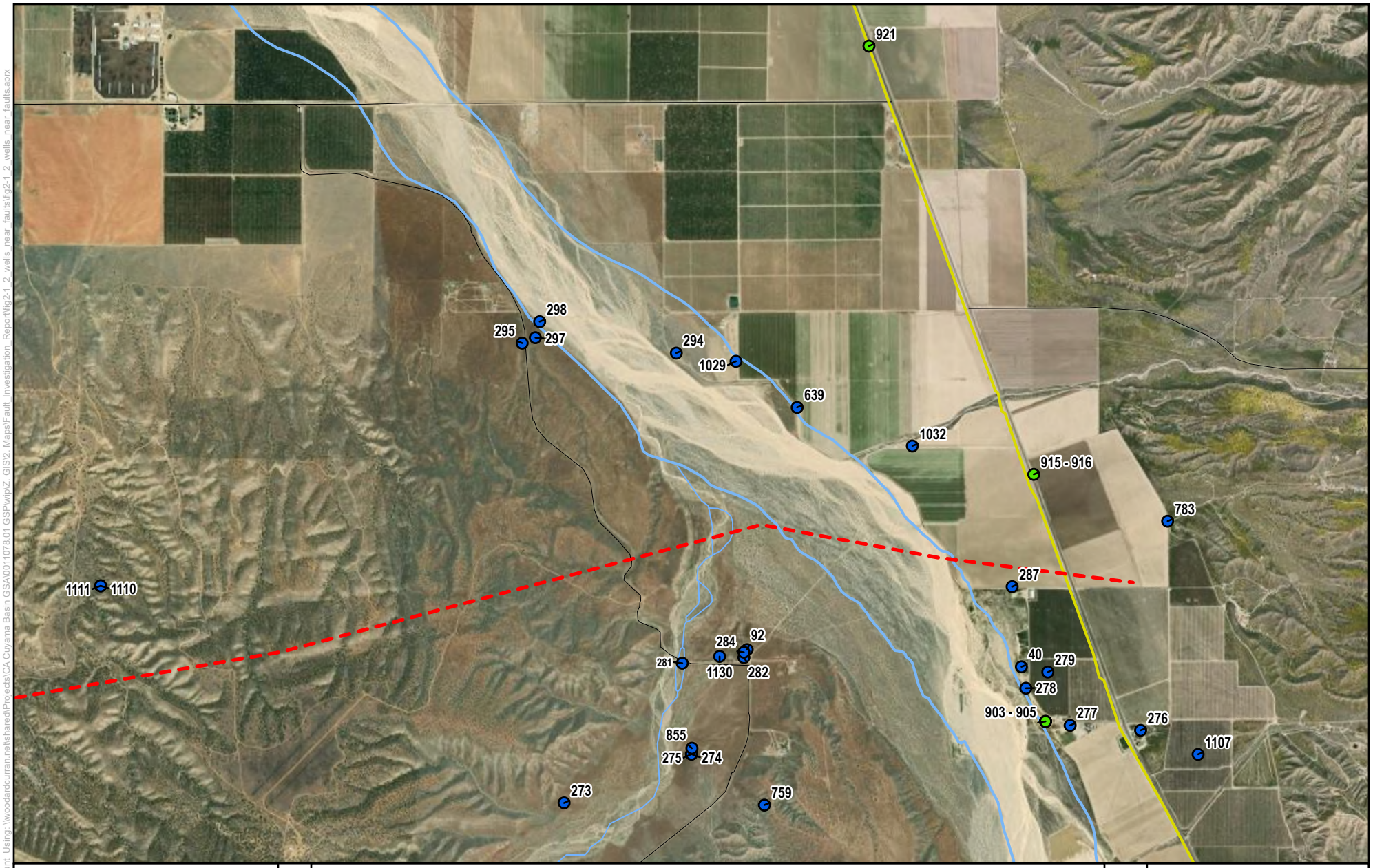

Figure 2-1: Santa Barbara Canyon Fault and Nearby Water Wells

Cuyama Basin Groundwater Fault Investigation Report

Legend

Well Type
- Opti Monitoring
- Private

Fault (Dashed where Inferred by USGS)
Highway
Local Road
Creek
Cuyama River
Cuyama Basin

N

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

0 0.13 0.25 0.5 Miles

Map Created: May 2025

Figure Exported: 5/9/2025 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\Fault_Investigation_Report\fig2-1_2_wells_near_faults\fig2-1_2_wells_near_faults.aprx

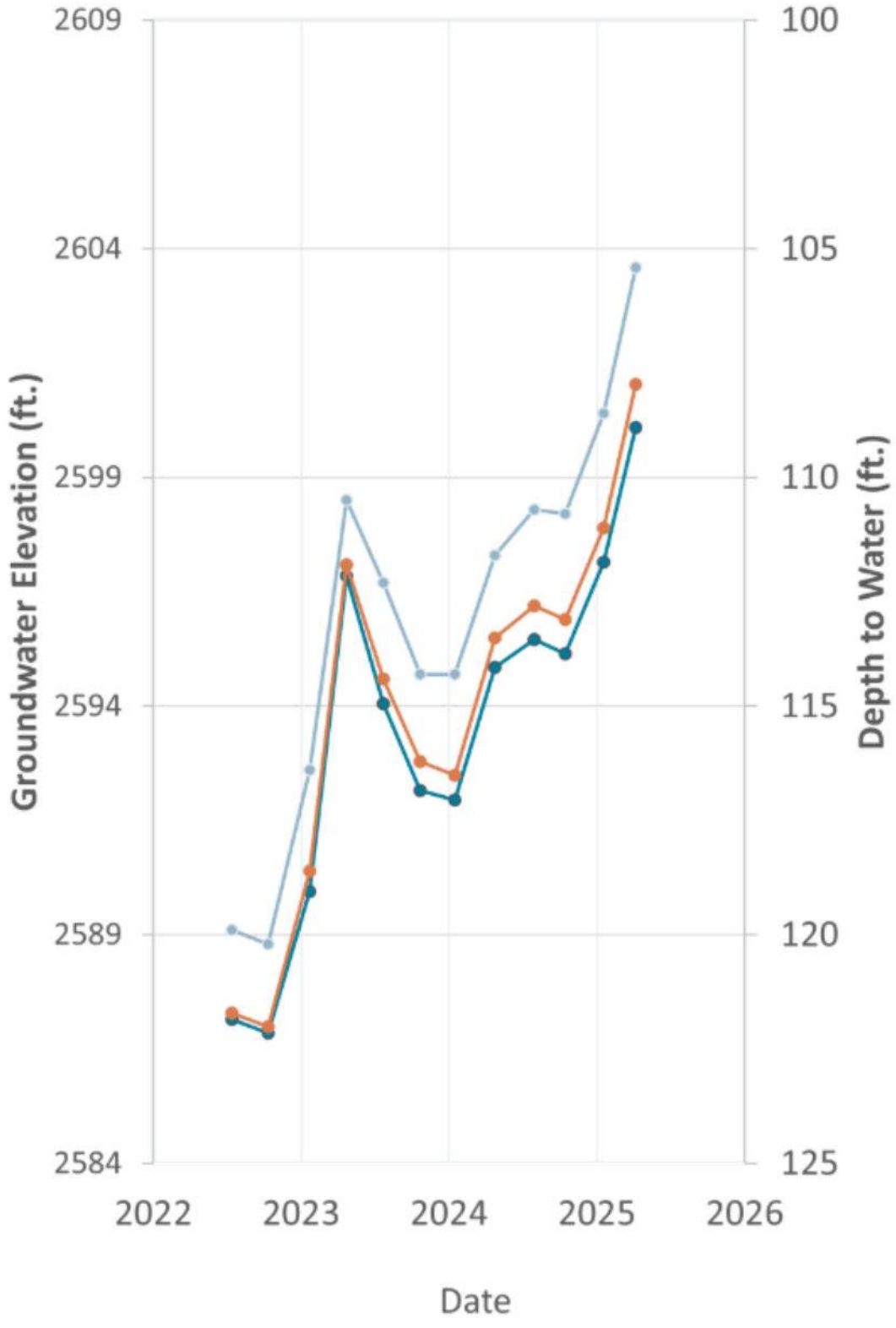

Figure 2-2: Hydrographs of Wells 903 - 905

Cuyama Valley Groundwater Basin

Legend

903 904 905

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Map Created: May 2025

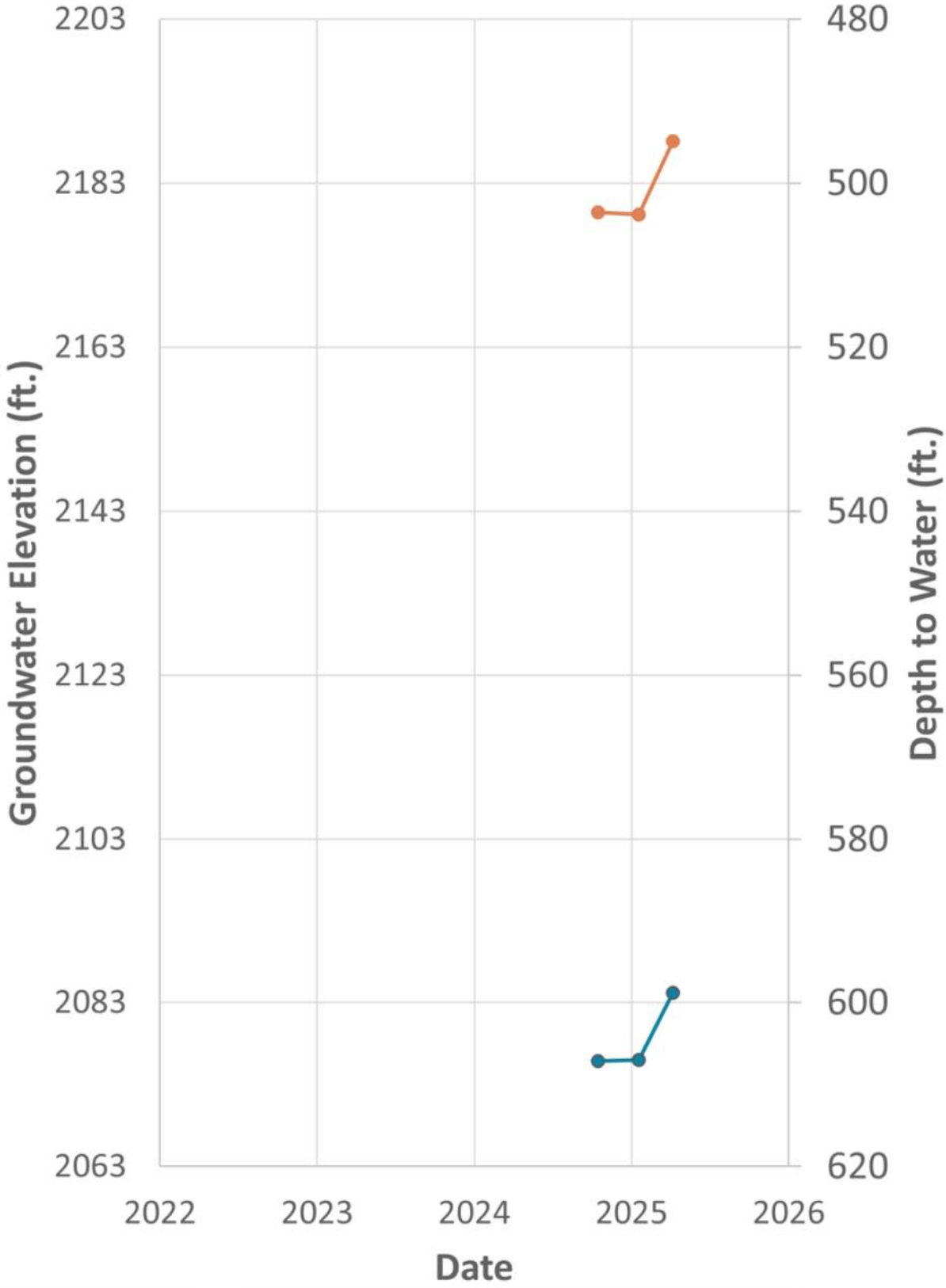

Figure 2-3: Hydrographs of Wells 915 - 916

Cuyama Valley Groundwater Basin

Legend

915 916

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Map Created: May 2025

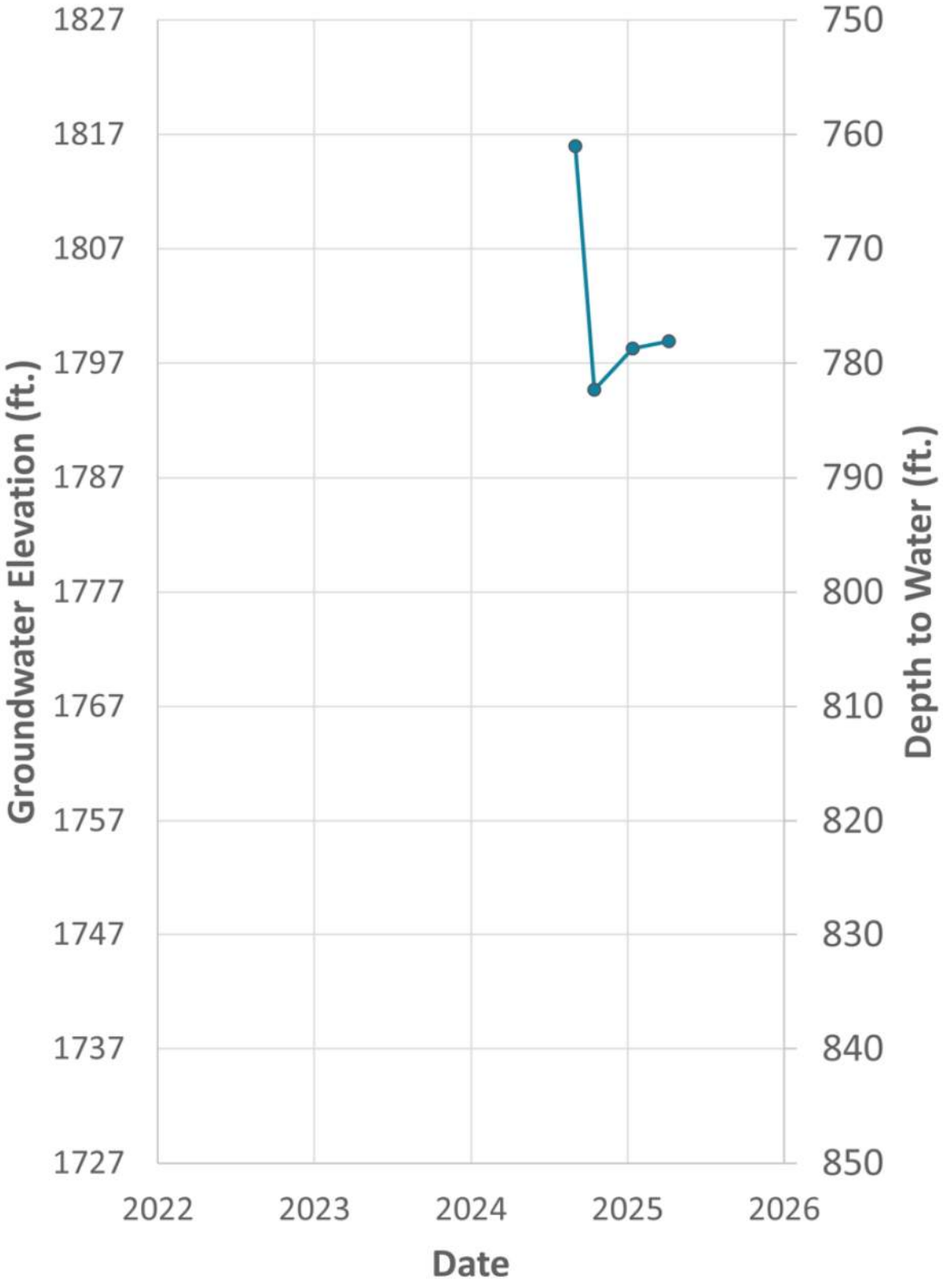

Figure 2-4: Hydrograph of Well 921

Cuyama Valley Groundwater Basin

Legend

921

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Map Created: May 2025

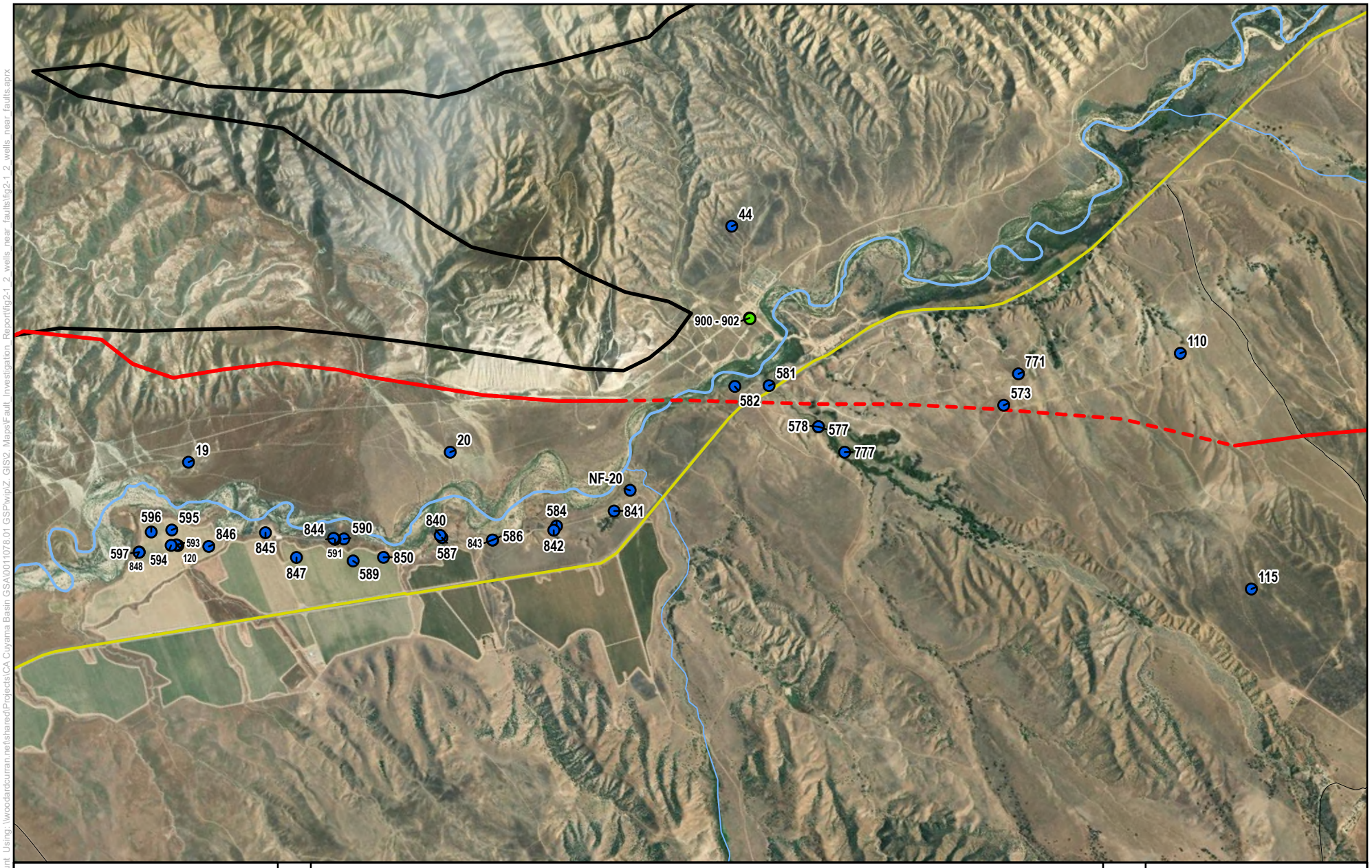

Figure 2-5: Russell Fault and Nearby Water Wells

Cuyama Basin Groundwater Fault Investigation Report

Legend

Well Type
- Opti Monitoring
- Private

Fault (Dashed where Inferred by USGS)
Highway
Local Road
Creek
Cuyama River
Cuyama Basin

N

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

0 0.17 0.35 0.7 Miles

Map Created: May 2025

Figure Exported: 5/6/2025 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\Fault_Investigation_Report\fig2-1_2_wells_near_faults\fig2-1_2_wells_near_faults.aprx

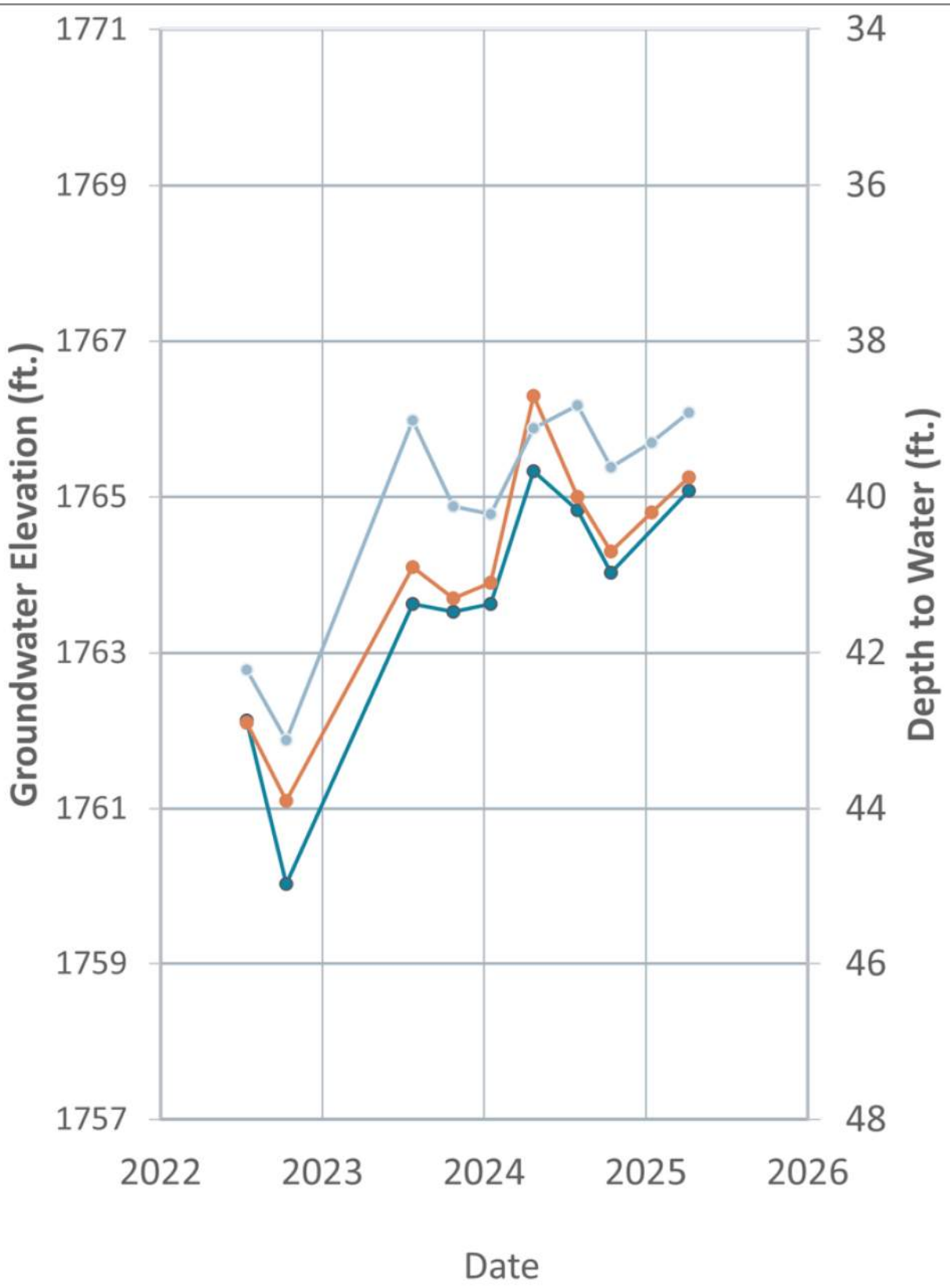

Figure 2-6: Hydrograph of Wells 900 - 902

Cuyama Valley Groundwater Basin

Legend

900 901 902

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Map Created: May 2025

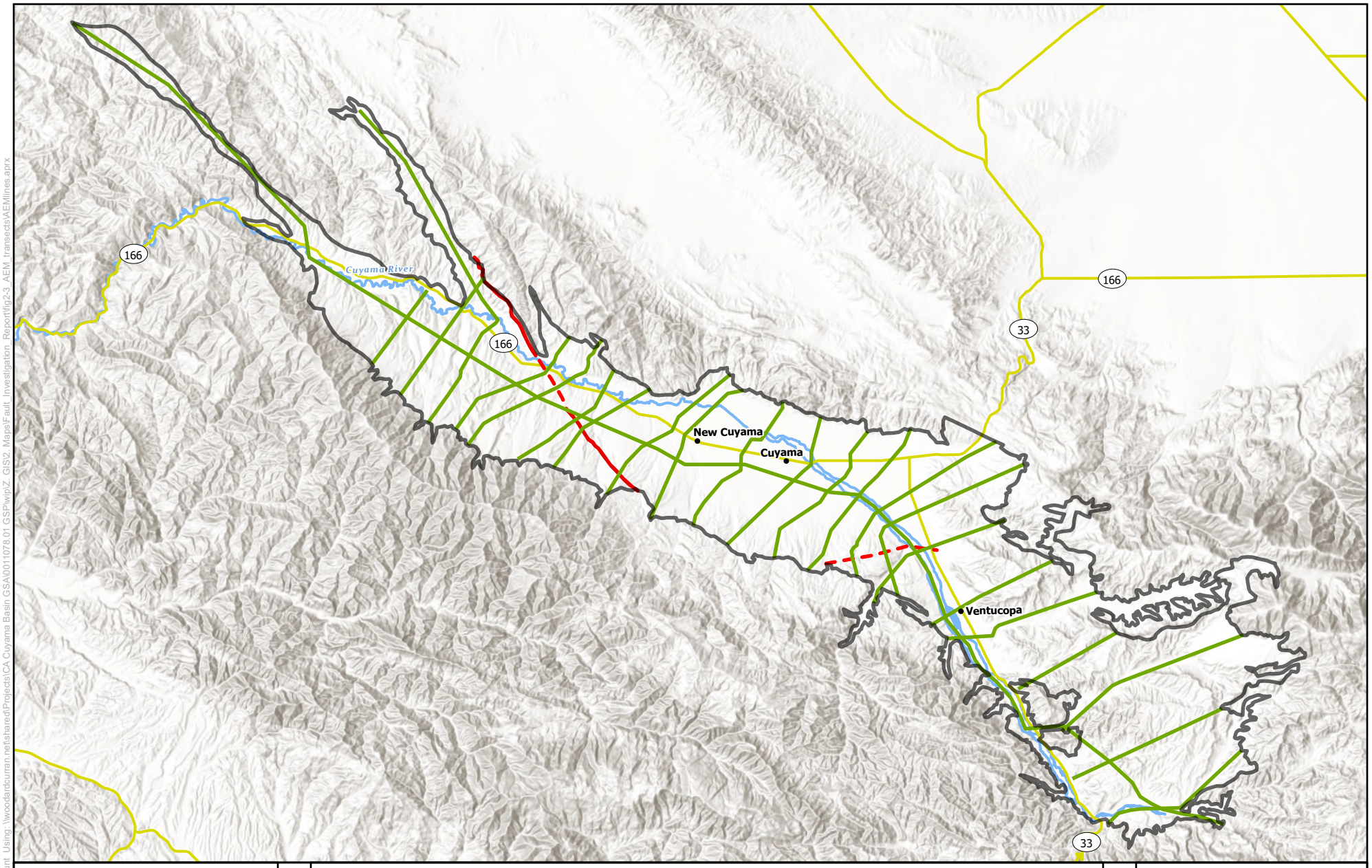

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Figure 2-7: AEM Flight Lines

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Highway
- Town
- Fault (Dashed where Inferred by USGS)
- AEM Flight Lines
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

0 1.75 3.5 7 Miles

Map Created: May 2025

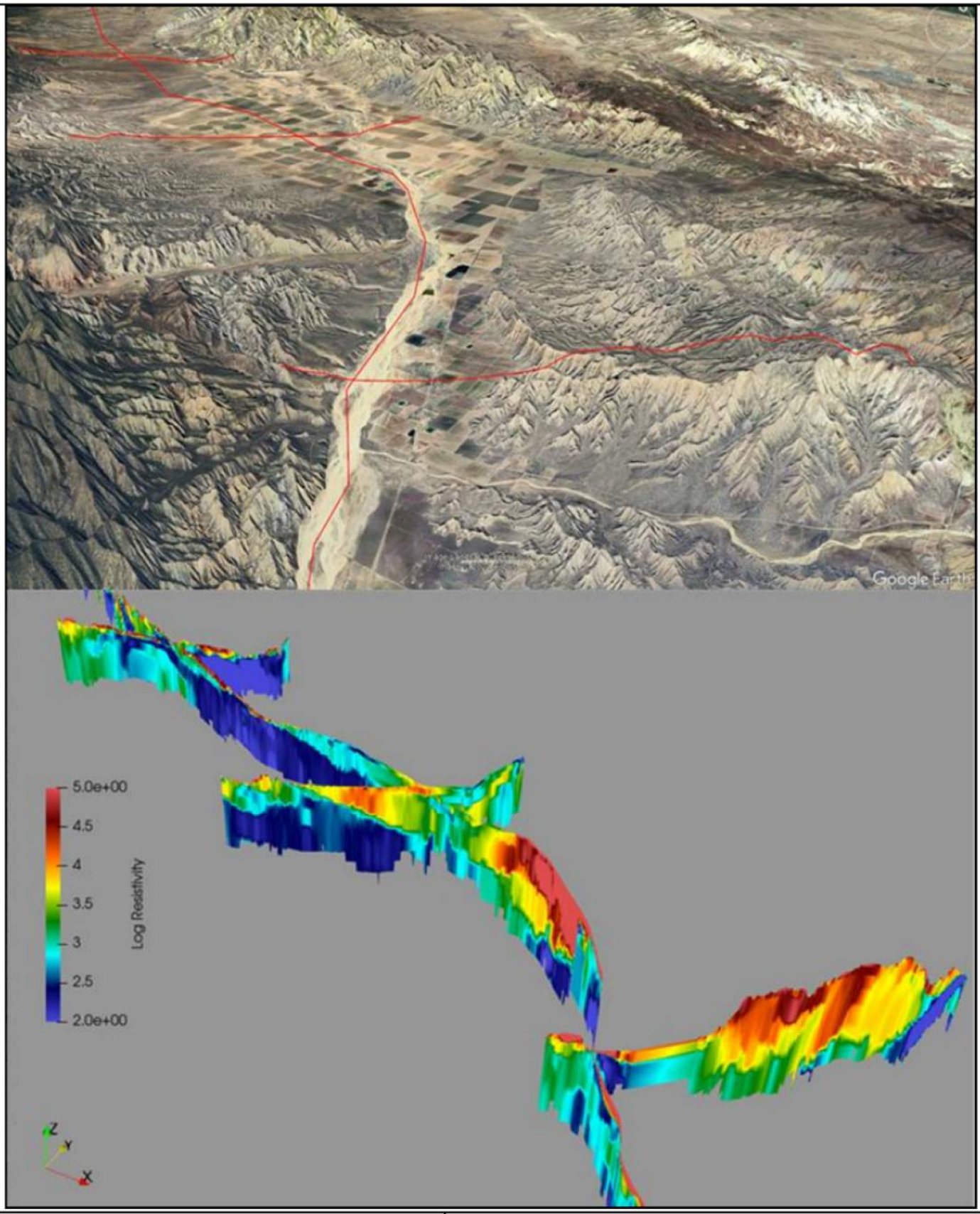

Figure 2-8:
DWR AEM Survey Transects

Cuyama Valley
Groundwater Basin

Map Created: May 2025

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

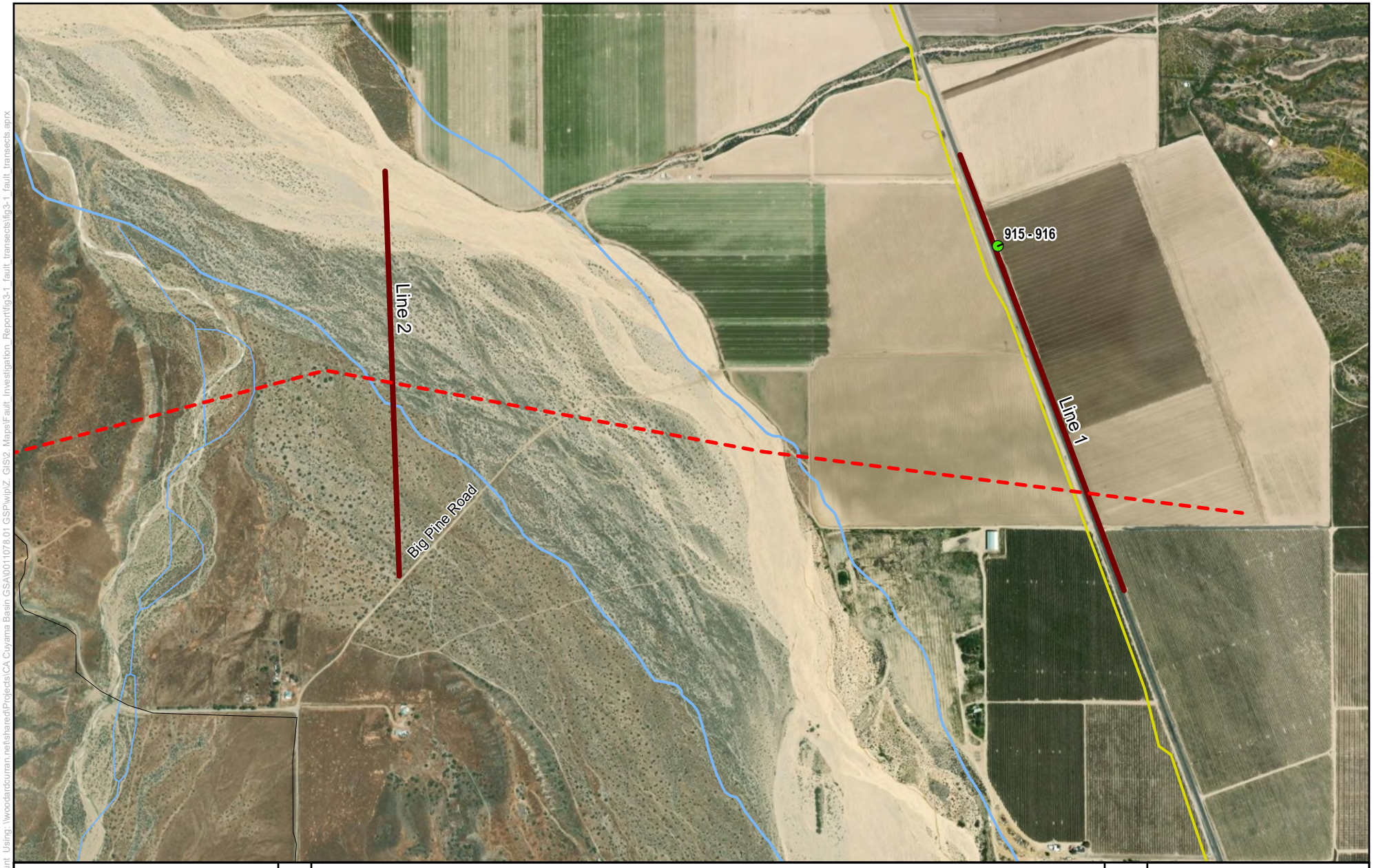

Figure 3-1: Santa Barbara Canyon Fault Transects

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Fault (Dashed where Inferred by USGS)
- Survey Transect
- Opti Monitoring Well
- Highway
- Local Road
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 0.05 0.1 0.2 Miles

Map Created: May 2025

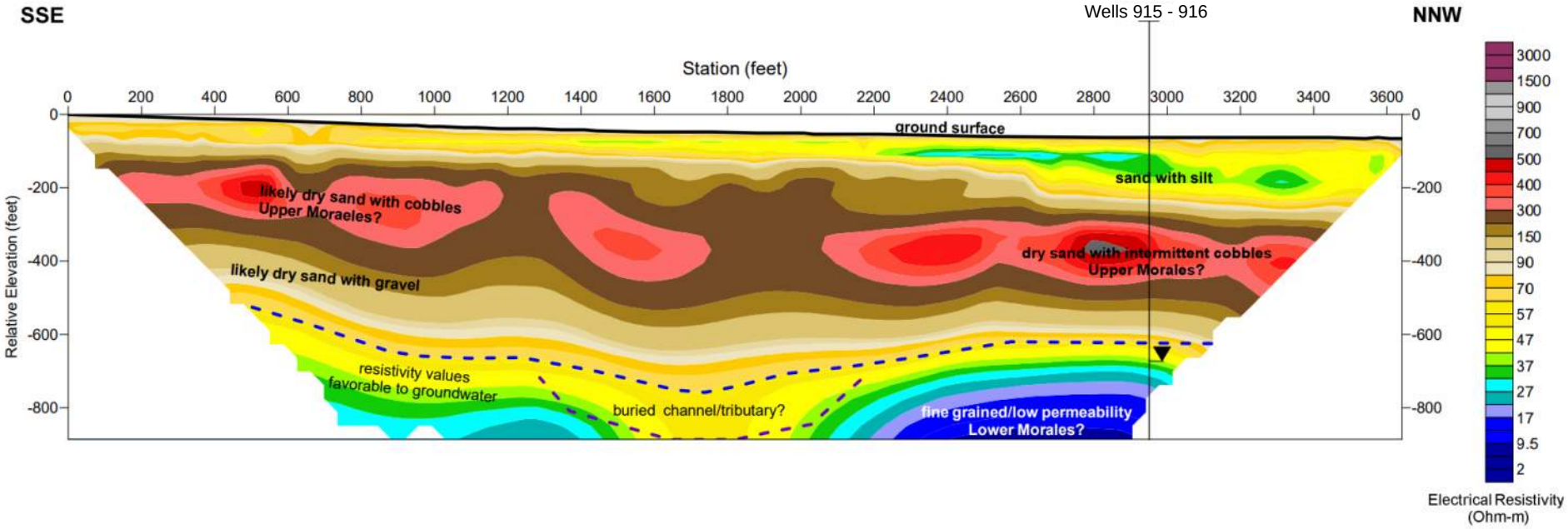

Figure 3-2: Santa Barbara Canyon Fault Transect 1: Resistivity Profile

Cuyama Basin Groundwater Fault Investigation Report

Legend

Water table (interpreted)

Woodard & Curran

Figure Created: May 2025

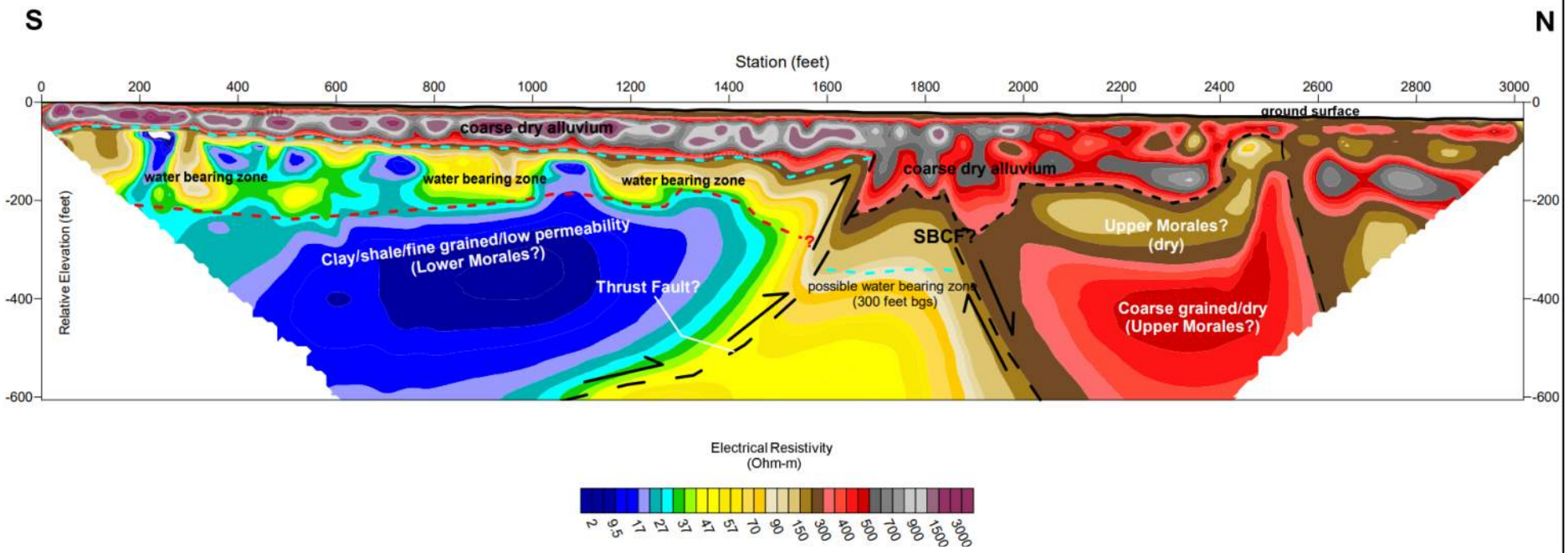

Figure 3-3: Santa Barbara Canyon Fault Transect 2: Resistivity Profile

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Interpreted top of water bearing zone
- Interpreted dry alluvium / Upper Morales interface (dry)
- Interpreted water bearing alluvium / Lower Morales interface

Woodard & Curran

Figure Created: May 2025

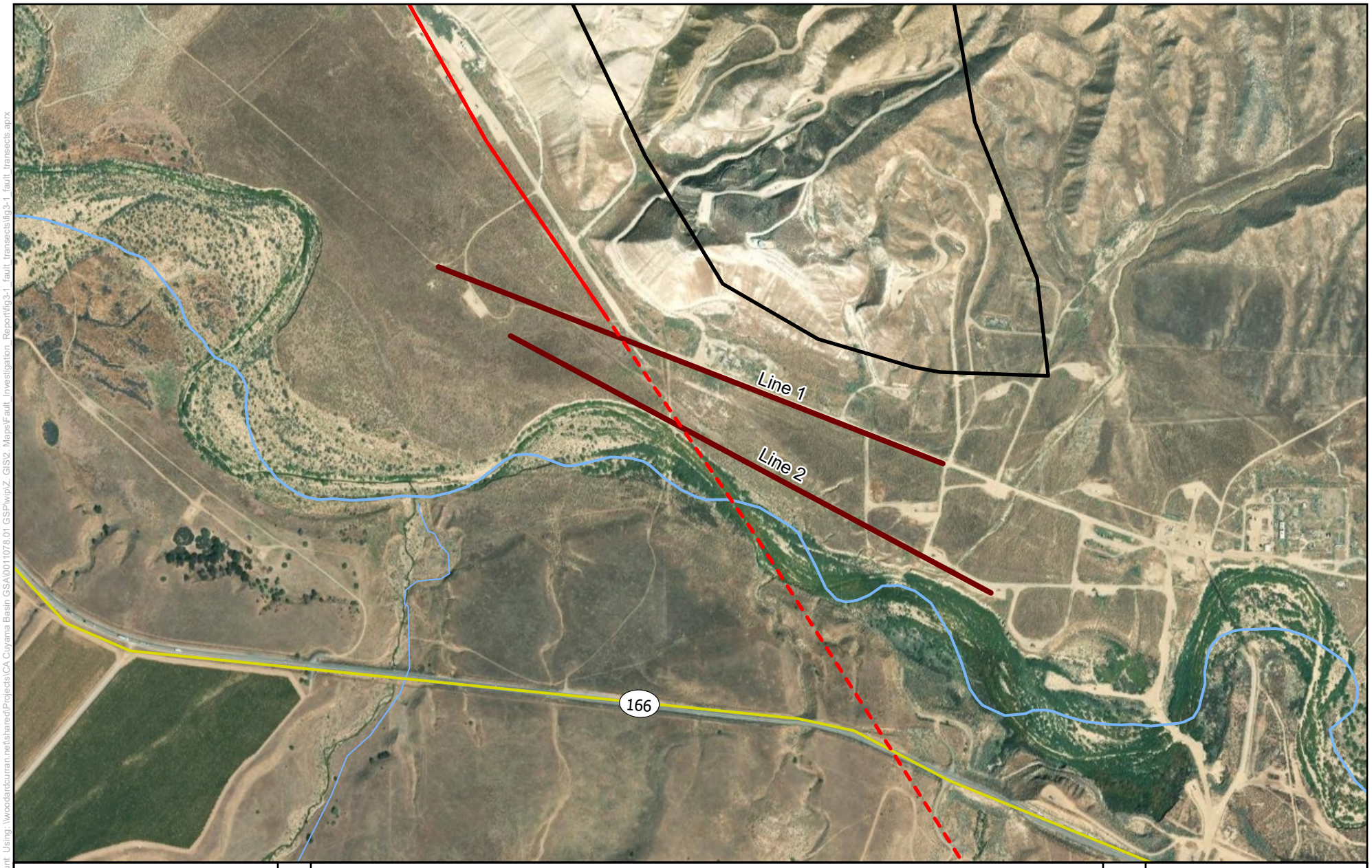

Figure 3-4: Russell Fault Transects

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Fault (Dashed where Inferred by USGS)
- Survey Transect
- Highway
- Local Road
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 0.04 0.09 0.18 Miles

Map Created: May 2025

Figure Exported: 5/8/2025 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\Fault_Investigation_Report\fig3-1_fault_transects\fig3-1_fault_transects.aprx

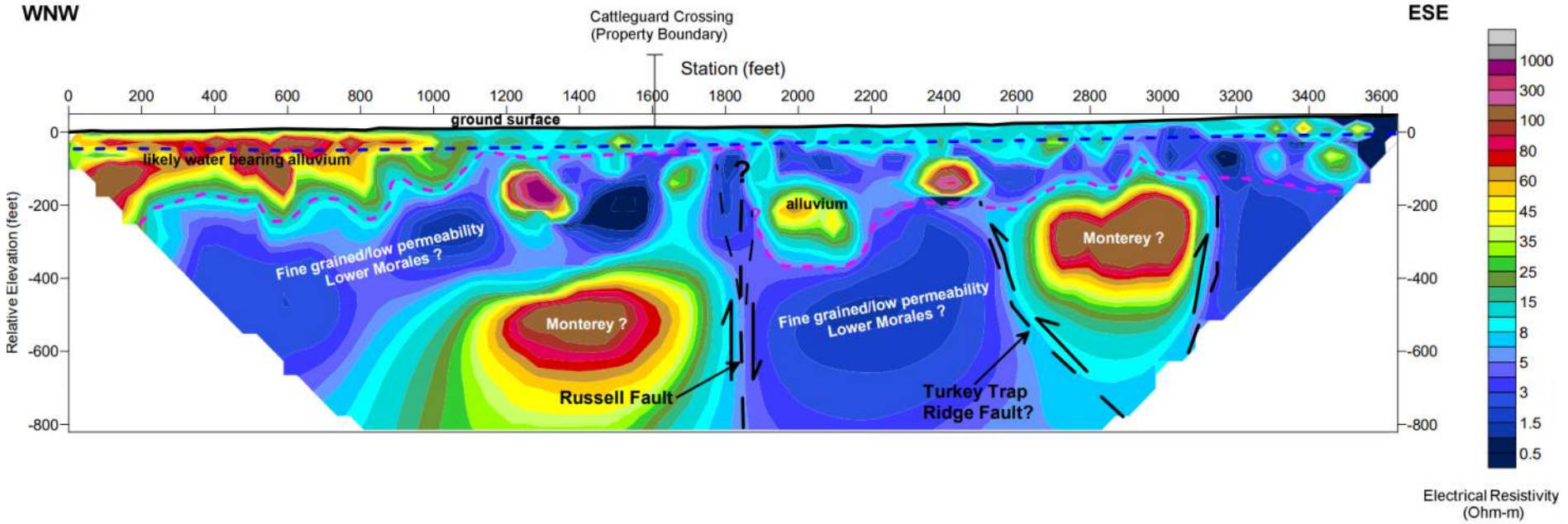

Figure 3-5: Russell Fault Transect 1: Resistivity Profile

Cuyama Basin Groundwater Fault Investigation Report

Legend

Approximate level of groundwater

Interpreted base of alluvium / top of rock

Woodard & Curran

Figure Created: May 2025

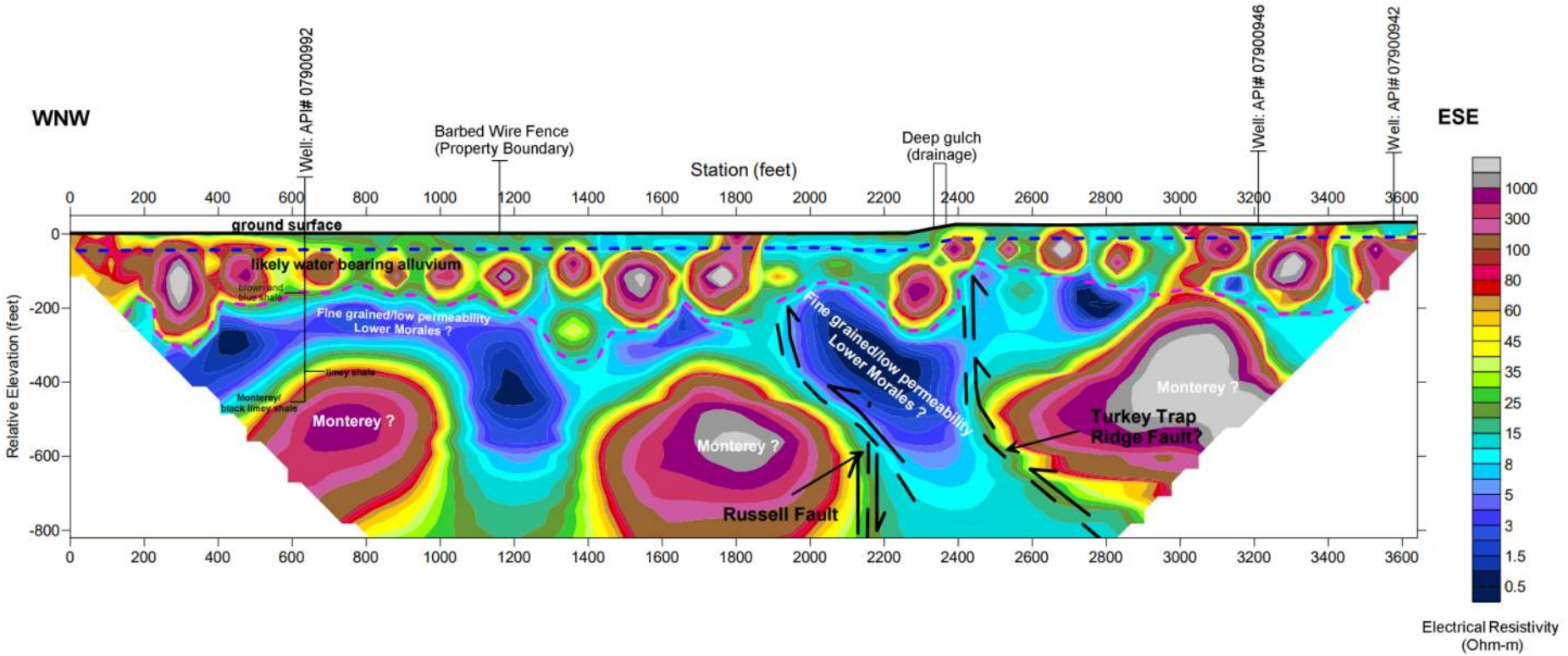

Figure 3-6: Russell Fault
Transect 2: Resistivity Profile

Cuyama Basin Groundwater
Fault Investigation Report

Legend

Approximate level of groundwater

Interpreted base of alluvium / top of rock

Woodard & Curran

Figure Created: May 2025

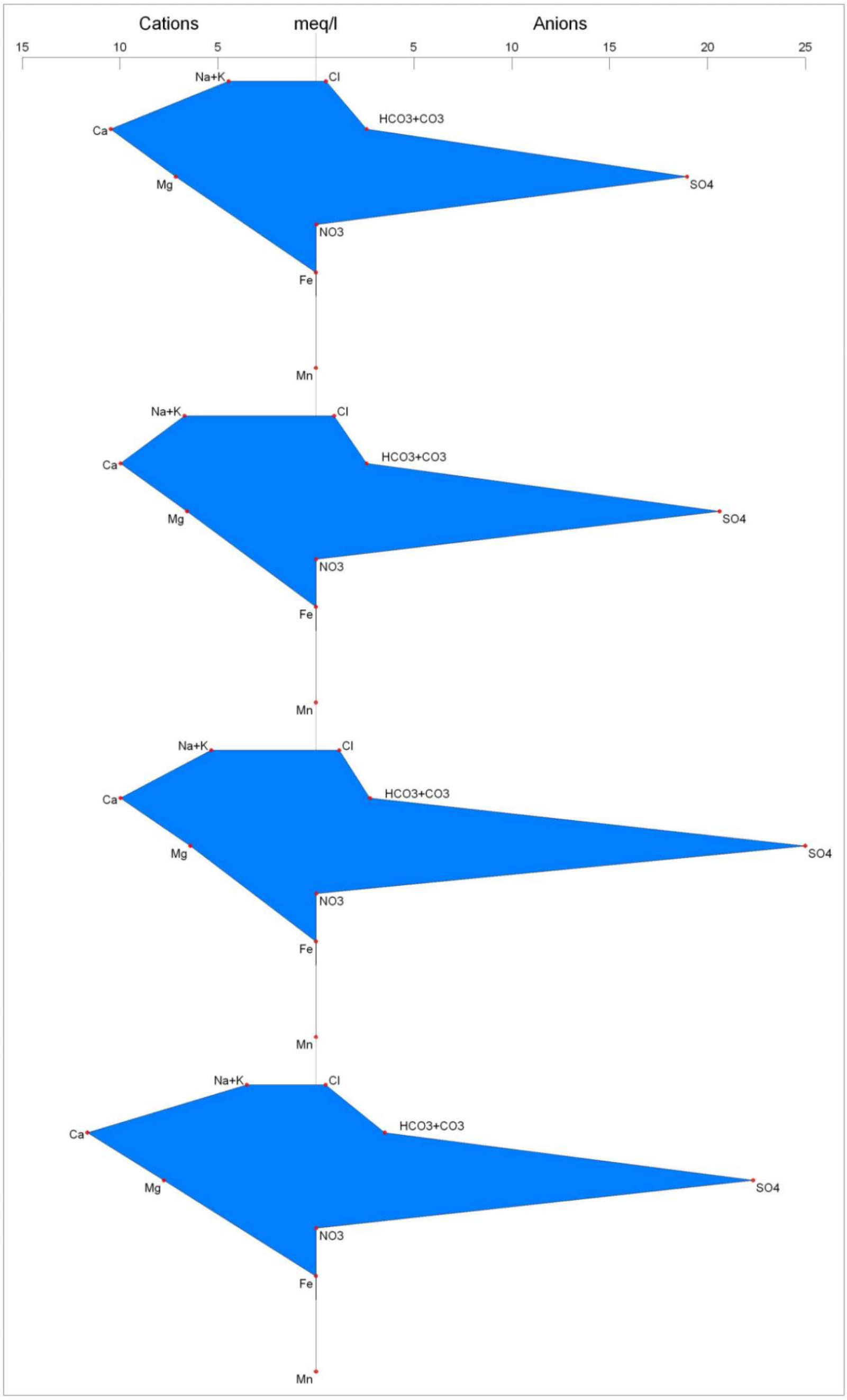

Figure 4-1:
Stiff Diagrams for
Wells 903 - 905 and 1029

Cuyama Valley
Groundwater Basin

Map Created: May 2025

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

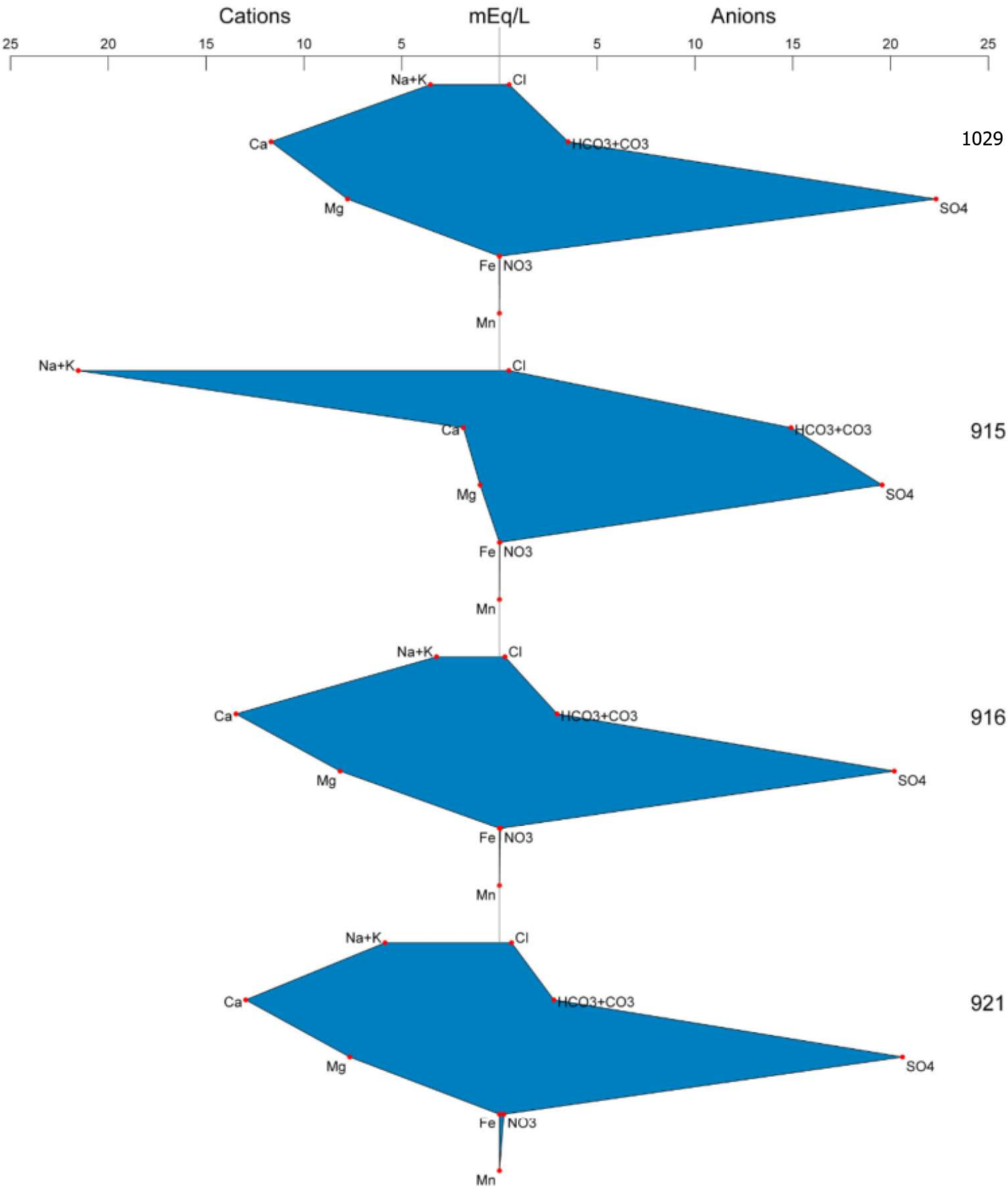

Figure 4-2:
Stiff Diagrams for
Wells 915, 916, 921 and 1029

Cuyama Valley
Groundwater Basin

Map Created: May 2025

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk.

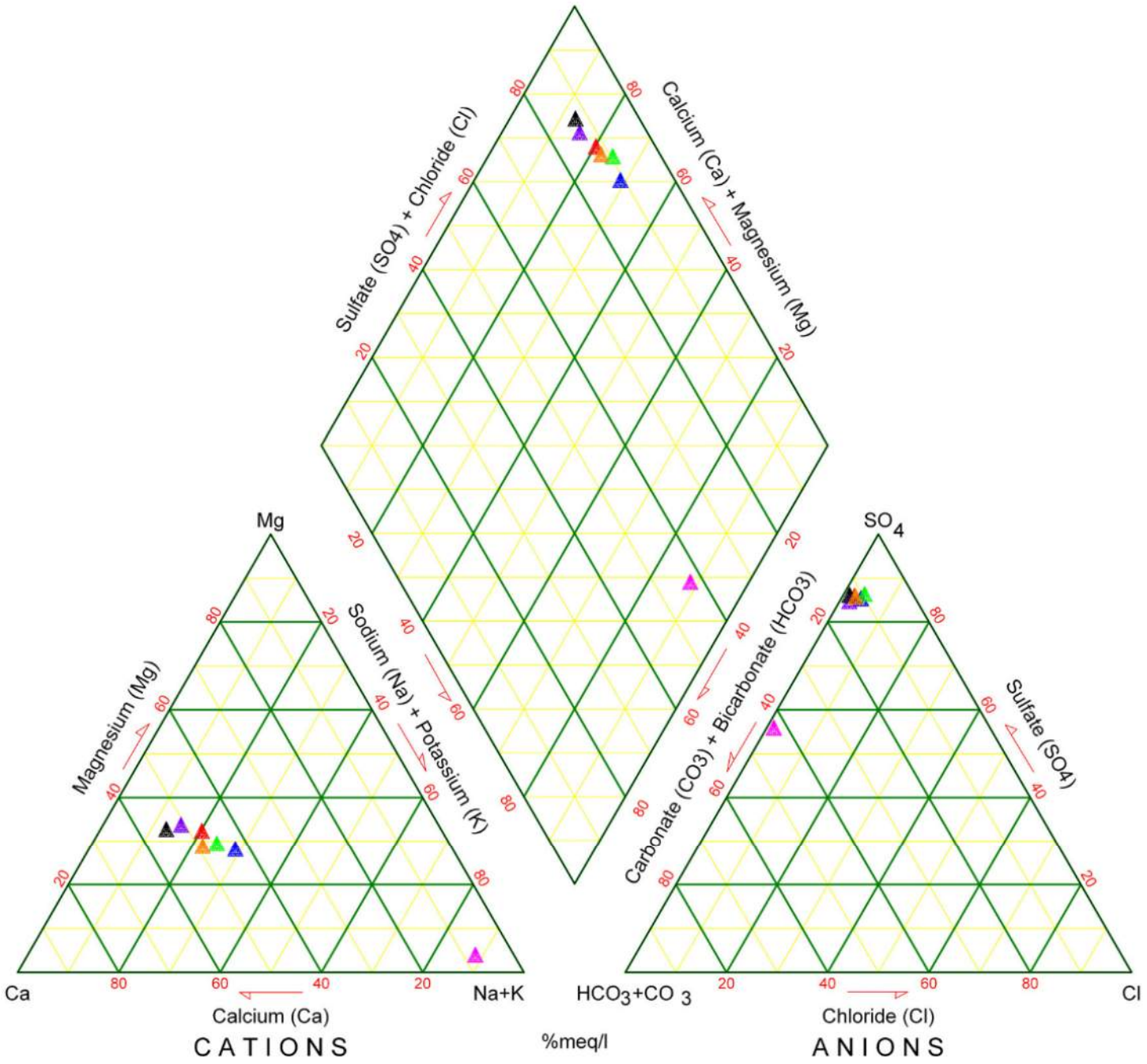

Figure 4-3: Trilinear Diagram for Wells Near the SBC Fault

Cuyama Valley Groundwater Basin

Legend

- Well 903
- Well 904
- Well 905
- Well 1029
- Well 915
- Well 916
- Well 921

Cuyama Basin Groundwater Sustainability Agency

Woodard & Curran

Map Created: May 2025

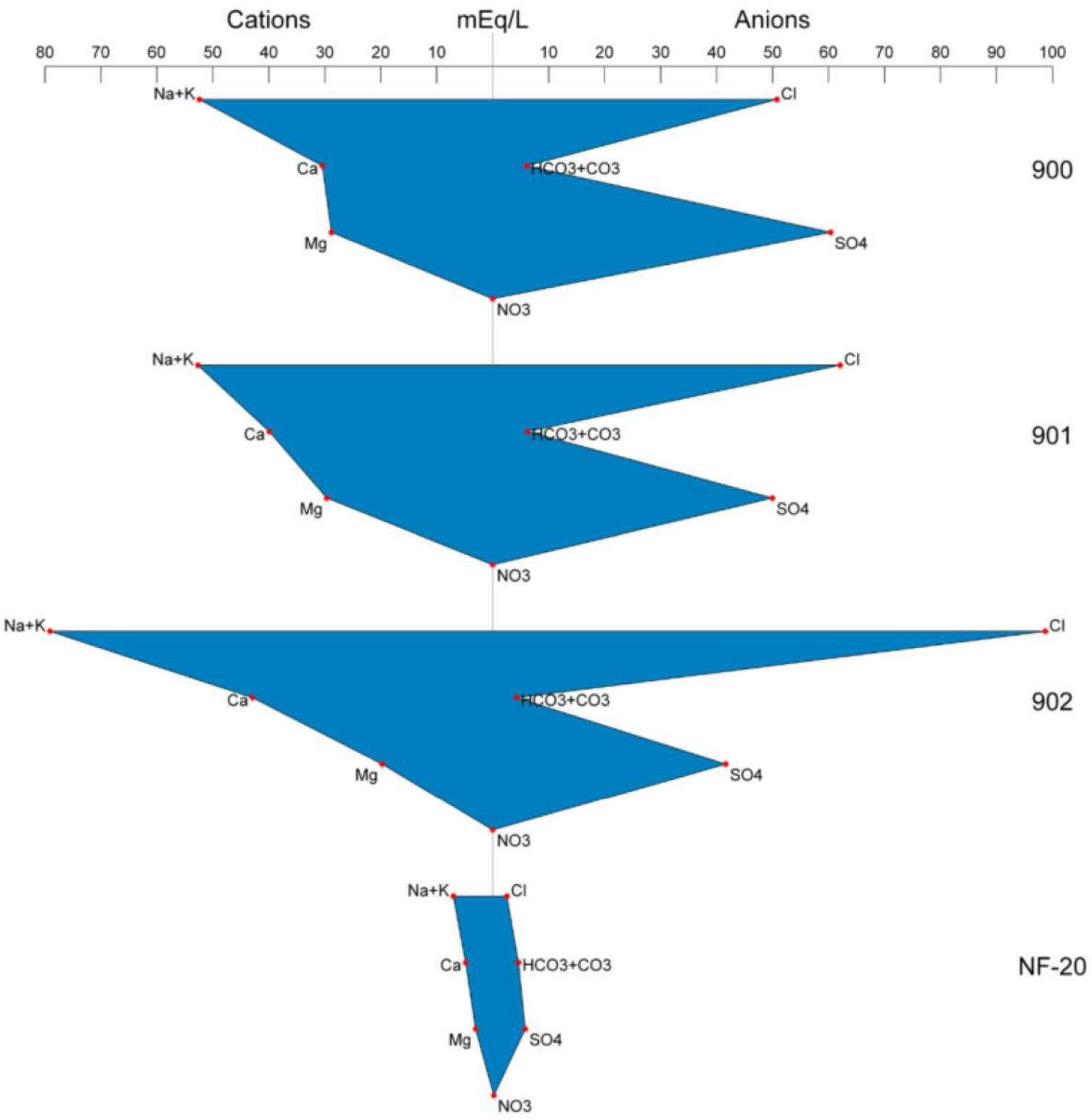

Figure 4-4:
Stiff Diagrams for
Wells 900, 901, 902 and NF-20

Cuyama Valley
Groundwater Basin

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Map Created: May 2025

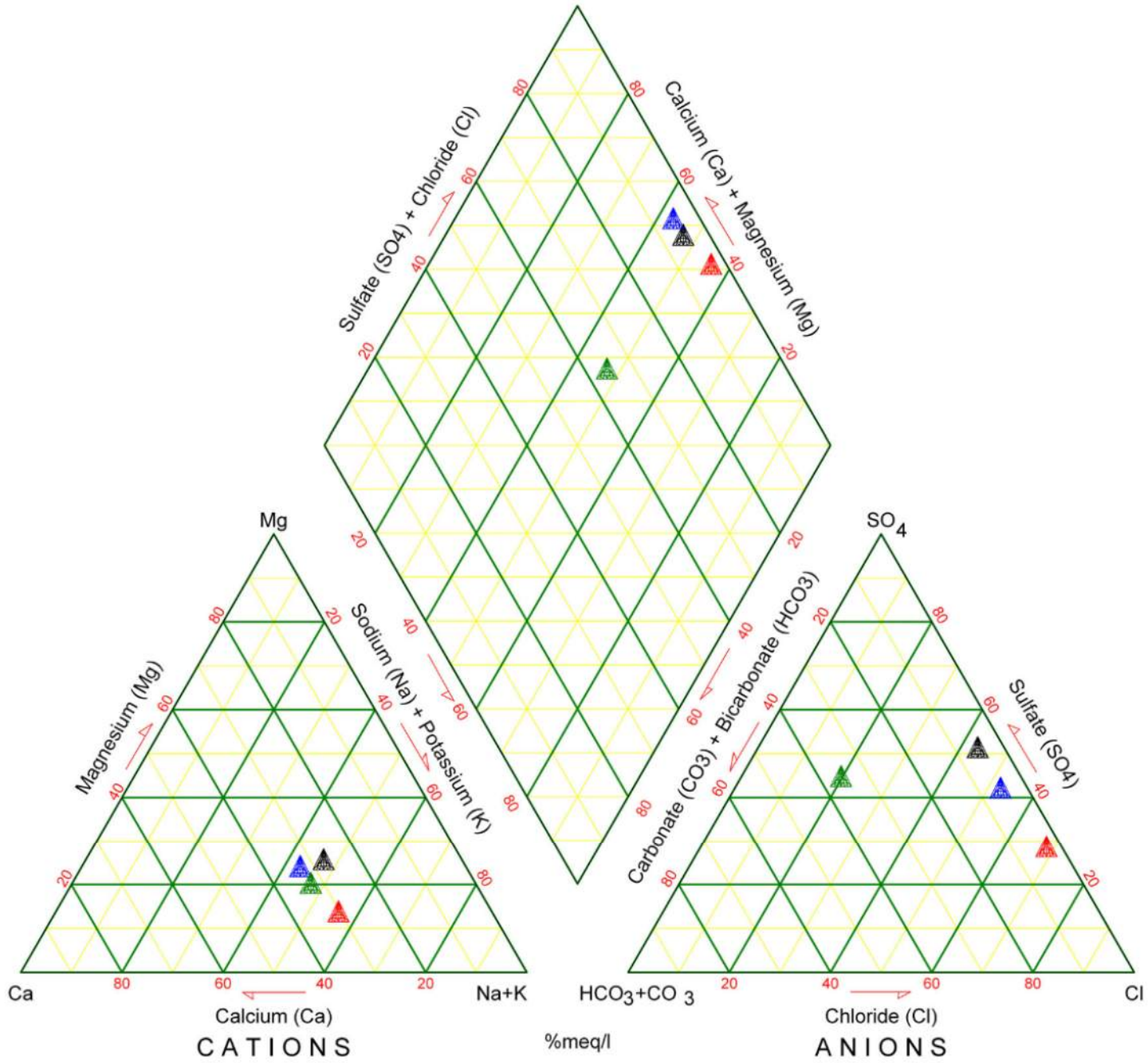

Figure 4-5: Trilinear Diagram for Wells Near the Russell Fault

Cuyama Valley Groundwater Basin

Legend

- 900
- 901
- 902
- NF-20

Map Created: May 2025

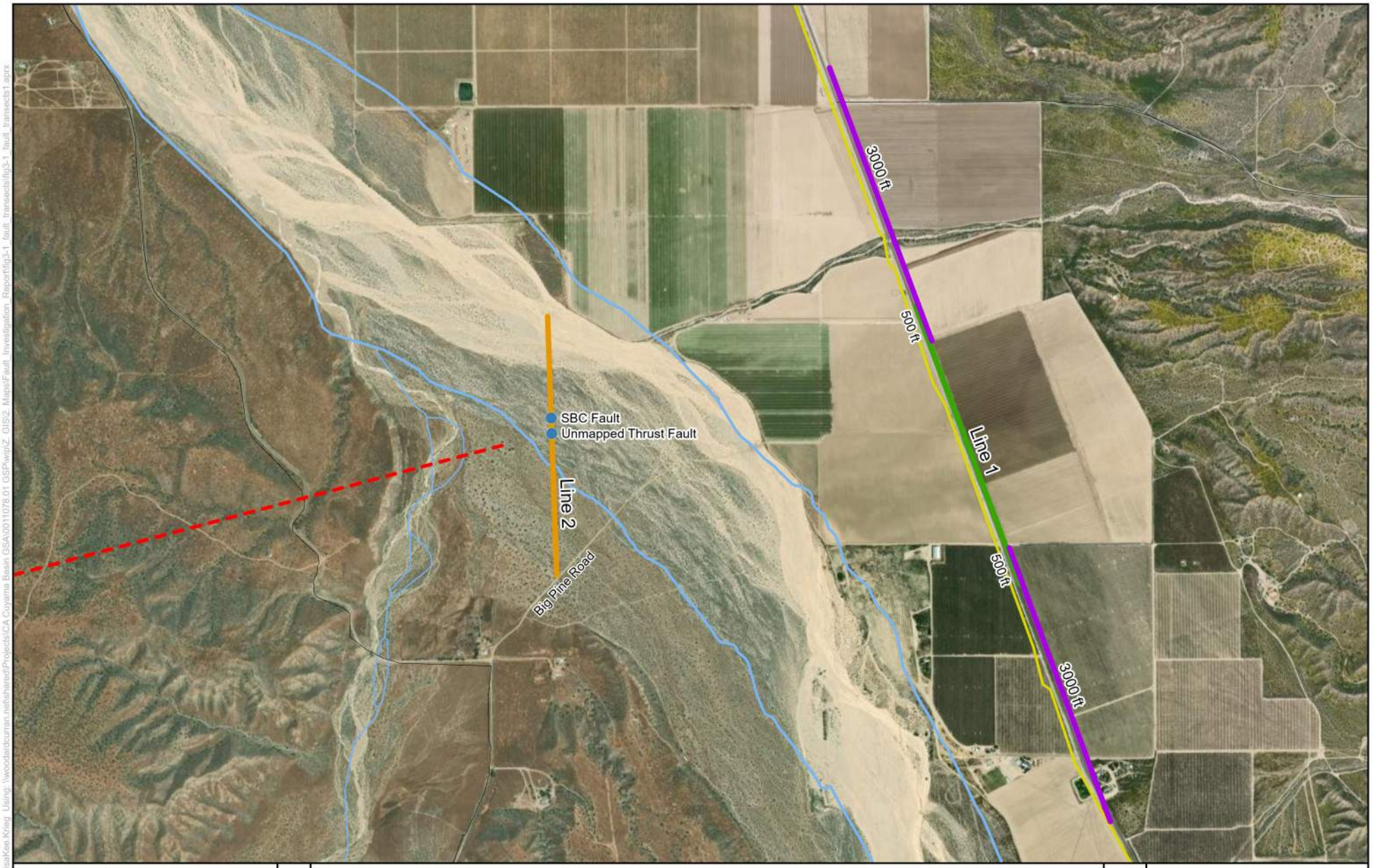

Figure 5-1: Recommended Transects for SBC Fault

Cuyama Basin Groundwater Fault Investigation Report

Legend

- Fault (Dashed where Inferred by USGS)
- Transect 1
- Transect 2 with Faults Identified
- Recommended Transects
- Cuyama Basin
- Highway
- Local Road
- Cuyama River
- Creek

N

Woodard & Curran

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

0 0.07 0.15 0.3 Miles

Map Created: May 2025

APPENDIX A: SPECTRUM GEOPHYSICAL INVESTIGATION REPORT

Report of Geophysical Investigation

Woodard & Curran
Cuyama Valley Groundwater Basin
Santa Barbara County, California

August 2, 2024

spectrum geophysics
REVEALING THE SUBSURFACE

16691 Gotthard, Suite L
Huntington Beach, California 92647
1-877-565-3595

Report of Geophysical Investigation
Cuyama Valley Groundwater Basin
Santa Barbara County, California

Prepared For:
Woodard & Curran, Inc.
Sacramento, California

Prepared By:
Spectrum Geophysics
16691 Gothard Street, Suite L
Huntington Beach, CA 92647

August 2, 2024

Laura Cathcart-Dodge
Vice President/Principal
California Professional Geophysicist, PGP #1017

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SPECTRUM GEOPHYSICS, 16691 GOTHARD STREET, SUITE L, HUNTINGTON BEACH, CALIFORNIA 92647

1.0 INTRODUCTION

A geophysical investigation was conducted by Spectrum Geophysics (Spectrum) for Woodard & Curran in early 2024 in the Cuyama Valley Groundwater Basin of Santa Barbara County, California (hereinafter referred to as the Basin). Woodard & Curran has been retained by the Cuyama Valley Groundwater Sustainability Agency (GSA) to implement the Groundwater Sustainability Plan (GSP; GSA and Woodard & Curran, 2019).

The purpose of the investigation was to locate, verify the trend of, and determine the depth of the Santa Barbara Canyon Fault/Fault Zone, located at the southeast end of the Basin, and the Russell Fault/Fault Zone, located at the northwest end of the Basin. . These faults were mapped by the United States Geological Survey (USGS) as "concealed" because they are buried by alluvium and have no surface expression. These subsurface faults reportedly affect local groundwater flow to an unknown extent. Therefore, the investigation was designed to provide detailed images of the geologic/lithologic units and structural features associated with each fault/fault zone to depths of 600 to 800 feet below ground surface (bgs). The geophysical data would indicate burial depth (i.e., young/old alluvium deposited post fault activity) and juxtaposition of geologic units, including water bearing units, resulting from historic fault movement. Based on review of existing data, it was determined that, while there has been some study of deeper oil bearing rocks in the Basin, there were significant data gaps for the shallow water bearing zones near these fault zones to meet the investigation objectives.

Based on discussions with Woodard & Curran, Spectrum recommended two dimensional (2D) DC electrical resistivity and induced polarization (IP) data collection. It was anticipated that at least two transects would be necessary in each investigation area to verify the trend of the fault/fault zone and "connect the dots" across structural features of interest in each of the resultant profiles. Each transect in each area of investigation was designed to be perpendicular to and centered on the inferred location of the fault, to the extent possible. The two parallel/sub-parallel transects were between 3000 and 3600 feet in length to achieve the desired depth of investigation. The 2D DC electrical resistivity and IP data collection methods were employed to provide two dimensional (both lateral and vertical) profiles of the electrical resistivity and IP chargeability variation in the subsurface along each transect. These data were used in the characterization of the faults/fault zones, and an evaluation of the possible effects of the faults/fault zones on water bearing zones and local groundwater flow.

The investigation was conducted in two phases. The field work for the first phase was conducted the week of February 13th, 2024, where two transects (designated Lines 1 and 2) were established at the southeast end of the Basin near Ballinger Canyon Road to provide an image of and confirm the inferred location of the Santa Barbara Canyon Fault. These transects are shown in Figure 1. Line 1 was established in the Caltrans' Right of Way on the east shoulder of Highway 33. Line 2 was established in the Cuyama River bed on land owned by the Bureau of Land Management (BLM). The field work for the second phase was conducted the week of March 18th, 2024, where two transects were established at the northwest end of the Basin. These transects, straddling the property boundary between the Russell Ranch east of the Russell Fault and the North Fork Ranch west of the Russell Fault, were established to provide

an image of and confirm the inferred location of the Russell Fault. These transects are shown in Figure 4.

A discussion of the equipment used during this investigation is presented in Section 2.0, the geologic/hydrogeologic background of the faults is presented in Section 3.0, the geophysical methods are presented in Section 4.0, field procedures are presented in Section 5.0, data processing is presented in Section 6.0, results and interpretation are presented in Section 7.0, conclusions are presented in Section 8.0, and limitations are presented in Section 9.0.

2.0 EQUIPMENT

Electrical resistivity and IP field equipment consisted of the Advanced Geosciences SuperSting R8/IP system (SuperSting), passive electrodes and associated cabling. This equipment is designed such that the data are collected in units of meters and then converted to feet during the data processing stage. Utility locators and a Fisher M-Scope shallow focus metal detector (M-Scope) were used to locate utilities and shallow metallic features along the designated transects. A Garmin 66S Handheld GPS unit (Garmin) was used to map the endpoints and key features along each resistivity/IP transect. The Advanced Geosciences EarthImager® software package (AGI, 2015) was used to process the resistivity and IP data.

3.0 GEOLOGIC/HYDROGEOLOGIC BACKGROUND

The Cuyama Basin is a northwest-southeast oriented alluvial basin located in the southeastern portion of the Coast Ranges and north of the Transverse Ranges of California. Topographically, this basin is bordered to the north by the Caliente Range, to the south by the Sierra Madre Range and to the northeast by the San Joaquin Valley. Structurally, the Basin was formed by a graben during Miocene extension, and then overprinted by younger thrust faulting during a period of compression beginning during the Pliocene and continuing through Quaternary time. As such, this older extensional Basin is bounded on the north by younger south-verging thrust faults, such as the Whiterock and Morales Faults, and on the south by younger north-verging thrust faults such as the South Cuyama Fault (USGS, 2013).

The geology, from the surface down in both areas of investigation, consists of Younger Alluvium underlain by Older Alluvium, which overlies the nonmarine Morales Formation. The Morales consists of a coarser grained, partly consolidated upper unit (Upper Morales) that is water bearing, and a finer grained lower unit (Lower Morales) that is non-water bearing. Deeper non-water bearing geologic formations that may be evident across faults in the study areas include the Quatal Formation in the southeast and the Monterey Formation in the west.

Groundwater in the Basin is mostly unconfined and generally consists of a single water body (Singer and Swarzenski, 1970). The unconfined aquifer occurs within the Older Alluvium or Younger Alluvium; however, in areas of overdraft (the central and southeastern portions of the Basin) the water bearing zones extend into the deeper Upper Morales Formation (Woodard & Curran, 2019).

While there is some geologic information available regarding the deeper zones of these faults, the question of whether these faults create an offset of water bearing units across it, or whether the fault/fault zone creates a barrier or restriction to groundwater flow through the unconfined aquifer, has not been studied. Therefore, this investigation targeted depths of 600 to 800 feet bgs to gather information on these shallower water bearing zones at each fault.

3.1 Background for Santa Barbara Canyon Fault

The USGS (2013) has reported that the Santa Barbara Canyon Fault (SBCF) is a subsurface normal fault. The SBCF was suggested by Singer and Swarzenski (1970) to be the cause of a steep hydraulic gradient in the southeastern part of the Basin. The fault could be a projection of east-northeast-striking faults mapped west of Santa Barbara Canyon by Dibblee and Minch (2007) (USGS, 2013). Maps indicate the fault bends to the east-southeast near Ballinger Canyon Road as it approaches the Cuyama River from the west. Based on water level changes of at least 100 feet (30 meters) over a distance of roughly 1.9 miles (3 kilometers [km]), the USGS (2013) suggests there could be a zone of subparallel faults. Available information from water wells in the vicinity of the Santa Barbara Canyon Fault indicates that aquifers exist primarily in the alluvium south of the fault in the Ventucopa area, and primarily in the Upper Morales north of the fault (Woodard & Curran, 2019).

The USGS (2013) reports the "relatively small amount of vertical offset on the SBCF indicates that changes in water levels across the fault are perhaps the result of distinct fault zone properties, rather than juxtaposition of differing water transmitting ability". In subsequent work, the USGS (2015) considered the SBCF to be a "barrier to groundwater flow."

Based on this information, the geophysical investigation was designed to evaluate whether the SBCF offset either alluvium or the Upper Morales. Available groundwater level information at the time of the investigation indicated a steep gradient near the SBCF, as reported by the USGS (2013). Interpretation of the geophysical data was made based on available geologic maps, water level data, and geophysical logs for DWR nested wells TSS #3 and a new monitoring well (MW-H) that was constructed during the geophysical investigation. Groundwater information from these wells indicated a depth to water of 114 to 117 feet bgs at TSS #3 and about 585 feet bgs at MW-H (Woodard & Curran, 2024a).

3.2 Background for Russell Fault

Available information on the Russell Fault indicates it is a subsurface transtensional feature, exhibiting both strike slip and normal sense of motion, created during Miocene extension (USGS, 2013). Based on this information the Russell Fault is a 7-mile long northwest-southeast trending fault, with both right lateral strike-slip and normal senses of motion, in the western portion of the Cuyama Basin. While it has been reported that the Russell Fault "offsets the top of bedrock by as much as 1500 feet" (Nevins, 1982), it is unclear whether it provides a barrier to groundwater flow since Yeats states "the base of the Morales Formation is not cut by the fault" (Yeats et al., 1989) and the fault does not appear to be active. Yeats also reports the Russell Fault is thought to be an older fault with little to no offset of the alluvial units or the Morales Formation (Yeats et al., 1989). However, the USGS reports there are indications that the fault "divides groundwater in the central portion of the basin from groundwater in the

west" and obstructs groundwater flow due to truncation of older geologic formations (USGS, 2015). Available groundwater information indicates that the aquifer in the area where the Russell Fault crosses the Cuyama River exist primarily in the alluvium on either side of the fault.

The location of the Russell Fault is well known based on oil production wells and seismic lines; however, the question of whether the fault offsets the Morales or provides a barrier to groundwater flow is less well understood. Based on this information, the geophysical investigation would obtain data to evaluate whether the Russell Fault offsets or truncates Older Alluvium and the Morales Formation, and its effect on the flow of groundwater. Available groundwater information indicates the depth to groundwater is between 40 and 70 feet on either side of the Russell Fault in the area of the Cuyama River (Woodard & Curran, 2024b). Interpretation of the geophysical data was made based on available geologic maps and well construction and geophysical logs for DWR nested well TSS #1 and oil production wells and logs in the vicinity of the investigation area. Groundwater information from TSS #1 indicated a depth to water of 40 to 43 feet bgs (Woodard & Curran, 2024b).

4.0 METHODS

4.1 Electrical Resistivity and IP

The electrical resistivity of a material is a measure of the ease with which an electrical current can flow through that material; whereas the IP chargeability of a material is a measure of its ability to polarize, or hold charge, after current has been applied.

DC resistivity and IP were chosen for this survey as these methods are very effective for the delineation of changes in the lithology of sediments and rocks in the subsurface. In particular, these methods are sensitive to changes in grain size, changes in chemistry or mineralogy, changes in saturation (particularly of permeable materials), and changes in the competency/density of sediments and rocks. DC resistivity and IP methods provide high quality, high resolution 2D imaging of subsurface stratigraphy and structure in areas where there is a contrast in electrical resistivity and/or chargeability across an interface or geologic contact, such as the contrasts between dry, coarse alluvium and saturated alluvium, or the contrast between coarse sand/gravel and soft clay.

The electrical resistivity and IP (ER/IP) methods had their beginnings in the mining industry, but are now commonly used in the environmental and engineering fields. To employ ER)/IP methods a DC circuit is established in the ground via cables and a linear array of electrodes. During data collection a known amount of current (I) is applied to the ground through a pair of electrodes (current electrodes), the voltage (V) is read between another pair of electrodes (potential electrodes) some distance from the current electrodes, and the ground acts as the resistor to complete the circuit. Ohm's Law (V=IR) is then used to calculate the electrical resistance of the ground through which the current has traveled (termed electrical resistivity). IP chargeability is obtained (in time domain IP) by turning the current off momentarily after the first resistivity measurement and recording the decay of the voltage over a specified time interval. Specifically, the SuperSting measures the change in voltage from the starting voltage

(in mV/V or chargeability) at specific time gates after the current has been turned off during a specified integration time (1 second for this investigation).
The ability of a material to polarize, or hold charge, is termed chargeability.

SuperSting Electrical Resistivity System

The ability of typical sedimentary earth materials to conduct a current depends on grain size, degree of saturation, and density/degree of cementation. If the material is permeable and fully saturated (such as water saturated coarse alluvium in an unconfined aquifer) the water acts as an electrolyte and carries the current readily (measured as low resistivity); whereas that same permeable material when dry is less able to carry a current and typically has higher resistivity. "Clean" coarse alluvium (alluvium with a low percentage of clay in the matrix) is typically low in chargeability; whereas clays (particularly soft clays) hold charge and are therefore high in chargeability. These properties make DC electrical resistivity and IP methods ideal for the delineation of aquifers and aquicludes in groundwater investigations. There are several different geometrical arrays that can be used to collect resistivity and IP data; however, the most common are Wenner, Schlumberger and dipole-dipole. These data are typically displayed in 2D sections or profiles where they supply lateral and vertical electrical resistivity/ IP chargeability information about materials directly below a given established transect (much like a road cut).

A useful property of electrical resistivity for dry sedimentary soils and rocks is that an increase in grain size generally causes an increase in resistivity (e.g. coarse-grained materials such as gravel or cobbles have higher resistivity values than finer grained materials such as fine sands and silts). Because the electrical resistivity of a material correlates well with grain size, this method can be used not only to identify lateral and vertical boundaries between different materials but also to identify the lithology of the material (e.g. sand vs. silt vs. clay). As electrical current flow through sedimentary soils and rocks is primarily electrolytic and takes place at the grain boundary, permeable materials (such as coarse sands or sandstones) are less resistive (or more conductive) when saturated than when dry. In addition, because ionic conduction is enhanced by the presence of dissolved salts in the pore fluid, soils and rocks saturated with saline or high-TDS groundwater will have significantly lower levels of resistivity than soils and rocks bearing fresh water. In the case of rocks, the higher the density or lithification/cementation of the rock, the higher the resistivity – where typically unfractured, highly competent rock such as limestone, cemented sandstone or certain types of shale (such as laminated/dense silicic or calcareous shale) – is high in resistivity.

Because the electrical resistivity method is sensitive to changes in grain size, lithification/density and chemistry, this method is ideal for displaying the lateral or vertical contrast between different types of materials across a 2D profile. This contrast readily allows the delineation of geologic contacts, vertical/subvertical and dipping geologic features such as faults/fault splays, fractures and unconformities, and different types of water bearing zones (such as coarse alluvium vs fractured rock) in areas where there is a sharp contrast in grain size or lithology at the boundary.

In turn, the IP method is known to be sensitive to changes in the chemistry or ionic activity of soils or groundwater, and typically detects a contrast in chargeability between coarse grained aquifers (typically lower in chargeability) and fine grained aquicludes, since clays and fine grained soils or rock tend to have higher chargeability than sands and gravels. This is because clays tend to have more free ions available than sands and gravels. While sands, gravels and cobbles in alluvium may exhibit a minor positive IP response (depending on the mineralogy of the alluvial materials), there is generally a drop in chargeability at the groundwater table, particularly in areas where the alluvium is coarse grained and well sorted and the water is fresh. This is a phenomenon that appears to be associated with a decrease in membrane polarization at the water table.

Taken together, 2D resistivity and IP provide very powerful indicators of the nature of subsurface materials and their saturation along an established transect, and also allow discrimination between possible types of lithology giving rise to an observed geophysical response, for example, discrimination between high resistivity, well cemented silicic or calcareous shale and high resistivity gravels/boulders in a clay matrix. In addition, since the electrical resistivity method is sensitive to changes in the level of groundwater saturation of materials, this method can provide a measure of permeability, particularly if the lithology is known. Electrical resistivity and IP methods can also be used to delineate sources of fresh groundwater that are structurally controlled, such as natural springs associated with faulting. As such, these methods are ideal for the discrimination between aquifers and aquicludes in the subsurface, delineation of faulting, folding and general bedding attitude, and offsets of water bearing units across a fault/fault zone.

Therefore, both electrical resistivity and IP data were collected during this investigation (where possible and time allowing); electrical resistivity was used to identify changes in lithology and subsurface stratigraphic/structural features, and once these determinations and features were identified, IP was used to screen for the presence of potential water bearing zones and possible barriers to groundwater flow.

4.1.1 SuperSting System

The SuperSting is a system that allows automated acquisition of electrical resistivity and IP data. During a SuperSting survey, many apparent resistivity/apparent chargeability measurements are made for a suite of electrode pair separations, and these apparent resistivity/ chargeability values are plotted on 2D diagrams (location of measurement vs. depth), which are referred to as pseudosections. The automated resistivity/IP data acquisition provided by the SuperSting allows for a tremendous amount of data to be acquired relatively quickly with very

high-resolution capability. Once the resistivity and IP data have been acquired for a given transect, they can be downloaded to a field computer and subsequently viewed and processed with appropriate software, where the end result is two 2D subsurface model sections (one for resistivity and one for IP chargeability) that contain both sounding and profiling data. Once an acceptable model section (profile) is obtained for each data set, these profiles can be interpreted for features of interest.

4.2 Utility Locating

Utility locators and shallow metal detectors were used to delineate metallic/conductive utilities in the immediate vicinity of the established transects in each area of investigation in order to both assist with the placement of electrodes prior to data collection and to distinguish anomalies caused by utilities (or active/abandoned oil wells in the case of the Russell Fault investigation) from those caused by geologic/hydrogeologic features of interest during data processing. The proper placement of electrodes in the presence of utilities is particularly important because utilities can cause artifacts in the data. If utility locations and orientations are known prior to electrode placement, key electrodes can be moved slightly to avoid unnecessary electromagnetic interference in the data.

Utility locators such as the Dynatel 500A (Dynatel) and Radiodetection 4000 (RD4000) are specifically designed to accurately locate and delineate metallic or conductive underground pipes and utilities. These locators are designed to detect the magnetic field resulting from electric current flow on a line. During the use of a locator, a transmitter emits a radio-frequency source signal that induces a secondary electromagnetic field in nearby utilities. A receiver unit measures the signal strength of this secondary magnetic field and emits an audible response to allow the precise location and tracing of the pipe, cable, or other conductor in which the signal is induced. If the utility is accessible, the source signal can be directly connected to it, which makes the secondary field much larger and more readily measurable. Where no direct connection is possible, the Dynatel and RD 4000 can be used to inductively trace the pipe or cable. Utility locators are effective for the location of long, linear metallic objects.

The Fisher M-Scope (M-Scope) was also used to augment the investigation of metallic utilities and to locate shallow buried metallic features (such as abandoned piping and buried vaults) in the areas of investigation. The M-Scope has a transmitter and a receiver at the ends of a short boom. During operation, the transmitter emits a radio-frequency source signal that induces a secondary magnetic field in metallic material in its immediate vicinity. The receiver measures the signal strength of this secondary magnetic field and emits an audible response, the volume and pitch of which increase in the presence of metallic material. The sensitivity of the M-Scope allows the precise identification of the lateral boundaries of a metallic object.

5.0 FIELD PROCEDURES

The field work was conducted in two separate phases, as previously discussed. However, while the actual site preparation/establishment of transects was different for each investigation area, the same resistivity/IP field procedures were followed for each area of investigation. The following sections describe these field procedures.

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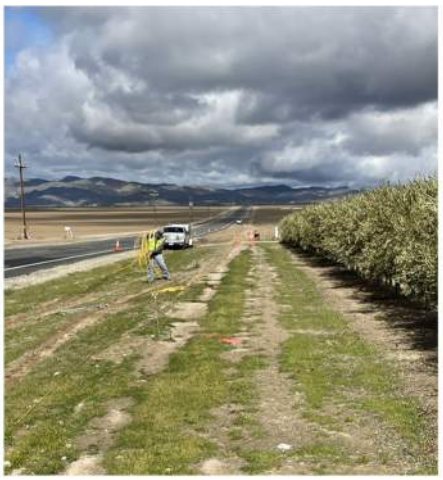
5.1 Site Preparation

5.1.1 Santa Barbara Canyon Fault

Two resistivity/IP transects (Lines 1 and 2) were established in the area where the SBCF is mapped, to obtain an image of lithologic, structural and hydrogeologic features in the vicinity of the concealed fault. These transect locations were designated by Woodard & Curran based on land access and are shown in Figure 1.



Establishing Line 1 along HWY 33 (View to the Northwest)

Line 1 was 1,110 ground meters (3,641.7 ground feet) in length and ran south-southeast to north-northwest in the public right of way along the east side of Highway 33 (inset right). This line was established to verify the eastern extent/bend of the SBCF and to tie into the new monitoring well MW-H. This well was established to address a local data gap and also to document the litholgy and depth to groundwater in the vicinity of the fault in support of this investigation. Line 1 was extended approximately 700 feet north-northwest of MW-H in order to ensure the greatest depth of investigation at the well. In practice, if one is trying to detect and delineate a linear feature in the subsurface (such as a fault or fracture), the transect should be oriented perpendicular to the expected trend of that linear feature (in the ideal case) to best detect it. While Line 1 was oriented somewhat oblique (not exactly perpendicular) to the mapped trend of the SBCF, its orientation was considered acceptable to detect it, as there is a generally accepted window of about 40 degrees (plus or minus) perpendicular to a linear feature to detect it.

Line 2 was 920 ground meters (3018.4 ground feet) in length, ran south to north, beginning just north of Big Pine Road and extending to the north into the Cuyama River bed (inset right). This line was designed to be centered on the mapped location for the SBCF, and was oriented perpendicular/sub-perpendicular to it (Figure 1).

Surveying along Line 2 (View to the South/Southwest)

As Line 2 was on BLM land and the area was subject to environmental protection Woodard & Curran worked with the BLM to obtain a CEQA Categorical Exclusion to conduct the investigation during dry/low flow conditions in the Cuyama River. A

wildlife biologist was present during the work to ensure no harm was done to specific animal and plant species during the data collection for Line 2.

5.1.2 Russell Fault

Two resistivity/IP transects (Lines 1 and 2) were established in the area of the mapped Russell Fault. As previously discussed, while much is known regarding the deeper rocks in the area of the Russell Fault from extensive drilling for oil exploration, there is little information available on the lithology and presence of groundwater within the upper 100 feet of the surface. The Russell Fault transect locations were decided by Woodard & Curran and Spectrum based on review of existing bedrock outcrops, terrain, and active oil field operations. In this part of the Basin, the Cuyama River has deeply incised the land surface - leaving a sharp 20 to 30 foot high bank. The presence of outcrops south of the river bed limited the location of transects to the north side of the river, and the steep river bank and heavy vegetation in the river bed prevented locating a transect in the river bed. As a result, the transects were established such that the western portion of each transect was on North Fork Ranch property and the eastern portion wa on the Russell Ranch property.. These transect locations are shown in Figure 4.

Line 1 at Russell Ranch
(View to the Northwest)

Based on the northwest-southeast orientation of the Russell Fault, parallel transects oriented northeast-southwest would have been ideal for delineation of the fault. However, as noted, there were significant spatial constraints at the Properties in the area of the Russell Fault. In particular, it was not possible to establish northeast-southwest oriented transects that were both centered on the mapped trace of the fault and of sufficient length (at least 3000 feet long) to reach the desired depth of investigation, given the presence of Whiterock Bluff to the north/northeast and the Cuyama River to the southwest. Therefore, an oblique orientation to the fault was necessary. The northwest-southeast oriented, roughly flat unpaved road along the base of Whiterock Bluff was used to establish the orientation of the transects. Line 1 ran along the south side of this road and extended into the vegetated area northwest of the Russell Ranch/North Fork Ranch property boundary (inset right). Line 2 was established between 300 and 600 feet south/southwest of and sub-parallel to Line 1, across a vegetated area that was just northeast of the Cuyama River (Figure 4).

Line 1 was 1,110 ground meters (3,641.7 ground feet) in length and ran northwest-southeast; this line began about 330 feet northwest of the abandoned well known as “Cuyama-1”. Line 2 began about 350 feet southeast of Cuyama-1 and ran southeast for 1,110 ground meters (3,641.7 ground feet), to the point where it terminated, just southeast of a well pad containing wells with API # 07900946 and 07900942 (Figure 4).

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5.2 Resistivity/IP Procedures

The resistivity/IP field procedures discussed below were generally the same for data collection at both the SBCF and the Russell Fault areas of investigation.

Once the location and orientation of each transect had been established, the transect was marked at 10-meter station intervals along its entire length. Once this was completed, steel stakes were established at each 10-meter electrode station and, where necessary, salt water was added to the soil to improve the electrical contact between the soil and the electrode. Once the stakes were established in the ground, the resistivity cable with passive electrodes was attached to each stake with a rubber band and the cable was connected across each stake to form the electrical circuit. When this procedure was completed resistivity (and IP where possible) data were collected using a linear array of multiple electrodes, where a full array length (ground length) was 112 electrodes (1,110 meters or 3,641.7 feet), each spaced 10 meters apart. Prior to data acquisition, all recommended manufacturer system tests were conducted, and contact resistance tests were conducted on the electrodes to ensure that enough current was traveling through the ground to obtain accurate results. Contact resistances were reduced as low as possible before any measurements were taken. Once the initial tests were performed, both Schlumberger and dipole-dipole arrays of data were collected on each transect. During data collection two readings were taken for every measurement in order to test for repeatability in the readings. Where possible, IP data were collected on the Schlumberger array of each transect; this procedure has been found to provide the greatest signal to noise ratio for IP data, as these data are more susceptible to error/spiky readings, and maintains an efficient field data collection schedule for these types of projects.

Once the data were fully acquired they were downloaded to a field computer, reviewed for quality and saved in a raw data file. Elevations were surveyed by the Spectrum crew at each electrode station along each transect. As no absolute elevation ties were available, Station 0 along each transect was arbitrarily assigned a relative elevation of zero. A detailed sketch map of the trend of each transect, along with the location and orientation of detected utilities and surface features (such as fences, steel gates, overhead power lines and oil wells/well pads) that could affect the measured resistivity/IP values along each transect was made by the Spectrum crew.

6.0 DATA PROCESSING

6.1 Resistivity Data Processing

The Schlumberger and dipole-dipole data files for each transect were entered into the software program EarthImager® (Advanced Geosciences, Inc., 2015). For each line of data collected, each array data set was reviewed carefully and edited appropriately for noisy or erroneous data points. Once this was done, the Schlumberger and dipole-dipole data sets were merged together, and an appropriate model solution was generated using the procedures described below.

EarthImager® Processing

This program first reads the data file, which contains information such as electrode spacing, length of transect, number of repeat measurements per electrode, and type of resistivity/IP array. Once read in, the resistivity and IP data are reviewed separately for indications of erroneous or noisy data points (which are removed) using a color graphic display. Once appropriate editing ha been carried out, surface topography information is read into the program and the data are then sorted into finite element blocks where each block is assigned an initial resistivity value. A forward modeling algorithm that uses a non-linear least squares optimization technique is used to first calculate apparent resistivity values that would be measured with the given array type for the starting model. The *calculated* apparent resistivity values are then compared with the *measured* apparent resistivity values, and the difference between the two used to adjust the model block values to produce a model that has a lower root-mean-square (RMS) error fit to the measured section. The program advances through a series of iterations until an acceptable error level is reached (usually 10% or less), at which point the final resistivity model is saved. Once an acceptable solution is obtained with the resistivity data, a linear inversion of the IP data is carried out and the final IP chargeability section is saved.

For each transect, the final product of the processing is two color-contoured model sections: one for resistivity and one for IP, where the final fitting error between the *calculated* pseudosection generated from the final model section and the *actual* measured pseudosection is represented as the RMS (root mean square) in percent. It should be noted that the resolution of the resisitivity/IP method decreases with increasing depth. Therefore, the finite element mesh becomes coarser with depth, providing lower resolution and a more generalized model. This tends to produce broadening and flattening along the lower boundary. The ultimate effect of this is that the data with the highest resolution and most accurate depths are found in the upper 30% of the model section, where the lateral resolution is approximately one-half of the unit electrode separation. In terms of the data collected for this investigation, one-half of the electrode spacing corresponds to 5 meters (16.4 feet) lateral resolution. Because two different arrays of resistivity data were collected along each transect and then merged together during processing, the loss in resolution of the resistivity data was minimized. The main limitation of 2D resistivity/IP imaging is in the data located in the bottom third of the model section (corresponding to the greatest detection depth), where both lateral and vertical resolution are lower than that for the upper two-thirds of the section.

7.0 RESULTS AND INTERPRETATION

While both the SBCF and the Russell Fault lie within the Basin, these areas have slightly different subsurface geology and potential contacts that might be offset across the respective faults. Therefore, the investigation areas are discussed separately and fault-specific resistivity color schemes interpreted for lithology were developed. The following sections contain the results for each area of investigation.

7.1 Santa Barbara Canyon Fault

The geophysical survey location map for the SBCF investigation is presented in Figure 1; Lines 1 and 2 are shown on this map. The electrical resistivity and IP profiles for Line 1 are presented in Figures 2 and 2A, respectively. The electrical resistivity and IP profiles for Line 2 are presented in Figures 3 and 3A, respectively. A summary of resistivity interpretation for lithology is presented in Table I. The interpretation of the SBCF data and results of the survey are discussed below.

7.1.1 Interpretation

Resistivity interpretation for lithology in the SBCF area was made from review of the following documents and maps:

- Well Completion Report and geophysical logs for DWR nested well TSS #3
- Boring and geophysical logs for MW-H
- *Cuyama Valley Groundwater Basin Groundwater Sustainability Plan* (Woodard & Curran, 2019)
- *Construction of 3-D Geologic Framework and Textural Models for Cuyama Valley Groundwater Basin, California (USGS, 2013)*
- Woodard & Curran map entitled "Wells Near SBC Fault, Depth to Groundwater" (Woodard & Curran, 2024a)
- Dibblee Foundation Geologic maps for the Ballinger Canyon, Cuyama, Cuyama Peak and Fox Mountain quadrangles (Dibblee and Minch, 2005a and 2005b; Dibblee and Minch, 2006; Dibblee and Minch, 2007)

Based on this review, correlations with measured resistivity values, and general experience from similar projects in Santa Barbara, San Luis Obispo and Ventura Counties, a key of resistivity values and their associated lithologic interpretation was generated. Once this was done a standard resistivity color scheme (ranging from 4 Ohm-meters to 1500 Ohm-meters) was created and used for various ranges of resistivity in the model resistivity sections (profiles) generated for both Lines 1 and 2. This color scheme utilized a "modified rainbow" and ran from dark blue (lowest resistivity values of 4 Ohm-meters) to green to yellow to tan/brown to salmon/red to grey to grey-purple (1000 to 1500 Ohm-meters with highest resistivity). Once this was done a summary of (color coded) resistivity interpretation for lithology was made for the area of the SBCF; this summary is provided in Table I. A brief discussion of this site specific resistivity may be found below.

As expected, the geologic units present in the area of the SBCF have similar resistivity values to those obtained in other areas with primarily non-marine deposition in fluvial sedimentary environments in Santa Barbara and San Luis Obispo Counties. The lowest resistivity values measured range from 4 to 20 Ohm-meters and correspond to finer grained materials such as clays and silts in unconsolidated sediments, and shales and claystones (likely Lower Morales) in consolidated/lithified materials. As the grain size of the materials increases in unconsolidated sediments or alluvium the resistivity value increases. For this investigation materials from sand to coarse sand to gravels to cobbles ranged in resistivity from 35 to 75 to

200 Ohm-meters, respectively. Similarly, sedimentary rock, less dense or fractured rock (particularly fine grained rock such as shale) is lower in resistivity than dense or strongly cemented coarser grained rock made of coarser grained material such as siltstone or sandstone. For this investigation the assumption is that fractured shale or claystone ranges from roughly 4 to 20 Ohm-meters, and as the rock changes from siltstone to sandstone the resistivity increases from roughly 25 to 75 Ohm-meters to 400 or 500 Ohm-meters (cemented, dense dry sandstone). The highest resistivity values (1000 to 1500 Ohm-meters- grey-purple) measured in the area of the SBCF are interpreted to correspond to large amounts of dry cobbles or boulders in alluvium. It should be understood that these high resistivity values can also occur in certain types of highly cemented, impermeable rock as well.

In addition, while no direct shallow water level tie in alluvium could be verified as correlating with shallow areas exhibiting a sharp drop in resistivity along Line 1 or 2, the interpretation of water bearing zones in alluvium was made where it seemed reasonable to do so. For the SBCF area, resistivity values ranging from 40 to 70 Ohm-meters are considered ideal for the presence of saturated zones of alluvium.

7.1.2 Line 1

The profile in Figure 2 contains the inverted resistivity distribution which best represents the actual lateral and vertical variation of earth resistivity beneath the ground surface along Line 1. In this figure, the colors represent resistivity values which key to the color bar to the right of the image and to the lithological interpretations presented in Table I. The resistivity values associated with the various colors are indicated on the right side of the color bar, and their general lithologic interpretation was discussed in Section 7.1.1. The numbers across the top of the profile represent ground distance along Line 1 in units of feet as measured from Station 0. The tie to MW-H is also indicated. The numbers along the vertical axis of the profile represent elevations relative to Station 0, which was arbitrarily assigned an elevation of zero. The dashed blue line at depth in Figure 2 indicates the interpreted top of the water saturated zone along Line 1. This interpretation was identified primarily by correlation with the known depth to groundwater in the shallow nested well at MW-H and also by a laterally traceable decrease in resistivity across the profile.

The resistivity data collected along Line 1 were of very high quality and provided reliable measurements to at least 823 feet bgs. In a general sense the resistivity profile along Line 1 indicates somewhat undulating, but laterally continuous layers with similar resistivity values that vary vertically – suggesting laterally continuous layers with similar lithology that are stratified vertically. The first (near-surface) layer is roughly 70 feet thick along the SSE half of the profile, and is marked by moderate resistivity values (50 to 75 Ohm-meters, gold to yellow orange) that are likely associated with coarse sand to sand with gravel. Beginning at about Station 2200 this layer appears to thicken and fine, as evidenced by a thicker section of gold to yellow-orange resistivity that has a lower resistivity wedge of material sandwiched within it (30 to 40 Ohm-meters, turquoise to green) that is likely silty sand and continues to at least Station 3400. This first layer thickens to 100 feet at Station 2600 and then to about 170 feet at the tie with MW-H, where it continues to gradually thicken to at least Station 3500.

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The next laterally continuous layer in the profile for Line 1 lies directly beneath the first layer, and exhibits a significant increase in resistivity, ranging between 170 and 460 Ohm-meters. This layer begins at a depth of 110 to 120 feet bgs at the SSE end of Line 1, where it is about 230 feet thick, and thickens to about 400 feet between Stations 1600 and about 2400. Past 2600 this layer thins again, and apparently retains thicknes to the end of Line 1.

The resistivity range of this layer suggests very coarse grained material that, assuming it is permeable, is likely dry. The middle layer sandwiched between may be sand or gravel that contains a high percentage of cobbles or even boulders (salmon colors). Beneath this layer the resistivity values continue to drop to what is apparently the water table based on resistivity vlaues between about 40 and 70 Ohm-meters (yellow to orange) and a tie with MW-H.

Indications of the Fault

Based on lateral continuity in resistivity layers across the profile to a depth of at least 700 feet bgs, this profile does not exhibit significant or sharp lateral contrast in resistivity, or significant (100 feet or greater) vertical offset in layers across a vertical or subvertical boundary which would be expected based on the sense (i.e., buried vertical/subvertical fault with normal offset) of the SBCF. A possible buried channel centered at about Station 1750 and beginning at a depth of about 750 feet bgs is evident in the data based on a roughly 500-foot wide area of moderate (50 to 60 Ohm-meter yellow) resistivity surrounding by lower resistivity on either side of it. This feature is labeled in Figure 2 and may represent a former tributary of the Cuyama River.

Groundwater

While the resistivity values measured in the upper layer on Line 1 are typical of sedimentary materials saturated with water, no shallow (roughly 100 to 150 feet bgs) groundwater was observed at MW-H where these resistivity values occur. Moreover, at the SSE end of Line 1, the resistivity values *increase* to about 200 Ohm meters at a depth of about 100 feet bgs - where the resistivity would be expected to decrease in the presence of the water table. It was noted thatwell TSS #3 to the south across Hwy 33 has a static depth to water of 114 to 117 feet bgs. In addition, resistivity values below 100 feet continue to increase rapidly to 300 to 350 Ohm-meters beneath this, whereas they would be expected to decrease if unconfined saturated materials were present.

Information provided by Woodard & Curran indicates that groundwater was first encountered at about 610 feet bgs based on a sonic log of the MW-H borehole; this tie is shown in Figure 2. Following well construction and development, the depth to water table in the shallow nested well was about 585 feet bgs. Based on this groundwater tie and review of the resistivity data, the interpreted unconfined water table along Line 1 is shown with a dashed blue line in Figure 2. This boundary corresponds with the 60 Ohm-meter contour and likely consists of saturated coarse grained sands and gravels, where resistivity values are below this level in the water saturated zone. It is interesting to note that an apparent zone of finer grained material (perhaps silty sand) is indicated by a decrease from 50 to 30 Ohm-meters in the resistivity data beginning at a depth of about 620 feet bgs, which grades down to even finer grained material (16 Ohm-

meters and below, perhaps silty clay or clay) at about 700 feet bgs. While this is a depth where there is some loss of data, review of the data to the south of the well tie suggests a significant layer of low resistivity (20 Ohm-meters and lower) below about 700 feet bgs beginning at about Station 2260 that extends to at least Station 2970. As this is close to the maximum depth of detection along Line 1, this deep zone is not well resolved in the data, and it cannot be determined if this layer extends further to the north-northwest.

The IP data along Line 1 (Figure 2A) indicate moderate chargeability values and appear to be responding primarily to grain size based on a comparison with the resistivity section in Figure 2. An area of low IP (about -300 mS) beginning at about Station 2400 at a depth of about 620 feet and extending to Station 3050 appears to correspond to the finer grained unit that ties at MW-H. Review of the IP data to the south of the well tie suggests that this low IP layer extends to at least 800 feet bgs in the area of the well. Another low IP zone is evident south of the channel feature between Stations 700 and 1200 in a similar depth range. While this low IP zone appears to correlate with a lower resistivity zone (25 to 30 Ohm-meters, turquoise to teal colors) this feature appears to be smaller and lower in amplitude than the feature in the area of the well, and less resolved in the data.

7.1.3 Line 2

The profile in Figure 3 contains the inverted resistivity distribution which best represents the actual lateral and vertical variation of earth resistivity beneath the ground surface along Line 2. As in Line 1, the colors in this figure key to the color bar to the right of the image and the resistivity summary in Table I. The numbers across the top of the profile in Figure 3 represent ground distance along Line 2 in units of feet as measured from Station 0, which was at the south end of Line 2. The numbers along the vertical axis of the profile represent elevations relative to Station 0, which was arbitrarily assigned an elevation of zero. The dashed turquoise line in Figure 3 indicates the interpreted top of the water saturated zone where it occurs along Line 2. A dashed black line marks the base of dry alluvium/Upper Morales interface. Heavy dashed black lines are used to delineate interpreted faults or fault splays.

The resistivity data collected along Line 2 were of very high quality and provided reliable measurements to about 600 feet bgs. Because no dipole-dipole data were collected along Line 2 due to the challenging terrain and vegetation, and because this line was shorter than Line 1, these data do not extend as deeply as those collected along Line 1. A number of features are evident in the profile in Figure 3. A layer of laterally variable high resistivity (500 to 1500 Ohm-meters, grey to purple-grey) extending from the surface that thickens to the north (from about 50 to 100 feet at Station 1680) is evident in the data; this layer is interpreted as dry alluvium. North of about Station 1700 the alluvium thickens to about 200 feet, which coincides with the intersection with the Cuyama River.

Beneath the alluvium, beginning at about 200 feet bgs, three significantly thick and laterally continuous units with similar resistivity values are evident in the data. From south to north, the first of these extends from about Station 300 to at least Station 1500, appears to be about 300 to 400 feet thick and consists of low resistivity values ranging from 4 to 20 Ohm-meters (blue to deep blue). This unit is interpreted as the Lower Morales and, assuming Line 2 is somewhat

perpendicular to strike in this area, appears to be dipping gently to the south. The second unit occurs at depth between Stations 1120 and 1970, appears to be at least 300 feet thick and consists of moderate to higher resistivity values ranging from 40 to 90 Ohm-meters (yellow/gold to tan colors). Based on our interpretation, it may correspond to a lower member of the Upper Morales. The third unit ranges in depth between about 160 and 240 feet bgs, occurs between about Station 1870 and Station 2580, and appears to be about 400 feet thick. This unit consists of moderately high to high resistivity values ranging from 150 to 500 Ohm-meters (brown to salmon colors) and is interpreted as the Upper Morales. A discussion of these units as they pertain to the fault and groundwater follows below.

Indications of the Fault

The presence of the SBCF is evident in the data at about Station 1830, based on a sharp lateral contrast in resistivity in layers beneath the alluvium along a steep, apparently north dipping vertical/subvertical feature that extends to depth along Line 2. This feature is buried and begins at about 212 feet bgs, and, based on the geologic units discussed above, appears to exhibit normal offset, where a lower/older unit of the Upper Morales is present immediately south of it and a higher/younger unit of the Upper Morales is present immediately north of it.

These data indicate the presence of a younger, unnamed thrust fault, that appears to be thrusting Lower Morales over the Upper Morales based on a south dipping feature with variable dip between Stations 1680 and 1080. In addition, this younger feature appears to create a subvertical/steeply south dipping offset in alluvium that may be affecting the presence of groundwater. This feature is shown in Figure 3 and may be related to a splay of the South Cuyama Fault or other unnamed fault. It appears to be an important feature that may affect the presence and flow of groundwater. Therefore, for the purposes of discussion this unnamed thrust fault will be assumed to be part of the SBCF, and together referred to as the "SBC Fault System". As noted, the resistivity data indicate the Morales is offset by the SBCF, and the (deeper) alluvium is offset by the SBC Fault System.

Groundwater

Based on a sharp vertical drop in resistivity from about 800 Ohm-meters (grey) to 50 Ohm meters (yellow) in about 30 feet vertically, the depth to groundwater on the south side of the SBC Fault System appears to gradually deepen from about 50 feet at the south end of Line 2 to about 100 feet at Station 1680. Based on ideal values of resistivity (40 to 70 Ohm-meters) high quality water bearing zones appears to be present in pockets south of the SBC Fault System, where the bottom of this water bearing zone is marked by the contact with Lower Morales and appears to be approximately 220 to 230 feet bgs.

Based on moderate resistivity values (yellow to yellow-orange), a water bearing zone may exist north of about Station 1600 at about 300 feet bgs; however, this zone may be confined based on its location within the SBC Fault System. Based on higher resistivity (150 to 500 Ohm-meters) values both laterally and vertically north of about Station 1800, significant water bearing zones do not appear to be present north of the SBC Fault System. Therefore, the SBC

Fault System appears to be providing an offset of water bearing units across its trace and providing a barrier to groundwater flow across it.

The IP data shown in Figure 3A indicate moderate values in chargeability and do not show direct correspondence with the variations in resistivity used to identify the geologic units discussed above. These measurements may be responding to patterns in grain size or disseminated metals or chargeable minerals in the sedimentary materials. However, there is a steeply north-dipping zero to low chargeability (yellow green to dark green to turquoise) feature beginning at about Station 1800 at a depth of about 200 feet, that corresponds well with the SBCF as interpreted from resistivity. This feature may be associated with fault zone properties of the SBCF.

7.2 Russell Fault

The geophysical survey location map for the Russell Fault investigation is presented in Figure 4: Lines 1 and 2 are shown on this map. The electrical resistivity and IP profiles for Line 1 are presented in Figures 5 and 5A, respectively. The electrical resistivity profile for Line 2 is presented in Figure 6.

7.2.1 Interpretation

Resistivity interpretation for lithology in the Russell Fault area was made from review of the following documents and maps:

- Well Completion Report and geophysical logs for DWR nested well TSS #1
- Boring logs for oil wells in the investigation area (CalGEM Well Finder)
- *Changing Tectonic Regimes in the Southern Salinian Block: Extension, Strike-Slip Faulting, Compression and Rotation in the Cuyama Valley, California (Ellis, 1994)*
- *Cuyama Valley Groundwater Basin Groundwater Sustainability Plan* (Woodard & Curran, 2019)
- *Construction of 3-D Geologic Framework and Textural Models for Cuyama Valley Groundwater Basin, California (USGS, 2013)*
- *Woodard & Curran map for Top of Shale, Russell Fault Vicinity (provided by Cleath-Harris Geologists (CHG))*
- *Cuyama Valley Groundwater Basin Bounary Modification Request* (CHG, 2018)
- Woodard & Curran map entitled "Wells Near Russell Fault, Depth to Groundwater" (Woodard & Curran, 2024b)
- Dibblee Foundation Geologic map for Caliente Mountain quadrangle (Dibblee and Minch, 2005c)

Based on this review, correlations with measured resistivity values, and general experience from similar projects in Santa Barbara, San Luis Obispo and Ventura Counties, a key of resistivity values and their associated lithologic interpretation for the Russell Fault area of investigation was generated. Once this was done a standard resistivity color scheme (ranging from 0.5 Ohm-meters to 2000 Ohm-meters) was created and used for various ranges of resistivity in the model resistivity sections (profiles) generated for both Lines 1 and 2. This

color scheme utilized a "modified rainbow" and ran from dark blue (lowest resistivity values of 0.5 to 2 Ohm-meters) to turquoise to green to yellow to red to purple to grey (1,000 to 2,000 Ohm-meters for the highest resistivity). Once this was done a summary of (color coded) resistivity interpretation for lithology was made for the area of the Russell Fault; this summary is provided in Table II.

Based on a few oil well ties on Lines 1 and 2, general discussion in the USGS and Woodard & Curran documents, and other documents listed above that contain descriptions of the geologic units in this part of the Basin, the following assumptions were made for interpretation of the resistivity profiles presented in Figures 5 and 6:

- Near surface sections of the profiles that exhibit a wide range of resistivity, from as low as 1 Ohm-meter (likely clay) to as high as 4,000 Ohm-meters (likely boulder trains), particularly variations in higher resistivity, both laterally and vertically, are assumed to be alluvium
- Low resistivity values (roughly 1 to 10 Ohm-meters) in the alluvium are assumed to be caused by grain size and likely associated with fine grained sediments such as clay or silt; however, where alluvium is saturated these lower resistivity values could be associated with shallow zones with brackish ground water
- Areas of low resistivity from about 0.7 to about 7 Ohm-meters (dark blue to to light blue) of signficant thickness and lateral extent are assumed to be associated with the Lower Morales, based on reports of finer grained materials in the Morales in the western part of the Basin, where the upper portion of the Morales unit is known to contain "abundant shale chips", and also may contain shells (Nellis, 1994)
- Areas with moderate resistivity (40 Ohm-meters–yellow) grading to higher resistivity (100 Ohm-meters to 9,000 Ohm-meters) of significant thickness and lateral extent are assumed to be the Monterey shale. This unit has been referred to as containing brown shale, black limey shale, silicic shale, calcareous shale, and dense, hard sand with shells. The wide variation in resistivity is common in marine shales and is likely associated with variations in hardness, cementation and chemistry, to name a few

These assumptions were necessary to assess whether the Morales and/or the alluvium was offset by the Russell Fault/Fault System. A discussion of the results on a line by line basis is provided in the sections below.

7.2.2 Line 1

The profile in Figure 5 contains the inverted resistivity distribution which best represents the actual lateral and vertical variation of earth resistivity beneath the ground surface along Line 1 in the Russell Fault investigation area. The colors in this figure key to the color bar to the right of the image and the resistivity summary in Table II. The numbers across the top of the profile in Figure 5 represent ground distance along Line 1 in units of feet as measured from Station 0, which was at the west/northwest end of Line 1 (Figure 4). The numbers along the vertical axis of the profile represent elevations relative to Station 0 on Line 1, which was arbitrarily assigned an elevation of zero. A dashed pink line is used to mark the interpreted base of alluvium along the line and heavy dashed black lines are used to delineate interpreted faults or fault splays.

The resistivity data collected along Line 1 were of good to high quality and provided reliable measurements to about 800 feet bgs; however, there were some areas of electromagnetic noise caused by utilities, abandoned oil wells or other surface cultural features (e.g., barbed wire fence). During data processing the data were carefully edited to remove erroneous measurements and reduce artifacts in the data caused by these features. As a result, the resistivity profile shown in Figure 5 is a smoothed representation of the actual geologic and structural features present along Line 1.

A number of features are evident in the profile in Figure 5. The resistivity data indicate that materials along Line 1 are both laterally and vertically variable in terms of grain size, lithology and density. Based on resistivity values ranging from 35 to about 150 Ohm-meters (yellow to red to brown), the first observed layer beneath ground surface appears to be alluvium, where the coarsest grained and thickest section occurs between Stations 0 and about 1000, which is west of the Russell Fault. Based on the resistivity values this layer of alluvium likely contains coarse sand with gravel and cobbles, thickens to the west and ranges in thickness between 140 and about 250 feet. Based on a slight vertical drop in resistivity in a few locations across this layer, the water table may be present beginning at a depth of about 50 feet bgs; this will be discussed more in the groundwater section below. Alluvial materials east of about Station 1100 are more conductive, where the resistivity ranges from about 7 (turquoise) to 13 (teal) Ohm-meters at least to Station 1800, and likely contain higher amounts of silt and clay than the alluvium west of Station 1000. In addition, resistivity values in the alluvium east of Station 1100 are lower than values considered to be favorable for the presence of high quality (i.e., less saline) groundwater.

The next layer evident beneath the alluvium west of the Russel Fault is interpreted as the Lower Morales, based on a 300 to 400-foot thick layer of low resistivity (0.5 to 4 Ohm-meters, dark blue to blue). Beneath this layer, a thick layer with higher resistivity (45 to 120 Ohm-meters – where it occurs) is interpreted as the Monterey Formation. Because Line 1 is likely either parallel to or oblique to geologic strike in this area, no attempt to determine approximate attitude of bedding in the Morales and Monterey along Line 1 was made. However, the apparent undulation of layers with similar resistivity does suggest these units have been deformed. East of Station 1800 the lateral variations in resistivity are significant and believed to be related to faulting. These features are discussed in the sections below.

Indications of the Fault

The presence of the Russell Fault is evident at depth in the data between about Stations 1840 to 1850 (sharpest at Station 1848), based on a sharp lateral contrast in resistivity across a near-vertical feature that is clearly evident at a depth of about 380 feet bgs and appears to extend to depth beneath this area of Line 1; this feature is labeled in Figure 3. Based on the geologic units reviewed and the resistivity values measured, this feature appears to represent normal offset across a vertical fault, where the Monterey Formation (resistivity values ranging from 40 to 150 Ohm-meters) appears to be present immediately west of it and the Lower Morales (resistivity values ranging from 1 to 4 Ohm-meters) is present immediately east of it. Based on the contact between the Lower Morales and the Monterey, the resistivity values east of the

fault (and no indication of the Morales/Monterey contact east of the fault), the base of the Morales appears to be offset at least 500 feet vertically across the fault (west side up).

Based on the resistivity values above 380 feet bgs with the apparent continuation of the vertical low resistivity anomaly centered at Station 1848, the Russell Fault appears to extend to depths as shallow as 50 feet bgs and may have subvertical splays on either side (likely associated with transpression). Between Stations 1750 and about 1900 in this depth range the Lower Morales appears to be directly west of the fault and alluvium is interpreted east of the fault.

The Russell Fault is reported to be a right lateral strike-slip fault and, based on the resistivity data, it appears to extend upward to a depth as shallow as 50 feet bgs. The apparent complexity of the Russell Fault signature in the data can be explained by its sense of offset and the current seismo/tectonic environment in this part of California. The Russell Fault investigation area lies directly west of the "Big Bend" area of the San Andreas Fault, which is currently experiencing transpression, which means that the shallow extension of the fault has right lateral offset and likely some reverse offset, where the old/buried normal fault has been reactivated as a reverse fault. In addition, the correlation of features and geologic units across the fault is more complex than a single normal or reverse fault, because these units are not only offset in a vertical sense but also in a lateral (northwest-southeast) sense. The USGS (2013) reported the fault has had as much as 18 miles (29 km) of right lateral offset, presumably at depth at this location.

In addition to the Russell Fault, the resistivity data indicate the presence of another (likely younger) fault that appears to be a buried thrust fault, that is thrusting Monterey Shale over the Lower Morales. This interpretation is based on an east dipping feature with variable dip between Stations 2520 and about 3150, where another subvertical fault/fault splay is indicated. Based on work by the USGS (2013) this thrust fault is interpreted to be the Turkey Trap Ridge Fault (TTRF). While the resistivity data suggest this fault offsets the Lower Morales with the Monterey, it is not clear if the TTRF extends through the overlying alluvium and creates an offset in shallow water bearing zones. For purposes of further discussion the TTRF is assumed to be part of the Russell Fault Zone, and together these faults are referred to as the "Russell Fault/TTRF System".

Groundwater

There were no direct ties to groundwater along Line 1. The nearest tie was nested well TSS #1, which is roughly 1500 feet east-southeast of, and about 8 feet lower in elevation, than the ESE end of Line 1. However, since these data were the closest to the line and reliable, the water level data for TSS #1 were carefully reviewed, as well as the depth to groundwater contour map provided by Woodard & Curran (2024b), for interpretation of the presence of groundwater on Line 1. The depth to water at TSS #1 ranges between 40 and 43 feet bgs, and appears to be brackish (personal communication, Woodard & Curran, 2024c).

In terms of groundwater quality in the vicinity of the Russell Fault along Line 1, the highest quality groundwater is likely to be present in the coarsest grained and thickest section of alluvium that occurs west of the Russell Fault, between Stations 0 and about 1000. Based on

the resistivity values this section of alluvium likely contains coarse sand with gravel and cobbles, thickens to the west and ranges in thickness between 140 and about 250 feet. The presence of groundwater is indicated by a slight vertical drop in resistivity in a few locations across this layer at about 50 feet bgs. Based on this interpretation and resistivity values of 40 Ohm-meters and above in this section of alluvium, it appears the thickness of the water bearing zone is typically between 100 and 200 feet based on the alluvium/Lower Morales contact. Based on this interpretation for the depth to groundwater, the pink dashed line marking the base of alluvium is used in Figure 5 to indicate the likely base of the saturated alluvial zone across Line 1.

East of about Station 1100 the resistivity values in the alluvium decrease to between 8 and 20 Ohm-meters (turquoise to olive green colors), indicating finer grained and lower permeability material. Between Stations 1200 and 1800, immediately below the water table, resistivity values drop below 10 Ohm-meters (to as low as 2 to 3 Ohm-meters), where the top of the Morales contact ranges between 10 and 20 feet below the top of the water bearing zone, or just 60 to 70 feet bgs. These resistivity values are not favorable to groundwater, and likely indicate low permeability material. East of the Russell Fault (Station 1848) the alluvium above the water bearing zone typically ranges from 8 to 10 Ohm-meters, where the resistivity below the water table ranges from 10 to as low as 2 Ohm-meters. While there may be a few pockets of higher resistivity in the alluvium east of the Russell Fault, the resistivity values are predominantly below the recommended level for high quality water, and may indicate somewhat brackish groundwater.

Based on the resistivity data and the contacts interpreted, it appears that the Morales is offset across the Russell Fault. A roughly 270 foot thick section of Morales beginning about 70 feet bgs west of the fault offsets water bearing alluvium east of the fault. It appears the up-thrusted Morales west of the Russell Fault may result in a slightly deeper and thinner layer of saturated alluvium directly above it west of the fault and a thicker layer of saturated alluvium east of the fault-particularly, in the section of higher resistivity between Stations 1848 and 2200. Further east, the water table appears to be shallower and, as noted, is between 40 and 43 feet bgs at TSS #1 roughly 1500 feet ESE of, and about 8 feet lower in elevation, than the ESE end of Line 1.

Based on resistivity values ranging from 0.5 to 5 Ohm-meters beneath the alluvium along Line 1, groundwater present beneath the base of the alluvium is likely to be poor quality and possibly brackish.

The IP data shown in Figure 5A indicate moderate values in chargeability (+/- 150 milliseonds) that do not show direct correspondence with the variations in resistivity used to identify the geologic units and structural features in Line 1, discussed above. However, there are some general observations that can be made from the IP data. East of the Russell Fault (from about Station 2000 to at least Station 3400 a shallow, thin and laterally continuous layer of elevated chargeability (approximately 60 to about 170 milliseconds – yellow-orange colors) is present directly beneath the (likely) water table indicated by a dashed blue line. This elevated chargeability layer thickens west of the Russell Fault and loosely follows the section of alluvium interpreted from the resistivity data (base of alluvium marked by the dashed pink

line). The IP chargeability also appears to be responding to the structural features and complexity along Line 1. Examples of this are a dipolar IP anomaly (juxtaposed high and low) across the Russell Fault between Stations 1700 and 2000; and contrasts in IP across apparent geologic contacts, such as the low IP anomaly (blue) beginning at about 190 feet bgs between Stations 2640 and 3200 that corresponds to the Monterey Formation, juxtaposed vertically against an area of elevated chargeabilty east-southeast of Station 3400.

7.2.3 Line 2

The profile in Figure 6 contains the inverted resistivity distribution which best represents the actual lateral and vertical variation of earth resistivity beneath the ground surface along Line 2 in the Russell Fault investigation area. The colors in the figure key to the color bar to the right of the image and the resistivity summary in Table II. The numbers across the top of the profile in Figure 6 represent ground distance along Line 2 in units of feet as measured from Station 0, which was at the west-northwest end of Line 2. The numbers along the vertical axis of the profile represent elevations relative to Station 0, which was arbitrarily assigned an elevation of zero. A dashed pink line is used to mark the base of alluvium along the line and heavy dashed black lines are used to delineate interpreted faults or fault splays.

The resistivity data collected along Line 2 were of moderate to good quality and provided reliable measurements to about 800 feet bgs; however, there were areas of significant noise in the data caused by utilities as well as existing and abandoned steel cased oil wells in the vicinity of Line 2. During data processing the data were carefully edited to remove erroneous measurements and reduce artifacts in the data caused by these features, and multiple inversions were run to obtain convergence in the solution and properly represent subsurface features. The result is that the resistivity profile shown in Figure 6 is a smoothed representation of the actual geologic and structural features present along Line 2, and the actual resistivity values of what is labeled as the Monterey Formation may be lower than what is shown in Figure 6.

A number of features are evident in the profile in Figure 6. The resistivity data indicate a somewhat continuous first layer of variable resistivity that varies in thickness from 120 to 300 feet bgs. Based on a wide lateral range in resistivity values ranging from 6 to about 3000 Ohm-meters (turquoise to green to pink to grey), the first observed layer appears to be the alluvial layer, which appears to vary in lithology from silts to gravels to cobbles to boulders. In addition, the alluvial layer on Line 2 is higher in resistivity than the alluvial layer on Line 1. This may be expected since Line 2 is closer to the Cuyama River than Line 1, where coarser grained materials are likely to be present in the subsurface. Despite these coarser grained, likely permeable materials in alluvium, the data do not exhibit a sharp drop in resistivity beneath the assumed water table.

The next layer evident beneath the alluvium west of the Russel Fault is interpreted as the Lower Morales, based on an undulating, roughly 100 to 150-foot thick layer of low resistivity (0.5 to 4 Ohm-meters, dark blue to royal blue). This undulation may be an indication of folding. Beneath this layer, a layer with higher resistivity (45 to 3000 Ohm-meters) is interpreted as the Monterey Formation. East of Station 1900 the variations in resistivity are significant and believed to be related to faulting. These features are discussed in the sections below.

Indications of the Fault

The presence of the Russell Fault is evident in the data at about Station 2160, based on a sharp lateral contrast in resistivity across a near-vertical feature that begins at a depth of about 570 feet bgs and appears to extend to depth beneath this area of Line 2. This feature is labeled in Figure 6 as the Russell Fault. Based on the geologic units reviewed and the resistivity values present, this feature appears to represent normal offset across a vertical fault (the Russell Fault), where the Monterey Formation (resistivity values ranging from 40 to 3000 Ohm-meters) appears to be present immediately west of it and the Lower Morales (resistivity values ranging from 12 to 16 Ohm-meters) is present immediately east of it.

In addition, based on the low resistivity values above depths of 570 feet bgs and an east dipping low resistivity feature, a thrust/reverse sense fault appears to overly (or interact with) the Russell Fault, and appears to be thrusting the Lower Morales over the Monterey Shale between Stations 1900 and 2400 - to depths as shallow as about 130 feet bgs at Station 2000. As previously discussed, this is likely because of the transpressional tectonics currently present in this area, which causes both right lateral and reverse (thrusting) sense motion to occur in the location of the old normal fault. Therefore, this feature may represent younger thrusting reactivating older normal sense motion in the area of the Russell Fault. Because of this complexity the area between Stations 1900 and 2250 is hereinafter referred to as the Russell Fault Zone.

Another thrust fault appears to be thrusting the Monterey Shale over or adjacent to the Lower Morales, based on an apparently east-southeast dipping feature that extends to a depth of at least 800 feet at Station 2770. This fault exhibits variable dip as it reaches shallower depths, so that it extends vertically beneath Station 2400 and is evident as shallow as about 100 feet bgs. Based on its character and a comparison with the profile for Line 1, this second fault is interpreted as the Turkey Trap Ridge Fault. As noted, these thrust faults/fault splays overlying the Russell Fault appear to form a positive flower structure and are likely associated with transpressional movement across the Russel Fault//TTRF System (Figure 6). Based on its character and the resistivity values in the upper 150 feet on either side of Station 2400,where the data indicate roughly a 100-foot vertical offset in the alluvium/Lower Morales contact across the fault, it appears that the TTRF fault may be creating an offset in alluvium that juxtaposes alluvium to the west against Lower Morales to the east. The alluvium/Lower Morales contact is as shallow as 100 feet bgs and appears to be pinched beneath Station 2450.

Groundwater

There were no direct ties to groundwater along Line 2. As for Line 1, the nearest tie is nested well TSS #1, which is about 1130 feet northeast of, and about 5 feet higher in elevation, than the ESE end of Line 2. Based on water level data for TSS #1 and a depth to groundwater contour map provided by Woodard & Curran (2024b), the resistivity data were reviewed for groundwater interpretation on Line 2. Based on this information and a laterally traceable layer of high resistivity (likely associated with permeable coarse grained alluvium), the depth of the

water table along Line 2 is estimated to be about 40 feet bgs. A blue dashed line in Figure 6 is used to indicate the approximate interpreted depth to water along Line 2.

In terms of groundwater quality in the vicinity of the Russell Fault along Line 2, it appears that the alluvium between Stations 0 and about Station 1870 contains highest quality water, where the water bearing zone can be up to 300 feet thick, based on the alluvium/Lower Morales contact. Between Stations 1870 and about 2200 there appears to be a zone of lower resistivity (13 to 20 Ohm-meters) alluvium directly beneath the assumed water table, with an absence of coarse grained material. The presence of finer grained material in the alluvium here may be the result of the Morales being thrust to shallow depths in this location by the Russell Fault/TTRF System. East of Station 2200 the coarse grained water bearing alluvial zone is again evident to at least Station 3450, based on relatively evenly distributed deposits with moderate to high resistivity values. In this portion of Line 2, the water bearing zone ranges between 70 and 200 feet thick.

Based on the resistivity data and the contacts interpreted, it appears that the Morales is offset across the Russell Fault, where a roughly 200-foot thick, low resistivity (0.5 to 3 Ohm-meters, dark blue) and apparently east dipping section of Morales east of the fault is juxtaposed with a thinner (100 foot thick), higher resistivity (11 Ohm-meters) section of the Morales west of the fault. This is contrary to Yeats (1989) stating the Russell Fault does not cut the base of the Morales. As the water bearing zone is above the Russell Fault/Fault Zone the fault does not appear to offset water bearing alluvium along Line 2; although, it may be associated with thinning of the alluvium between Stations 1870 and about 2200.

While the Russell Fault/Fault Zone does not appear to offset alluvium on Line 2, the resistivity data indicate that the TTRF offsets both the alluvium and the Morales, as well as the Monterey Shale beneath the Morales. This is evident based on the character of the feature and the resistivity values in the upper 150 feet on either side of Station 2400 on Line 2 where the data indicate roughly a 100-foot vertical offset in the alluvium/Lower Morales contact across the fault. This offset appears to be caused by reverse movement on the TTRF where alluvium to the west is juxtaposed against Lower Morales to the east. Additionally, the alluvium/Lower Morales contact appears to be as shallow as 100 feet bgs – particularly at Station 2450 where the alluvium appears pinched by vertical motion on the TTRF beneath it. While the water bearing zone lies above the TTRF, this 100-foot offset in the alluvium/Morales contact at Station 2400 may be limiting the thickness of the water bearing zone east of the fault.

Taken together, it appears that the Russell Fault/TTRF System creates offset in the Lower Morales, and also causes the water bearing zone in the alluvium to thin.

8.0 CONCLUSIONS

This DC resistivity and IP geophysical investigation obtained data that addresses the stated objectives. In particular, the resistivity imaging method was able to provide a data "fingerprint" of the key layers of interest in both areas of investigation. For the Santa Barbara Canyon Fault investigation these key layers were the alluvium, the Upper Morales and the Lower Morales. For the Russell Fault investigation these key layers were the alluvium, the

Lower Morales and the Monterey Shale. Once these fingerprints were identified in the profiles, it was then possible to identify the location of target faults (and additional faults/fault splays) based on indications of geologic contacts, changes in apparent attitude of bedding and truncation/offsets in layers of similar resistivity. The attitude of these faults/fault zones was then identified based on the trace of these contacts and indications of vertical/subvertical features associated with normal and transpressional type faulting. Once these features were identified in the data, it was then possible to identify indications of water bearing zones, non-water bearing zones and how the faults/fault zones might be offsetting those water bearing zones and/or affecting their thickness.

The imaging method provided a reasonably resolved image of subsurface features using 10 meter (33 foot) electrode spacing along the surface arrays to obtain these data. The vertical resolution of features or interfaces (such as the water table or the alluvium/Morales interface) is about 5 meters in the upper 1/3 of the sections and about 10 meters or more in the lower 2/3. Images from a surface electrical resistivity survey should not be compared directly to a borehole geophysical log (E-log) for identifying interfaces or marker beds because the vertical resolution of E logs is much higher for the entire length of a borehole. However, general trends observed in the E-logs (such as the transition from a resistive geologic unit to a conductive geologic unit) can typically be observed in the surface resistivity data. Our interpretations of mapped and concealed locations of faults and fault zones and water bearing units based on data collected in this investigation and documented above are summarized below.

8.1 Santa Barbara Canyon Fault

The data collected on Line 1 were of very high quality and reliability. The location of the concealed fault mapped by the USGS is not accurate as the presence of the Santa Barbara Canyon Fault was not found. The resistivity data indicate the presence of a deep water table across the Line 1 profile. This interpretation is supported by a depth to water of about 585 feet bgs at MW-H, which lies on Line 1. The resistivity data indicate the presence of a possible deep buried channel or tributary to the Cuyama River in the center of Line 1.

The resistivity data collected on Line 2 were of very high quality and reliability and clearly indicated the Santa Barbara Canyon Fault. These data indicate the following:

- The Santa Barbara Canyon Fault is more complex than reported in the literature. It appears to be a fault system that consists of an old, buried subvertical normal fault that has an apparently south dipping, younger thrust fault overprinting it to the south. Together these faults are referred to as the "SBCF Fault System"
- The SBCF Fault System offsets both the Lower and the Upper Morales, as well as deeper alluvium
- The SBCF Fault System creates an abrupt transition in the depth to groundwater - particularly in the Upper Morales, where there is indication of water bearing zones as shallow as 50 to 100 feet bgs south of the Fault System and little or no indication of water bearing zones north of the fault, to at least 600 feet bgs

8.2 Russell Fault

The data collected on Line 1 were of good quality and reliability and clearly identified the Russell Fault/Fault Zone, as well as other faults. The data collected on Line 2 were of good quality but had a greater amount of noise due to electromagnetic interference from metallic cultural features.. Nonetheless, the data collected on Line 2 clearly indicated the Russell Fault as well as other faults. The resistivity data collected on Lines 1 and 2, along with correlation with groundwater levels at TSS #1, allowed the identification of the likely water bearing zones in alluvium on each profile. The data collected along the transects indicate that any groundwater present beneath the base of the alluvium is likely to be poor quality with high TDS/salinity. The data collected on Lines 1 and 2 indicate the following:

- The Russell Fault is more complex than a buried normal fault. There appears to be a fault system that consists of an old, more deeply buried vertical normal fault (Russell Fault) that has been reactivated as a reverse/transpressional feature above it, which also has an adjacent (east) apparently younger, east dipping thrust fault (the Turkey Trap Ridge Fault) that is overprinting and interacting with it. Together these faults are referred to as the "Russell Fault/TTR Fault System"
- The Russell Fault offsets the Morales on Lines 1 and 2, and appears to offset the deeper alluvium on Line 1
- The TTR Fault offsets both the Morales and the deeper alluvium on Lines 1 and 2
- The Russell Fault appears to cause a transition in the thickness of saturated alluvium on Line 1 but not on Line 2
- While there may be a few pockets of higher quality groundwater in the alluvium east of the Russell Fault on Line 1, groundwater in saturated alluvium east of the Russell Fault is primarily somewhat brackish on Line 1 but there is not a similar indication on Line 2
- The TTR Fault may be reducing the thickness of saturated alluvium to the east

9.0 LIMITATIONS

9.1 Resistivity Interpretation for Lithology and Hydrogeology

It should be understood that the geologic and hydrogeologic interpretations made during this investigation (and geologic units labeled in Figures 2/2A, 3/3A, 5/5A and 6) were made based primarily on resistivity data values, character of anomalies and experience in similar sedimentary environments. However, all available lithologic and E-logs from wells (DWR and other water wells in both the SBCF and the Russell Fault investigation areas and oil production wells in the Russell Fault investigation area) that either tied directly to the resistivity transects or were within a few hundred feet of them were carefully reviewed. In the SBCF investigation area, because no direct lithologic/hydrogeologic ties were available for Line 2 as it fell on BLM land, the lithologic log and E-log from well MW-H on Line 1 were used for interpretation of resistivity values on Line 2, as well as current water level maps (Woodard & Curran 2024a) and previous work in the SBCF area (USGS 2013, USGS 2015,

Woodard & Curran 2019 . In addition, the interpretation of resistivity for lithology is highly site specific, where lithologic interpretations for one geologic environment may be *incorrect and erroneous* for a different geologic environment. As a result, the resistivity interpretations presented in Table I should only be used for the SBCF area and the resistivity interpretations presented in Table II should only be used for the Russell Fault area.

No direct observation or verification of the depth of alluvium or depth to the Upper or Lower Morales in the SBCF investigation area was made. Similarly, while there were some lithologic ties to oil production wells and lithologic/E-logs along Lines 1 and 2 in the Russell Fault investigation area, these logs did not specify the presence or depth of the Morales unit, or clearly indicate the subsurface contact between the Lower Morales and Monterey Shale. As a result, this contact was inferred largely from the contrast in resistivity and character of the data.

Just one direct water level tie was available on Line 1, and no direct water level ties were available on Line 2 in the SBCF investigation area. No direct water level ties were available for Lines 1 or 2 in the Russell Fault investigation area; although, the water levels from DWR Well TSS#1 were used as a general reference for the depth to saturated alluvium along Lines 1 and 2 . As a result, the interpretation of the location and depth of saturated zones in the SBCF investigation area was made based on either resistivity values known to be favorable for the presence of groundwater, or a sharp vertical drop in resistivity across a laterally traceable horizon. Because the shallow resistivity data east of the Russell Fault on Line 1 did not clearly identify coarse grained material or a laterally traceable horizon below which resistivity values were favorable to the presence of non-saline/low TDS groundwater, the depth to the water table along Line 1 was assumed to be similar to the depth to water at well TSS#1. The interpretation of the water table along Line 2 in the Russell Fault investigation area was made based on a shallow laterally traceable layer of moderate to high resistivity (assumed to be coarse grained alluvium) as well as the depth to water at well TSS#1. Although the possibility of brackish or high TDS water in alluvium east of the Russell Fault was considered in the interpretation of near surface low resistivity values along Lines 1 and 2, low resistivity values below the base of the alluvium were assumed to be caused by lithology/grain size and not materials saturated with saline/brackish groundwater.

Based on all of these factors, Spectrum therefore provides no warranty (either express or implied) that the specific geologic units and/or precise contacts discussed in this report and shown on the profiles for the SBCF and Russell Fault investigation areas are actually present at the depths shown. In particular, in the SBCF investigation area, no verification of the alluvium/ Lower Morales interface south of the SBC Fault System or the alluvium/Upper Morales interface north of the SBC Fault System was available, and the presence of geologic units other than the Morales (such as the Quatal Formation) cannot be ruled out.

9.2 Electrical Resistivity/IP Method

The lateral resolution, and accuracy, for resistivity/IP surveys is determined by data quality and electrode spacing. During this investigation the quality of the data was in general very good in the SBCF investigation area; however, there were some "noisy" data points along Line 2 in the Cuyama River bed – likely because of high contact resistance from extremely coarse

grained material at the surface. In addition, because just one array (the Schlumberger array) was used on Line 2 in the SBCF, these data were slightly lower resolution than the data collected along Line 1 in the SBCF, and some of the structural features depicted in Figures 3 and 3A may be slightly offset or less resolved than they would be if two arrays of data were used.

The 10-meter (roughly 33-foot) electrode spacing used for data collection in the SBCF and the Russell Fault investigation areas provided 5 meter (15.4 feet) lateral and vertical resolution of features in the upper third of the resistivity/IP profiles presented in this report. The vertical resolution of features below about 200 feet bgs decreased with depth, ranging from about 6 meters (20 feet) at 200 feet bgs to about 15 to 20 meters at 600 to 800 feet bgs. As a result, the lateral location of subsurface features in the upper 1/3 of these profiles as interpreted from the resistivity/IP data (such as the location of identified faults) can be regarded as correct to within 5 meters for profiles where the faults extend to within 200 feet of the surface, and to within roughly 10 meters for features at depth in these profiles.

The IP data collected along the profiles in the SBCF and Russell Fault investigation areas did not respond as sharply to the geologic features and lithologic contacts evident in the resistivity data. This is likely because of the typical overprint from the natural IP signature in sedimentary deposits that tends to mask the IP anomaly from lithologic/geologic/hydrogeologic contacts. This natural IP signature can be caused by patterns in disseminated fine grained materials, disseminated metallic minerals, or the mineralogic source materials in sedimentary deposits. In addition, because of time and budgetary constraints just one IP array (Schlumberger array) of data was collected on each profile in the SBCF and Russell Fault investigation areas – resulting in lower lateral and vertical resolution in the IP profiles when compared to the associated resistivity profile.

9.3 Lateral Location

The location of features and faults depicted in the profiles for the SBCF and the Russell Fault investigation areas may not correspond to the satellite distance, which was used to measure the location of the faults shown in Figures 1 and 4. This is because distances along the profiles were measured during the field investigation according to *ground distance;* whereas features and distances in a satellite image are measured from *horizontal distance* (as the crow flies). As a result, the mapped location of geologic features and faults indicated in the profiles may be in error on a satellite image by as much as 10 to 15 feet (particularly in areas with significant surface topography). Therefore, it may be best to relocate these features using a tape measure along the ground surface.

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Electrical Resistivity Transect

N
W E
S
North

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Geophysical Survey Location Map**

PROJECT: Cuyama Valley Groundwater Basin
SBCF
San Luis Obispo County, California

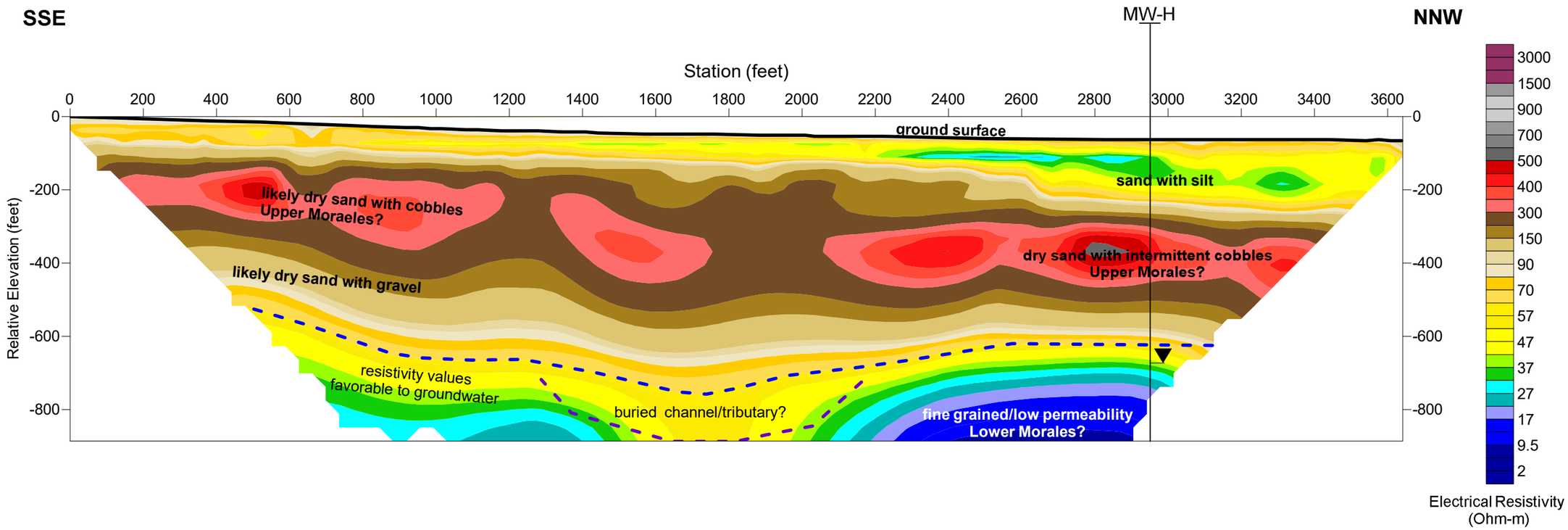
FIGURE NO.: 1

PREPARED FOR: Woodard & Curran
Sacramento, California

PROJECT NO.: 8443

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = approx 500 ft	BAU	BAU	8/2/24

Line 1
Electrical Resistivity Profile
Santa Barbara Canyon Fault



Water table
(interpreted)

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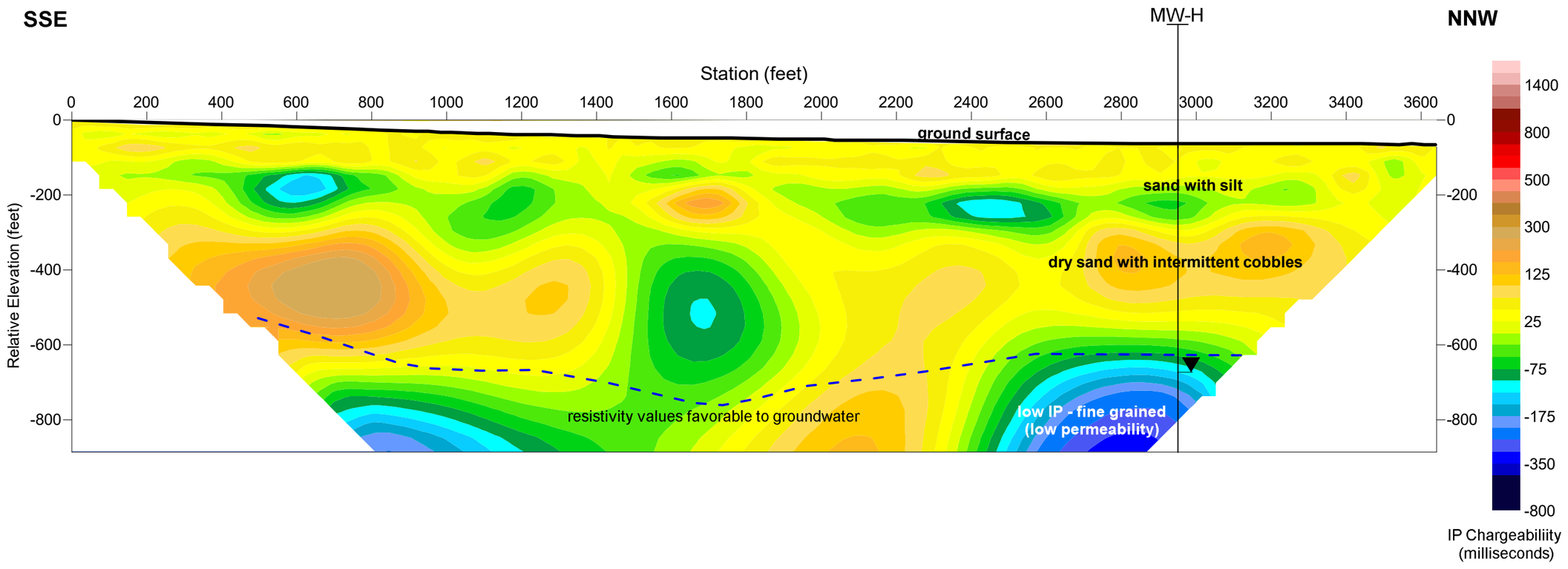
MAP: Electrical Resistivity Profile - Line 1 Santa Barbara Canyon Fault		FIGURE NO.: 2
PROJECT: Cuyama Valley Groundwater Basin San Luis Obispo County, California		
PREPARED FOR: Woodard & Curran Sacramento, California		PROJECT NO.: 8443
SCALE: 1 inch = 300 feet	FIGURE BY: BU / REVIEWED BY: LCD	DATE: 8/02/24

Line 1
Induced Polarization Profile
with Resistivity Interpretations
Santa Barbara Canyon Fault



Water table
(interpreted)

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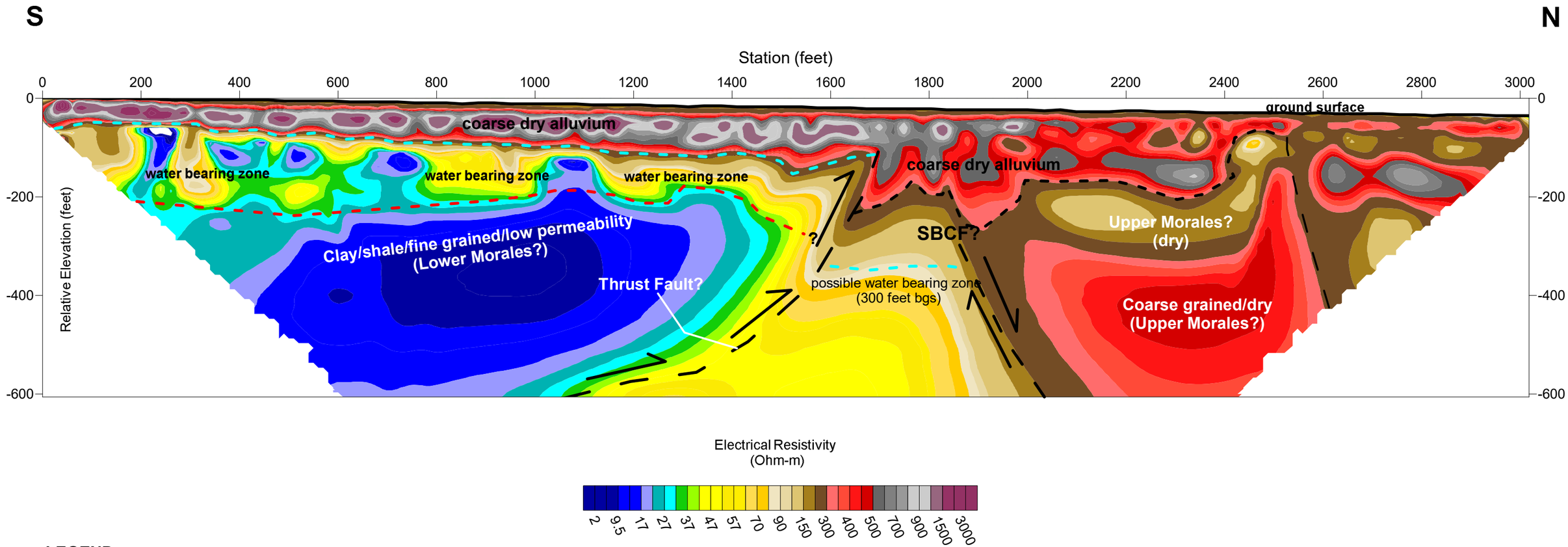
MAP: Induced Polarization Profile - Line 1 Santa Barbara Canyon Fault		FIGURE NO.: 2A
PROJECT: Cuyama Valley Groundwater Basin San Luis Obispo County, California		
PREPARED FOR: Woodard & Curran Sacramento, California		PROJECT NO.: 8443
SCALE: 1 inch = 300 feet	FIGURE BY: BU REVIEWED BY: LCD	DATE: 8/02/24

Line 2
Electrical Resistivity Profile
Santa Barbara Canyon Fault



Electrical Resistivity
(Ohm-m)

2 9.5 17 27 37 47 57 70 90 150 300 400 500 700 900 1500 3000

LEGEND

- Interpreted top of water bearing zone
- Interpreted dry alluvium/Upper Morales interface (dry)
- Interpreted water bearing alluvium/Lower Morales interface

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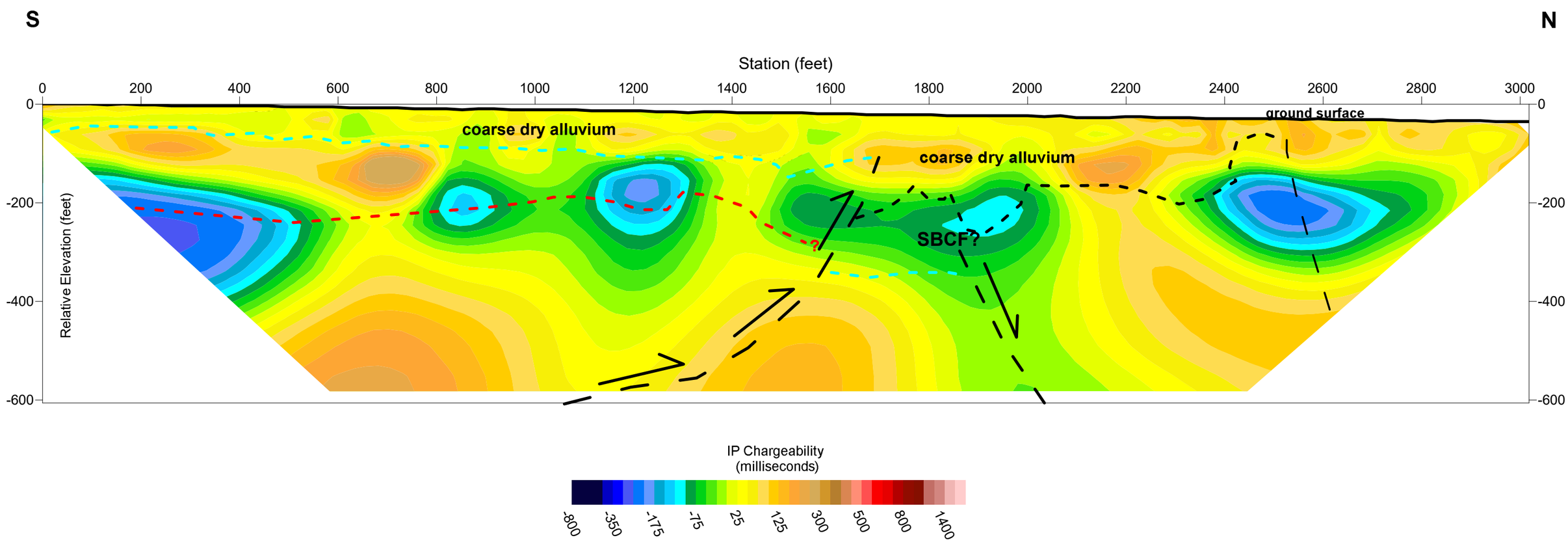
MAP: Electrical Resistivity Profile - Line 2 Santa Barbara Canyon Fault		FIGURE NO. 3
PROJECT: Cuyama Valley Groundwater Basin San Luis Obispo County, California		
PREPARED FOR: Woodard & Curran Sacramento, California		PROJECT NO. 8443
SCALE: 1 inch = 200 feet	FIGURE BY: BU / REVIEWED BY: LCD	DATE: 8/02/24

Line 2
Induced Polarization Profile
with Resistivity Interpretations
Santa Barbara Canyon Fault



LEGEND

- Interpreted dry alluvium/Upper Morales interface (dry)
- Interpreted top of water bearing zone
- Interpreted water bearing alluvium/Lower Morales interface

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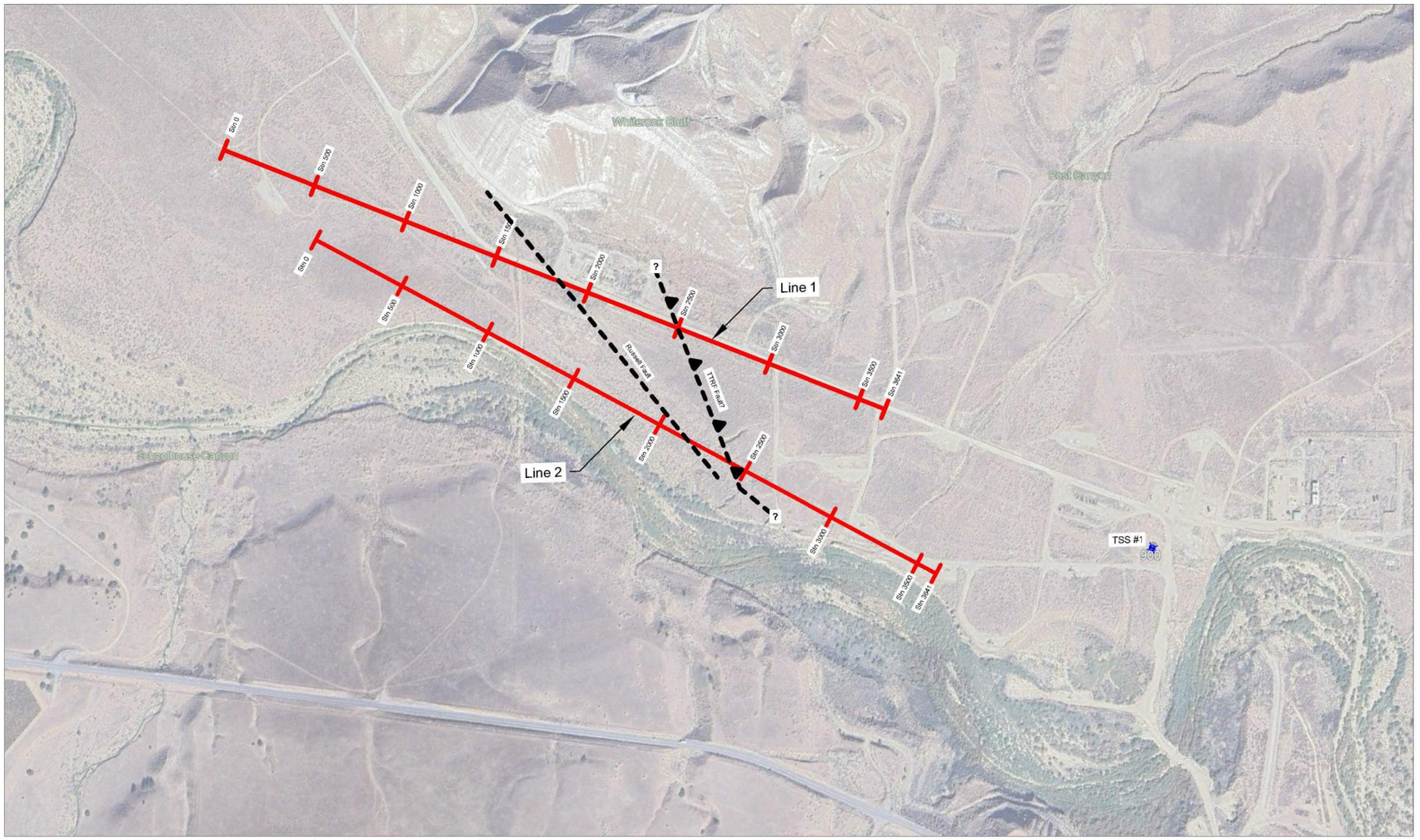
MAP: Induced Polarization Profile - Line 2 Santa Barbara Canyon Fault		FIGURE NO.: 3A
PROJECT: Cuyama Valley Groundwater Basin San Luis Obispo County, California		
PREPARED FOR: Woodard & Curran Sacramento, California		PROJECT NO.: 8443
SCALE: 1 inch = 200 feet	FIGURE BY: BU / REVIEWED BY: LCD	DATE: 8/02/24



Electrical Resistivity Transect

N
W E
S
North

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Geophysical Survey Location Map**

PROJECT: Cuyama Valley Groundwater Basin
Russell Fault
San Luis Obispo County, California

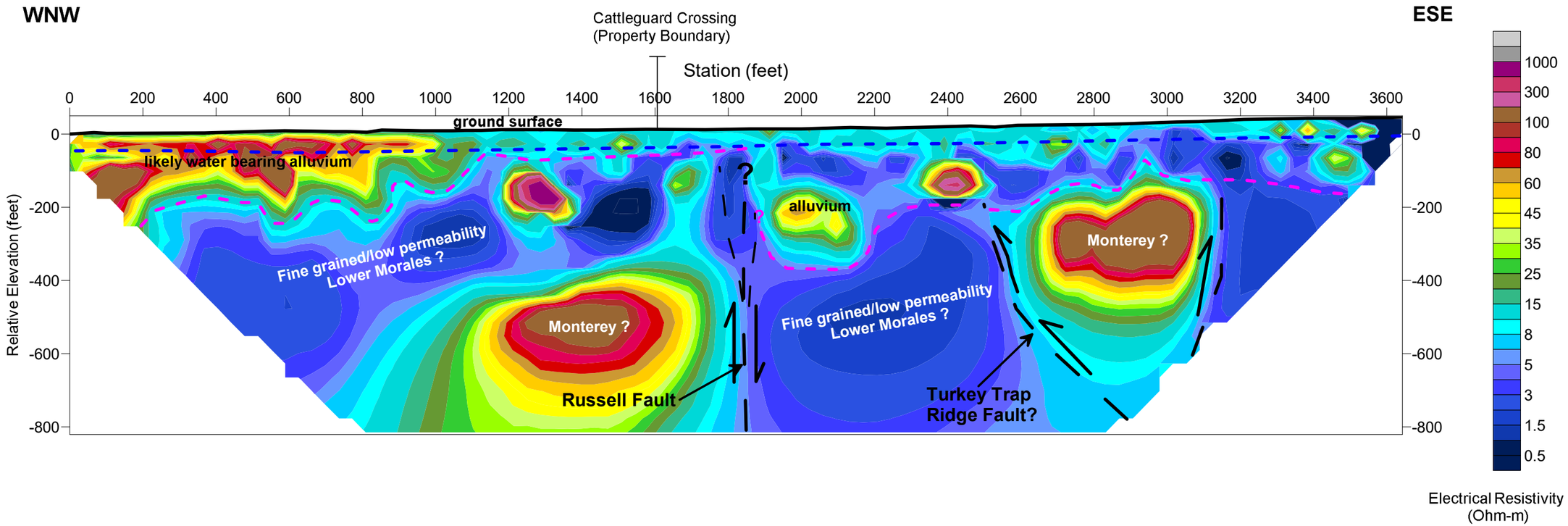
FIGURE NO.: **4**

PREPARED FOR: Woodard & Curran
Sacramento, California

PROJECT NO.: 8443

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = approx 500 ft	BAU	BAU	8/2/24

Line 1
Electrical Resistivity Profile
Russell Fault



LEGEND

Interpreted base of alluvium/top of rock

Approximate level of groundwater

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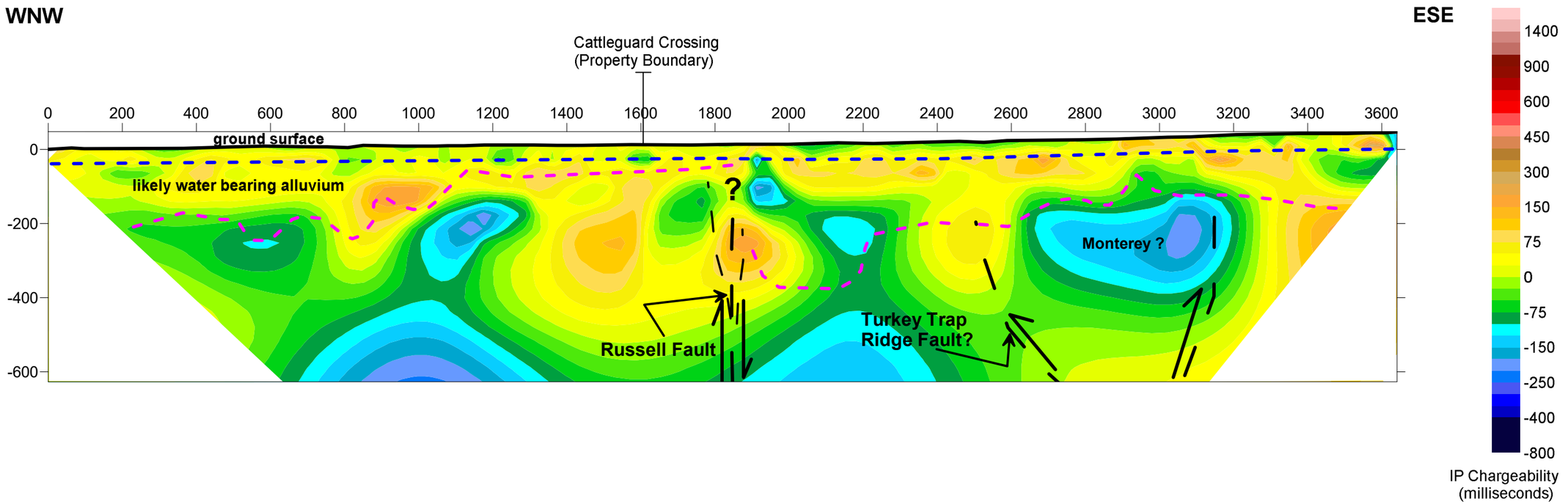
MAP: Electrical Resistivity Profile - Line 1 Russell Fault				FIGURE NO. 5
PROJECT: Cuyama Valley Groundwater Basin, San Luis Obispo County, California				
PREPARED FOR: Woodard & Curran, Sacramento, California				PROJECT NO. 8443
SCALE: 1 inch = 300 feet	FIGURE BY: BU	REVIEWED BY: LCD	DATE: 8/02/24	

Line 1
Induced Polarization Profile
with Resistivity Interpretations
Russell Fault



LEGEND

Interpreted base of alluvium/top of rock

Likely level of groundwater

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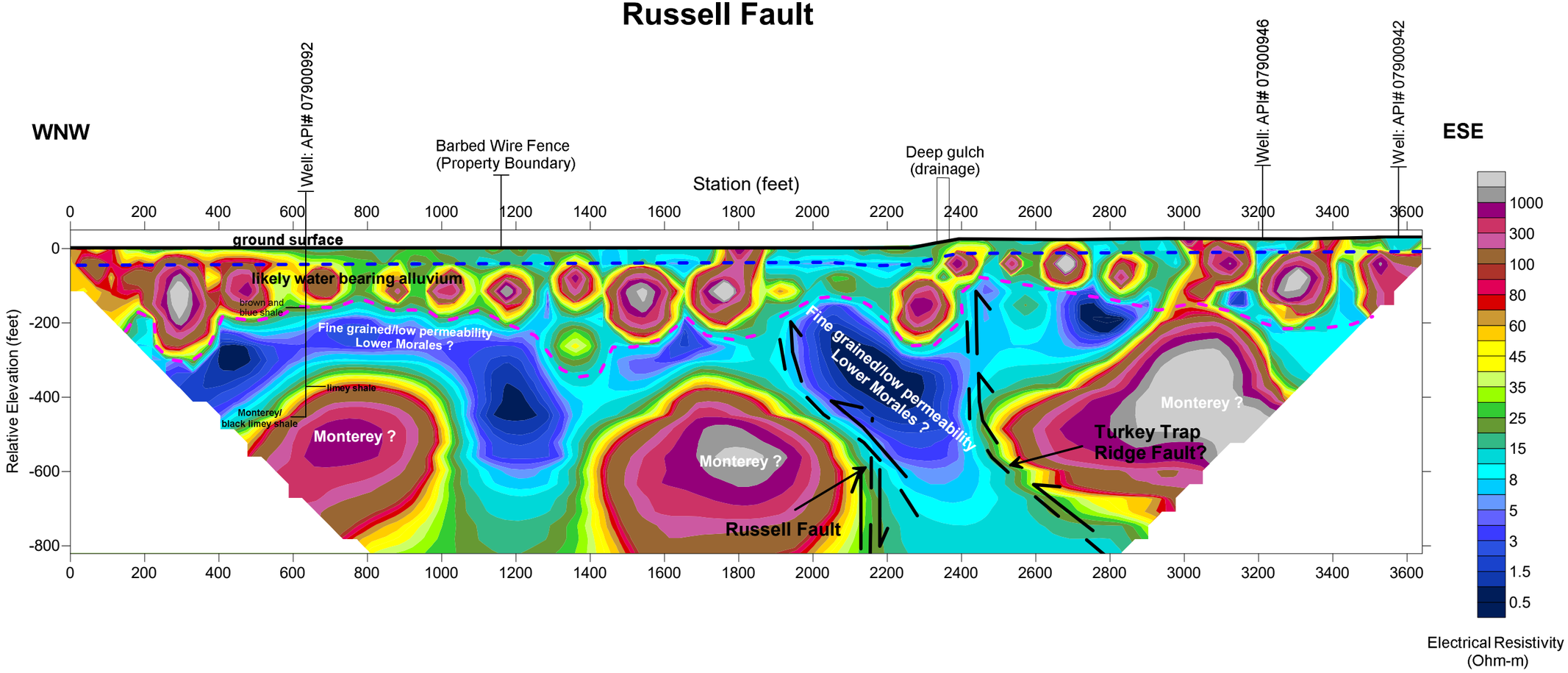
MAP: Induced Polarization Profile - Line 1, Russell Fault				FIGURE NO.: 5A
PROJECT: Cuyama Valley Groundwater Basin, San Luis Obispo County, California				
PREPARED FOR: Woodard & Curran, Sacramento, California				PROJECT NO.: 8443
SCALE: 1 inch = 300 feet	FIGURE BY: BU	REVIEWED BY: LCD	DATE: 8/02/24	

Line 2
Electrical Resistivity Profile
Russell Fault



LEGEND

Interpreted base of alluvium/top of rock

Likely level of groundwater

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MAP: Electrical Resistivity Profile - Line 2 Russell Fault				FIGURE NO. 6
PROJECT: Cuyama Valley Groundwater Basin, San Luis Obispo County, California				
PREPARED FOR: Woodard & Curran, Sacramento, California				PROJECT NO. 8443
SCALE: 1 inch = 300 feet	FIGURE BY: BU	REVIEWED BY: LCD	DATE: 8/02/24	

TABLE I: Interpretation of Resistivity for Lithology - Santa Barbara Canyon Fault, Cuyama Basin, California

Resistivity			Interpretation
Range	Color	Category	
4 to 20 Ohm-meters	dark blue to pale blue	low to moderate resistivity	clay (4 to 10 Ohm-m) to silty clay to clayey silt (12 to 20 Ohm-m), where values approaching 20 Ohm-meters have greater amounts of silt in the matrix, typically occuring in alluvium. Alternatively, low resistivity values (4 to 10 Ohm-m) could be associated with the claystone of the Lower Morales unit, and higher resistivity values (12 to 20) could be associated with siltstone
21 to 35 Ohm-meters	teal to turquoise to green	moderate resistivity	clayey silt (20 Ohm-m) to silty sand to sand (35 Ohm-m), where the grain size of material increases with increasing resistivity values. Alternatively, these values could be associated with siltstone or sandstone of the Lower Morales unit
35 to 70 Ohm-meters	yellow-green to yellow to yellow-orange	moderate resistivity	sand or sandy (35 Ohm-m) to gravelly alluvium (50 Ohm-m), where values approaching 70 Ohm-m have greater amounts of gravels. Alternatively, these values could be associated with siltstone or sandstone of the Morales unit. Where these values are horizontally continuous at a favorable depth for groundwater, (40 to 70 Ohm-m) they may be associated with water bearing zones in alluvium or saturated Upper Morales sand or sandstone
75 to 200 Ohm-meters	yellow-orange to light tan to brown	moderate resistivity	partly saturated or dry alluvium with gravels (75 Ohm-m) to cobbles (100 to 200 Ohm-m), where values approaching 200 Ohm-m have greater amounts (or larger diameter) cobbles. Alternatively, these values could be associated with partially consolidated gravelly arkosic sand and siltstone of the Upper Morales, where the higher the resistivity value the more likely the material is to be dry
200 to 1500 Ohm-meters	dark brown to salmon colored to grey to grey-purple	moderate to high resistivity	transitional range from moderate (200 Ohm-m) to high resistivity (500 Ohm-m and above),where matieral is likely dry. These values in alluvium are likley associated with dry gravels, cobbles and boulders (1,000 to 1500 Ohm-meters). High resistivity values (300 to 600 Ohm-meters) where laterally homogeneous and over 200 feet thick are likely associated with dry sandstone or siltstone of the Upper Morales

* NOTE: It should be understood that interpretation of resistivity for lithology is highly site specific. This table should not be used for other geologic environments

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TABLE II: Interpretation of Resistivity for Lithology - Russell Fault, Cuyama Basin, California

Resistivity			Interpretation
Range	Color	Category	
0.5 to 7 Ohm-meters	dark blue to royal blue to pale blue	very low to low resistivity	clay to silty clay (0.5 to 7 Ohm-m), where values approaching 7 Ohm-meters have greater amounts of silt in the matrix, typically occuring in alluvium. Alternatively, these low resistivity values could be associated high TDS groundater in alluvium or, where of significant thickness/lateral extent these values could be associated with clay/silt deposits with abundant shale chips of the Lower Morales unit
7 to 20 Ohm-meters	turquoise to teal green	low to moderate	silty clay to clayey silt to sandy silt, where values approaching 20 Ohm-meters have greater amounts of sand in the matrix, typically occuring in alluvium. Alternatively, materials ranging from 7 to 12 Ohm-m could be associated with coarser grained layers of the Lower Morales unit
21 to 40 Ohm-meters	olive green to yellow	moderate resistivity	sandy silt (21 Ohm-m) to silty sand to sand (35 to 40 Ohm-m), where the grain size of material increases with increasing resistivity values, typically occurring in alluvium. Alternatively, these values could be associated with the transition to the Monterey Formation
40 to 70 Ohm-meters	yellow to gold to tan	moderate resistivity	sand to coarse sand to sand with gravel or cobbles, where values approaching 70 Ohm-m have greater amounts of gravels and cobbles. Alternatively, these values could be associated with siltstone or sliceous/calcareous shale of the Monterey Formation. Where these values are horizontally continuous at a favorable depth for groundwater, (40 to 70 Ohm-m) they may be associated with water bearing zones in alluvium
75 to 500 Ohm-meters	red to brown to pink	moderate to high resistivity	partly saturated or dry alluvium with gravels (75 to 100 Ohm-m) to cobbles (150 to 500 Ohm-m), where values approaching 500 Ohm-m have greater amounts (or larger diameter) cobbles. Alternatively, these values could be associated with siliceous to calcareous shale of the Monterey Formation, where the higher the resistivity value the more likely the material is to be dense and well cemented
500 to 1500 to 10000 Ohm-meters	pink/purple to dark grey to light grey	high to very high resistivity	transitional range from high (500 to 1500 Ohm-m) to very high resistivity (5,000 to 10,000 Ohm-m),where material is likely dry. These values in alluvium are likley associated with large amounts of dry gravels, cobbles and boulders (1,000 to 5,000 Ohm-meters). Alternatively, where significantly thick and laterally continuous these values could be associated with very dense/competent siliceous or calcareous shale of the Monterey Formation

* NOTE: It should be understood that interpretation of resistivity for lithology is highly site specific. This table should not be used for other geologic environments

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APPENDIX B: CALTRANS ENCROACMENT PERMIT

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

DOT TR-0120 (REV 05/2023)

FM 91 1436

Permit No.
05-23-6-SV-0472

In compliance with your application of October 12, 2023

Dist/Co/Rte/PM
05/SB/33/PM 6.05-6.78

Reference Documents:

- ☐ Utility Notice No. _____ of _____
- ☐ Agreement No. _____ of _____
- ☐ R/W Contract No. _____ of _____
- ☐ Project code (ID): _____ CFC #: _____
- ☐ Applicant's Reference/ Utility Work Order No. _____

Permit Approval Date
October 26, 2023

Performance Bond Amount (1)	Payment Bond Amount (2)
$0	$0

Bond Company
N/A

Bond Number (1)	Bond Number (2)
$ N/A	$ N/A

TO:

Cuyama Basin Groundwater Sustainability Agency
C/O: James Strandberg Senior Project Manager
2175 North California Blvd, Suite 315
Walnut Creek CA 94596
(925)627-4122

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

conduct a geophysical survey using the electrical resistivity method along a 3,600 ft. transect in unpaved soil; transect to consist of 100 to 112 electrodes at a 10 meter spacing to determine the location of any buried utilities as shown on the attached plans and as directed by the permit provisions in State Route 33 right of way between postmiles 6.046-6.779 in the County of Santa Barbara.

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (check applicable):

- ☒ YES ☐ NO General Provisions
- ☐ YES ☒ NO Utility Maintenance Provisions
- ☒ YES ☐ NO Storm Water Special Provisions
- ☒ YES ☐ NO Special Provisions
- ☐ YES ☒ NO A Cal-OSHA Permit, if required: Permit No. _____
- ☐ YES ☒ NO As-Built Plans Submittal Route Slip for Locally Advertised Projects
- ☐ YES ☒ NO Storm Water Pollution Protection Plan

In addition to fee, the permittee will be billed actual costs for:

- ☐ YES ☒ NO Review
- ☐ YES ☒ NO Inspection
- ☒ YES Field Work *(if any Caltrans effort expended)*

As-built Plans are Required

☐ YES ☒ NO

☐ YES ☒ NO The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before April 30, 2024
This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

CC:
#1:
#2:
#3:
#4:

APPROVED:

Scott Eades, District Director

BY

Valerie Beard
Valerie Beard (Oct 26, 2023 14:33 PDT)

VALERIE BEARD, District Permit Engineer

ADA Notice This document is available in alternative accessible formats. For more information, please contact the Forms Management Unit at (279) 234-2284, TTY 711, in writing at Forms Management Unit, 1120 N Street, MS-89, Sacramento, CA 95814, or by email at Forms.Management.Unit@dot.ca.gov.

California Department of Transportation

Encroachment Permits Office
50 HIGUERA STREET | SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3152 | FAX (805) 549-3062 | TTY 711
http://www.dot.ca.gov/dist05

10/26/2023

05-SB-33-6.046-6.779
0523 NSV 0472

Cuyama Basin Groundwater Sustainability Agency
c/o Woodard & Curran, Inc.
Attn: James Strandberg
2175 N. California Boulevard, Suite 315
Walnut Creek, CA 94596

Dear James:

Attached is your approved encroachment permit. **DO NOT BEGIN WORK UNTIL YOU HAVE FIRST READ THE ENTIRE PERMIT CAREFULLY AND COMPLETELY AND CONTACTED THE STATE INSPECTOR LISTED ON YOUR PERMIT.**

This permit is a legal and binding contract once work on it has begun. You are subject to the provisions contained in the permit and in the attached Encroachment Permit General Provisions. If there is any question regarding interpretation of any detail in the permit or the General Provisions, you may contact the inspector listed on your permit or our office at (805) 549-3152. Thank you in advance for your cooperation.

Pursuant to the Executive Department, State of California, Proclamation of a State of Emergency, signed on October 27, 2019, and under the direction of the Office of Emergency Services and the State Emergency Plan, work authorized by this permit will be suspended when a planned Public Safety Power Shutoff (PSPS) notification is in effect. Unless Permittee has obtained special approval from the Director of Caltrans or his assigns to work during a PSPS event, Permittee must stop work and make all traveled ways and roadsides safe for public travel and emergency services if notified by the Director of Caltrans or his assigns.

Sincerely,

for
VALERIE BEARD, P.E.

District Permit Engineer

Work authorized under this permit:

conduct a geophysical survey using the electrical resistivity method along a 3,600 ft. transect in unpaved soil; transect to consist of 100 to 112 electrodes at a 10 meter spacing to determine the location of any buried utilities as shown on the attached plans and as directed by the permit provisions in State Route 33 right of way between postmiles 6.046-6.779 in the County of Santa Barbara.

Permit Distribution List:
Permit File
Payman Hamed - Inspector
Joshua Milton - D.O.

STATE PERMIT INSPECTOR

Unless approved otherwise by the State Permit Inspector, **Permittee must contact the State Permit Inspector listed below, at the following times, before starting work in the State right of way:**

- **A minimum of two weeks** prior to commencing work for a pre-job meeting to discuss permit provisions, notification requirements, and scheduling.

- **A minimum of two working days** prior to commencing work.

State Permit Inspector: Payman Hamed	**Phone:** (805) 276-1570
Email: payman.hamed@dot.ca.gov	**Fax:**

Notification requirements that will impact your work schedule:

1. **Changes to horizontal or vertical clearances**; minimum of 25-day advance notification.
2. **Lane closures**: completed "Weekly Traffic Update" form must be submitted by noon the Monday prior to date of proposed lane closure.
3. **Public Affairs**: completed "Public Affairs – Permitted Activity Notification" form must be submitted as early as possible (One Week Ahead is Best) prior to beginning of permitted activity.
4. When work has been interrupted for more than five working days, the Permittee must notify the Caltrans Permit Inspector a minimum of two working days prior to **restarting work**.

This issued encroachment permit is void unless the permitted activity or construction is completed by the void date shown on page 1 of the encroachment permit form

DOT TR-0120. The Permittee is solely responsible to keep track of the permit void date. All requests to extend this void date must be received by the District 5 Encroachment Permits Office while the encroachment permit is valid. Request for an extension received after the permit void date cannot be processed.

Pursuant to the Executive Department, State of California, Proclamation of a State of Emergency, signed on October 27, 2019, and under the direction of the Office of Emergency Services and the State Emergency Plan, work authorized by this permit will be suspended when a planned Public Safety Power Shutoff (PSPS) notification is in effect. Unless Permittee has obtained special approval from the Director of Caltrans or his assigns to work during a PSPS event, Permittee must stop work and make all traveled ways and roadsides safe for public travel and emergency services if notified by the Director of Caltrans or his assigns.

ADDITIONAL PERMIT ATTACHMENTS

- PUBLIC AFFAIRS PROJECT NOTIFICATION
- WEEKLY TRAFFIC UPDATE
- HOLIDAY AND SPECIAL DAY LANE CLOSURE RESTRICTION CALENDAR
- DISTRICT 5 NON-STANDARD SPECIAL PROVISION 12-4.02C(3)(f)
- CALTRANS STANDARD PLANS T9-T14, T30-T34
- FORM CEM-3101
- SURVEYS (SV)
- Other:
  - Typical Temporary Sign Support Details
  - Encroachment Permit Applicant: Contractor(s) Authorization Form (DOT TR-0429)
  - Notice of Completion TR-0128
  - Completed Standard Encroachment Permit Application (DOT TR-0100)
  - Approved Plans

PLANS AND SPECIFICATIONS

If conflicts arise between Special Provisions, Plans, Caltrans Standard Plans, Standard Specifications, or other Caltrans standards, the Caltrans Inspector shall make the final determination regarding selection or interpretation of standards and/or specifications. State Standards and Specifications must apply to all work within the State right of way unless directed otherwise by the State Inspector. Reference to the Engineer in the State Standard Specifications must include the State Representative (Caltrans Permit Inspector or District 05 Permit Engineer).

Attention is directed to Section 5 of the current State Standard Specifications and the Encroachment Permit General Provisions (TR-0045) regarding control of work and permit work plan revisions. Additionally, the State Permit Inspector may require reasonable additions, modifications, or revisions to the scope of work at no cost to the State if the change is in the best interest of the State facility where the encroachment permit is being granted and Caltrans policy, Standard Specifications, or Permit Provisions are unclear.

WORK HOURS

Work authorized by this permit that does not restrict or close any traffic lane or shoulder may be performed on weekdays between the hours of 8:00 AM and 4:00 PM.

Traffic lane and shoulder restrictions or closures:

Hours to be determined by the Caltrans Permit Inspector based on location of work.

Work and lane closure restrictions will apply prior to and after a holiday or holiday weekend:

1. **As shown on the attached Holiday and Special Day Lane Closure Restrictions calendar.**

2. **Work schedules beyond the calendar dates shall comply with the attached District 5 Non-Standard Special Provision 12-4.02C(3)(f).**

3. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday.

4. When November 11th falls on a Saturday, Friday November 10th shall be a designated legal holiday.

The State Inspector must approve deviations from these hours in advance.

All work that will impact the normal operations of Caltrans traffic signal facilities must be performed under traffic control and during the hours approved by the Caltrans Inspector and Caltrans District 5 Traffic Management Center.

CONDITIONS OF APPROVAL

1) Failure to meet with the Caltrans Permit Inspector for a pre-job meeting prior to starting work within the State right of way may result in the immediate termination of work at the site. The State right of way shall be restored to a safe condition and all personnel and equipment must be removed from the State right of way as soon as possible as directed by the Caltrans Representative. Work may resume once the meeting with the Caltrans Permit Inspector has taken place and the Caltrans Permit Department has determined that the work is in compliance with the provisions of this permit.

2) Failure to comply with the permit provisions may result in the revocation of this permit (See Encroachment Permit General Provision number 2.) and will also result in more stringent permit requirements for future encroachment permits.

Caltrans Lane Closure System (LCS) Compliance Contacts

3) Work authorized by this permit will require compliance and proper notification in LCS.

4) If the above LCS contacts have changed, Permittee or Permittee's contractor must provide the updated contact information for replacement personnel, who will be ensuring LCS compliance to the Caltrans Permit Inspector. Contact information shall include personnel's full names, phone numbers and email addresses.

5) If not identified elsewhere in this permit, Permittee or Permittee's contractor must provide the contact information for two personnel, who will be ensuring LCS compliance during the pre-job meeting with the Caltrans Permit Inspector. Contact information shall include personnel's full names, phone numbers and email addresses.

Surveys

6) This permit does not authorize work on freeways, expressways, or controlled access highway rights of way. Work on these types of highway facilities must be the subject of a permit rider or a separate permit for each request or site location.

7) Traffic control and traffic control signage for each survey site must be determined by and approved by the State Inspector prior to starting work.

8) All survey operations must be conducted off the traveled way except where necessary to cross pavements and medians.

9) When survey operations are being conducted, the permittee must furnish, place, and maintain signs and safety equipment in accordance with the latest edition of the Caltrans Survey Manual, Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones, and California Manual on Uniform Traffic Control Devices.

10) All personnel must wear hard hats and warning garments in the appropriate color (fluorescent/reflective versions). Work must be done during daylight hours only.

11) Unless specifically authorized in this permit, markings within the right-of-way must be temporary. Any painted markings must be made with water-soluble paint, and other markings must be removed upon completion of the survey.

12) Electromagnetic and radioactive equipment must be operated by certified personnel and must not interfere with radio communications or be directed toward the traveling public.

13) Permission is also granted to park survey vehicles temporarily within the right of way, outside the shoulders, while survey work is in progress. Auxiliary support and employee vehicles must remain outside of the right of way.

14) Survey information and assistance may be obtained upon request to:

Department of Transportation 15)
Survey Section
Attn: Jeremy Villegas
50 Higuera Street
San Luis Obispo, CA 93401

Phone: (805)549-3066
Email: jeremy.villegas@dot.ca.gov

16) If feasible, monuments should not be set within the traveled way. All monuments that must be set or perpetuated in paved surfaces must be constructed in accordance with Caltrans Standard Specifications, **Section 78-2, "Survey Monuments,"** and Standard Plan A74, Type D, or equal with prior approval of the District Surveys Engineer.

17) Any survey data requested by or furnished to Caltrans must be provided without charge.

18) Copies of Corner Records or Records of Surveys, recorded in compliance with the Business and Professions Code, must be forwarded to the District Surveys Engineer.

19) Measurements across traffic lanes must be made with electronic distance measuring devices utilizing non-visible light or other optical means.

20) Permittee must provide for the safe passage of pedestrians and bicyclists.

21) This permit does not authorize removal, cutting, trimming or damage to any tree,

shrub, or plant within the highway right of way.

22) Unless specifically authorized elsewhere in this permit, excavation of holes in paved surfaces is prohibited.

23) Any permitted excavations must be backfilled in accordance with State standards and as directed by the State's representative.

24) When on the State Highway system, use W21-6 "Survey Crew" sign prior to survey area per the Caltrans Standard Plan T9 advance warning sign spacing or under the guidance of the Caltrans Permit Inspector.

Unmanned Aircraft Systems (UAS)

25) Unless specifically authorized in this permit, UAS operations within the State right of way requires prior written approval from the District Encroachment Permits Office.

26) UAS operations must comply with Caltrans UAS Operations Handbook.

Soil Bore/Sampling

27) Placement of borings must be determined to offer the least possible immediate and future conflict with pedestrian and vehicle traffic. Work to be done beyond the permit work completion date must be covered by a permit rider to this permit.

28) If the method of backfill is not specified, the entire bore must be backfilled with a minimum of 564 lbs. (6-sack) Portland cement and 6 gallons of water per sack of cement, per 1 yard of commercial-quality concrete sand, using the tremie method. Bores located on the roadway or shoulder paving shall be backfilled to within 1 inch below the existing AC paving. The remaining backfill must be with hot mix asphalt paving or with 590 lbs of Portland cement to 1 yard of aggregate concrete colored to match the adjacent surfaces. Bores located on the graded shoulder must be backfilled to within 18 inches below existing grade. The remaining backfill in the graded shoulder must be approved native material or as directed by the State Inspector per Caltrans Standard Specification for backfill requirements.

PERMITTEE AND PERMITTEE'S PRIME CONTRACTOR(S)

Notwithstanding Encroachment Permit General Provision #4, the Permittee and Permittee's prime contractor(s) are required to complete, sign, and submit the

attached **Encroachment Permit Applicant: Contractor(s) Authorization Form DOT TR-0429,** prior to the pre-construction meeting, to the Caltrans Permit Inspector.

1. The form must reference permit number **0523 NSV 0472.**

2. A California licensed contractor, individual, or company under contract directly with the Permittee is considered a prime contractor for this encroachment permit.

3. If prime contractor(s) are replaced or added after the initial submission of Form DOT TR-0429, Permittee and Permittee's new prime contractor(s) must complete, sign, and submit another form with signatures to the Caltrans District 5 Encroachment Permits Office.

4. Work within the State right of way may not begin until the receipt and approval of Form DOT TR-0429 by the Caltrans Permit Inspector and the required information listed below from the prime contractor(s) has been approved with a permit rider by the Caltrans District 5 Encroachment Permits Office.

NOTIFICATIONS

Notice of Materials Used
Permittee's attention is directed to the **Caltrans Standard Specification Section 6, Control of Materials.**

The Permittee must bear all costs for source material inspection. Please note that these materials may require source inspection and approval at the manufacturer's plant.

Permittee shall be solely responsible to furnish a list of materials to be used on the permitted project by completing the attached Form CEM-3101 "Notice of Materials Used" for traffic signal standards, lighting (electrolier) standards, metal poles, mast arms, foundation bolts, overhead sign trusses, guard rail components, column casings, epoxy coated rebar, reinforced concrete pipe, steel girders, sign panels, and other items as specified by the State representative. Form must be submitted to the Caltrans Permit Inspector and METS Material Administrator.

The METS Material administrator must determine which materials will require source inspection and which will require onsite inspection in coordination with the Caltrans Permit Inspector. Additional form submissions may be required to address additional items that require source inspection.

Please allow a minimum of six weeks for source inspection, testing, and approval of materials to be used.

Reference attached form CEM-3101 for email address, fax number, and mailing address for submission to the METS Material Administrator.

TRAFFIC CONTROL AND PUBLIC SAFETY

This permit does not authorize traffic control that reduces the number of travel lanes.

All traffic control must be performed under the direction of qualified and competent traffic control personnel. If it becomes apparent to the Caltrans Permit Inspector that the Permittee's contractor does not have adequately trained and competent staff to perform traffic control, the Permittee or Permittee's contractor must hire a suitable contractor to provide traffic control.

Traffic control and construction zone signing must be performed per an approved traffic control plan.

In the absence of a project specific traffic control plan:

> All traffic control must be performed in compliance with the applicable Caltrans Standard Plans for traffic control, California Manual on Uniform Traffic Control Devices, or as approved by and as directed by the Caltrans Permit Inspector,
>
> or
>
> If requested by the Caltrans Permit Inspector, Permittee or Permittee's contractor must provide a traffic control plan prepared by a duly licensed individual for review and approval. Plans must bear the licensed individual's signature and identifying licensing information.

All traffic control personnel performing flagging operations must be trained in accordance with Cal/OSHA Title 8, Division 1, Chapter 4, subchapter 4 Construction Safety Orders, Article 11, Section 1599 (f) and (g), and must provide certification of training if requested by the State Permit Inspector.

Traffic control and construction zone signing must be performed in accordance with the applicable Caltrans Standard Plans for traffic control, Caltrans Traffic Manual, California Manual on Uniform Traffic Control Devices, or as approved by and under the direction of the State Inspector.

The Permittee must provide all traffic control devices and personnel. All expenses incurred from traffic control operations must be borne by the Permittee.

All traffic control devices must comply with the current California Manual of Uniform Traffic Control Devices.

If it is determined that the proposed work will require Buffer Lanes, as described below, the Permittee must apply for a permit rider and submit a traffic control plan for the required lane closure.

Standard Specification12-4.02C(4) Buffer Lanes
Where two or more lanes are adjacent to a work area, including work on shoulders, you must close the lane adjacent to the work area in accordance with the lane closure requirements as follows:

1. Work is on the traveled way within 6 feet of the adjacent traffic lane.

2. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the posted speed is 45 mph or greater.

3. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the posted speed is less than 45 mph.

Closure of the adjacent traffic lane is not required for:

1. Workers protected by a permanent or temporary barrier

2. Installation, maintenance, or removal of traffic control devices except for temporary barrier system

For time periods at the beginning or end of work when the lane requirement charts do not allow the closure of the adjacent traffic lane, the following construction activities are allowed without a buffer lane:
1. Paving
2. Parking, positioning, loading, unloading vehicles, or storing equipment or materials necessary for the work being performed
3. Placing, removing or maintaining traffic stripes, pavement marking, or pavement markers
4. Operations not performed by workers on foot such as grinding, grooving, planing, sweeping, applying a tack coat, or operating a crane
5. Operations where workers on foot are protected, at each work location, within the same closure by an impact attenuator vehicle in the lane adjacent to live traffic

Do not perform work activities or store equipment, vehicles, or materials within the buffer lane.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators will represent the edge of traffic lane. Existing traffic lanes must not be reduced to less than 10 feet in width without the written approval of the State Inspector.

"NO PARKING" zones must be posted a minimum of 48 hours in advance of proposed parking lane closure.

Suspended Loads
Suspended loads or equipment must not be moved nor positioned over public traffic or pedestrians.

GENERAL REQUIREMENTS

Project/Work Site
All disturbed areas must be restored to original or better condition.

Any change in the existing drainage pattern, whether occasioned by increase or diversion, and the cost of damage, repair, or restoration of the State highway right of way must be the responsibility of the Permittee.

No earth or construction materials are to be dragged or scraped across the highway pavement. No excavated earth shall be placed or allowed to remain at a location where it can be tracked on the highway traveled way, public, or private approach by the Permittee's construction equipment or by traffic entering or leaving the highway traveled way. The Permittee must immediately remove excavated earth or mud so tracked onto the highway pavement or public or private approach.

No excavation, maintenance hole, pull box, or vault shall be left open overnight or unattended during work hours without written permission from the Caltrans representative and adequate protection for traffic and pedestrians is provided.

Personnel Protective/Safety Equipment
All personnel working within the State right of way must wear the appropriate personnel safety/protective equipment as specified by the personnel's employer's "Injury and Illness Prevention Program" required by the California Code of Regulations 3203. If requested by the Caltrans Permit Inspector, personnel's employer must provide a copy of said "Injury and Illness Prevention Program" and identify the locations within the document that addresses, but not limited to,

personal protective equipment, head protection, and warning garments.

In the absence of an "Injury and Illness Prevention Program," all other personnel within the project work zone must conform to the personnel protective/safety equipment requirements in the latest edition of the Caltrans Safety Manual.

Aerially Deposited Lead (ADL) for Minimal Disturbance

Permittee must reuse the soil within the work limits in the immediate area from which it was excavated. If any excess soil is generated, it becomes the property of the Permittee. Permittee must transport all excess soil outside of Caltrans' right-of-way and dispose of it in accordance with all applicable environmental laws and regulations.

Construction Debris and Waste Materials

The Permittee solely owns all construction debris and waste materials, including hazardous waste, generated by this permitted project. Said materials must be removed from the State right of way, stored, and disposed of in accordance with applicable local, regional, State, and Federal specifications or regulations. Construction debris and waste materials must be disposed of:

at designated off-site commercial facilities approved to accept said materials,

at non-commercial permitted sites approved to accept said materials (Permittee must provide copies of all necessary local and State agency permits prior to disposal.),

or at sites outside of the State of California approved to accept said materials (Permittee to provide copies of permits issued by the local and State agency with jurisdiction over the site prior to disposal.).

If requested by the State Permit inspector, Permittee must provide a copy of documentation as proof of the proper disposal of said materials.

Survey Monumentation

Permittee's attention is directed to **Caltrans Standard Specifications Section 5-1.36, Property and Facility Preservation** and "Professional Land Surveyors' Act," Section 8771 of the State of California Business and Professions Code. Permittee must physically inspect the work site and locate survey monuments prior to work commencement. Monuments that might be disturbed must be referenced or reset in accordance with the standards mentioned above.

If feasible, monuments should not be set within the traveled way. All monuments

that must be set or perpetuated in paved surfaces must be constructed in accordance with **Caltrans Standard Specifications Section 78-2, Survey Monuments,** and Caltrans Standard Plan A74, Type D, or equal with prior approval of the District Surveys Engineer.

Copies of Corner Record files or Record of Surveys recorded in compliance with the Business and Professions Code must be forwarded to the Caltrans District 5 Surveys Engineer at the following address:

Caltrans District 5
Survey Section
Attn: Jeremy Villegas
50 Higuera Street
San Luis Obispo, CA 93401

Phone: (805) 550-0861
Email: jeremy.villegas@dot.ca.gov

Material Testing

Material testing and quality control must conform to the State Construction Manual and to the State Material Testing Manual. Testing must be performed by a certified material-testing consultant acceptable to the State and paid for by the Permittee. Material testing and quality control tests must be performed as required by the State's Inspector and the results thereof must be made immediately available.

All required construction compliance tests must be performed with the California Test Methods and must be in accordance with the latest edition of Caltrans Independent Assurance Program Manual. A Caltrans certified laboratory must also perform all tests and all laboratory reports must be furnished to the Department's representative at no cost to the State.

Backfill Requirements

All backfilling and compaction must conform to the applicable sections of the **Caltrans Standard Specifications Section 19-5, Compaction.**

Backfilling using ponding or jetting methods are prohibited.

Caltrans Standard Specification 2-sack slurry cement should be used for backfilling under all paved surfaces to expedite roadway repairs.

All backfill material must comply with and must be constructed per Caltrans Standard Specifications.

Backfill material must be approved by the Caltrans Permit Inspector prior to beginning excavation.

Culverts with less than 2 feet of cover must be backfilled as directed by the State Inspector with minor concrete conforming to **Caltrans Standard Specifications Section 90-2**.

Relative Compaction (90 Percent)
Embankment compaction beyond the roadbed or outside of structure backfill must not be less than 90 percent relative compaction unless stated otherwise in the Caltrans Standard Specifications or Caltrans Highway Design Manual.

Relative Compaction (95 Percent)
Relative compaction of not less than 95 percent must be obtained for a minimum depth of 0.5-foot below the grading plane for the width between the outer shoulders, whether in excavation or embankment.

In addition, relative compaction of not less than 95 percent must be obtained for a minimum depth of 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on each side thereof, whether in excavation or embankment.

For limits of 95 percent compaction of embankment adjacent to abutments and for retaining walls without pile foundations reference **Caltrans Standard Specifications Section 19-5.03B**.

Existing Trees and Vegetation
Unless stated elsewhere in this permit or shown on the approved permit plans, this permit does not authorize the removal, severing of roots or trimming of vegetation. If work of this nature is required, a written request and approval, by the Caltrans Permit Inspector, is required in advance of performing the work. Replacement planting may be required as a mitigation measure. Excavations should be done outside of drip line to reduce tree damage and integrity of trees. If excavations must be made within the drip line of trees (or extending tree roots) along the right of way, the trenches must be hand dug and the utility routed beneath or around root structure. Major tree roots must not be cut or damaged. Additionally, the exposed roots must be wrapped and kept moist until the excavation is back filled with the native material. Requests for exceptions must be accompanied by an Arborist's recommendation.

Archaeological/Cultural Requirements
If archaeological resources or human remains are accidentally discovered during construction, work must be halted within 150 feet of the find until a qualified professional archaeologist can evaluate it. Permittee must notify Caltrans District

Archaeologist Krisstin Hadick, (805) 458-1238, about the discovery immediately. If the find is determined to be significant, appropriate mitigation measures must be formulated and implemented.

Signs

Installation of roadside signs must comply with all applicable portions of the current **Caltrans Standard Specifications Section 56-3**, Caltrans Standard Plans, California Manual on Uniform Traffic Control Devices, and Caltrans policies.

If exact locations of roadside and construction area signs are not shown on the project plans, post holes must be dug by hand, except where potential conflicts can be eliminated. Potential conflicts are considered eliminated when an appropriate regional notification center has performed field mark-out and no subsurface utilities are within 4 feet of the proposed post hole, or the post hole can be moved 4 feet away from subsurface utilities as located by the utility owner.

Temporary and permanent signs placed within the State right of way must comply with minimum retro-reflectivity requirements of the most current of the following: Federal Highway Administration Manual on Uniform Traffic Control Devices - Section 2A.08, **Caltrans Standard Specifications Section 82-2.02C, Retroreflective Sheeting.**

Roadside signs mounted on post(s) must be placed at locations shown on the permit plans and must be installed in compliance with the latest edition of Caltrans Standard Plan RS1 through RS4.

Temporary signs mounted on barricades and barricade/sign combinations must be crashworthy.

The bottom of a temporary sign mounted on a barricade, or other portable support, must be at least 1 foot above the traveled way or the existing surface at the location of placement.

Proposed sign placement must not interfere with the visibility of any existing warning, regulatory, information or guide signs along the State Highway.

Signs to be owned and maintained by the Permittee shall be appropriately marked on the back of the sign.

A safe pedestrian passageway width of 4 feet must be maintained at any sign installation in areas normally traversed by pedestrians. The minimum passageway adjacent to a drop off, such as a curb face or gutter must be at least 5 feet.

EXISTING FACILITIES

Existing improvements must be protected or relocated as required by the work authorized by this permit. If existing improvements including pavement markings and delineation are damaged or their operation impaired by this work, they must be replaced or restored to the satisfaction of the Caltrans representative. Such work must be done immediately if requested by the Caltrans representative.

IT SHALL BE THE PERMITTEE'S RESPONSIBILITY TO FULLY INVESTIGATE THE PROPOSED WORK AREA FOR POSSIBLE CONFLICTS WITH EXISTING UTILITIES AND FACILITIES, INCLUDING BUT NOT LIMITED TO SEWERS, ELECTRICAL CONDUCTORS, GAS LINES, WATER PIPES AND TRAFFIC SIGNAL FACILITIES. THE PERMITTEE AGREES TO ACCEPT ALL LIABILITY FOR DAMAGES DONE TO EXISTING FACILITIES CAUSED BY THE WORK AUTHORIZED UNDER THIS PERMIT.

Caltrans Traffic Signals, Lighting, and Electrical Facilities

Caltrans does not subscribe to underground utility locating services. It is the Permittee's sole responsibility to investigate, locate, and mark existing Caltrans traffic signal equipment, loops, conduits, and street lighting facilities prior to work in or between signalized intersections and street lighting facilities.

If it is apparent that impacting traffic signal conduits during construction will be unavoidable Permittee must install temporary overhead wiring for the signal at Permittee's own expense. Permittee must always have on hand all necessary equipment and personnel needed to provide traffic control at an intersection should the traffic signal malfunction.

If a signal detector loop, including the portion leading to the adjacent pull box is damaged by Permittee's operations the entire detector loop must be replaced, in kind, within 24 hours of the occurrence. If an adjacent loop is damaged during the replacement, that loop must also be replaced. The Caltrans Inspector must be notified immediately when damage occurs. Arrangements for Caltrans Electrical operations staff must be made to have the traffic signal controller reprogrammed.

WATER POLLUTION CONTROL

Discharge of Storm Water and Non-Storm Water

Work within State highway right-of-way must be conducted in compliance with all applicable requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued to the Department of Transportation (Department), to govern the discharge of storm water and non-storm water from its properties. Work must also be in compliance with all other applicable Federal, State and Local laws and regulations, and with the Department's Encroachment Permits Manual and

encroachment permit. The Department's NPDES Permit requires the Permittee to comply and maintain, if applicable, the approved Storm Water Special Provisions for Minimal or No Impact (TR-0400), Water Pollution Control Program, or Storm Water Pollution Prevention Plan.

The Contractor (permittee) must be responsible for fines assessed or levied against the Contractor or the Department as a result of the Contractor's (permittee) failure to comply with these provisions. Fines shall include civil liability fines, criminal penalties and/or damages, assessed, or levied against the Department or the Contractor, Contractor liability for failure to comply with these provisions shall also include reimbursement for payments made or costs incurred by the Department in settlement for alleged violations of the Permits, the Manuals, or applicable laws, regulations, or requirements. Costs incurred could include sums spent in lieu of fines or penalties, in mitigation or to remediate or correct violations.

If an unforeseen illicit discharge is generated during construction activities and the Caltrans Permit Inspector cannot be contacted, the Permittee or Permittee's contractor must contact the Encroachment Permit Storm Water Coordinator, Rachel Naccarati (805) 534-3303 immediately. The Permittee or Permittee's contractor is responsible to contain and remediate the illicit discharge as directed by the Caltrans Permit Inspector or Encroachment Permit Storm Water Coordinator at no cost to the State.

Unless stated otherwise in this permit, approved plan, or approved specifications, seeds sown for erosion control must achieve 70% germination over the disturbed soil area as determined by the Caltrans Permit Inspector.

The Caltrans Permit Inspector must approve the seed mix prior to its application.

PROJECT COMPLETION

Once work authorized by this permit has started, cancelling the permit or failure to contact the Caltrans Permit Inspector may result in the forfeiture of any remaining fee deposits.

Immediately following completion of the work permitted herein, the Permittee must fill out and send by email the Notice of Completion attached to this permit.

THANK YOU!

DISTRICT 5 NOTIFICATION REQUIREMENTS

The following provisions shall apply to all permit work requiring temporary lane closures or traffic detours:

Temporary Lane Closures

Notification of temporary lane closures or traffic detours shall be given to the State Inspector for his approval using copies of the attached form entitled, **WEEKLY TRAFFIC UPDATE**. Notification shall be submitted to the State Inspector by 12:00 PM (noon) Monday, prior to the week of the proposed closure or detour. Notifications submitted after the deadline cannot be approved for the upcoming week. **All traffic control requiring the temporary closure of lanes or detour of traffic shall be approved in advance by the State Inspector.**

Ramp Closures

14 to 7 calendar days prior to an approved ramp closure, notice shall be posted at the ramp entrance using the appropriate SC6 sign. In addition, an SC8 or portable changeable message sign shall be posted for the preceding ramp the day of the closure unless otherwise approved by the Caltrans Permit Inspector.

Caltrans Lane Closure System (LCS) Compliance

Work authorized by this permit may require compliance and proper notification in LCS.

If not identified elsewhere in this permit, you or your contractor must provide the contact information for two personnel, who will be ensuring LCS compliance during the pre-job meeting with the Caltrans Permit Inspector. Contact information shall include personnel's full names, phone numbers and email addresses.

You or your Contractor's LCS contact will be required to properly notify the District Traffic Management Center (TMC) as described below.

When a lane closure or lane shift has been identified by the Inspector with a Lane Closure ID # and Log #, you will be required to provide the TMC notification status when you are placing the lane closure, when you remove the lane closure, or when you cancel the lane closure.

When providing the status of the lane closure to the TMC you will need to follow these steps,

1. **Obtain the Lane Closure ID and Log # assigned for the approved scheduled lane closure event from the Caltrans Permit Inspector** a minimum of one weekday prior to the closure day or duration.

2. **Call the TMC/Lane Closure Phone Number (805) 549-3837 to provide the Lane Closure ID Status**

   For a stationary closure on a traffic lane, use code:

   1. 10-97 immediately before you place the 1st cone on the traffic lane

   2. 10-98 immediately after you remove all of the cones from the traffic lane

   For a stationary closure on the shoulder, use code:

1. 10-97 immediately before you place the 1st cone after the last advance warning sign
2. 10-98 immediately after you remove the last cone before the advance warning signs

For a moving closure, use code:

1. 10-97 immediately before the actual start time of the closure
2. 10-98 immediately after the actual end time of the closure

For closures not needed on the authorized date, use code 10-22 within 2 hours after the authorized start time.

When calling the TMC to provide the status on your lane closure you will say something to the effect of (substituting your lane closure ID number and Log number for example ID "P101CA" and Log number "1" below),

- "**1097**"- *"This is (your name, phone number) calling to provide a 1097 status to lane closure ID P101CA and log number 1. That is a 1097 for Papa 101 Charlie Alpha log number 1."*

- "**1098**"- *"This is (your name, phone number) calling to provide a 1098 status to lane closure ID P101CA, log number 1. That is a 1098 for Papa 101 Charlie Alpha log number 1."*

- "**1022**"- *"This is (your name, phone number) calling to provide a 1022 status to lane closure ID P101CA, log number 1. That is a 1022 for Papa 101 Charlie Alpha log number 1."*

Failure to properly status the lane closures will result in a written warning by the Caltrans Permit Inspector on the first violation. If there is a 2nd violation, your permit may be suspended until a Contractor or new Contractor (C-31 or General Engineering A License preferred) who is experienced in traffic control and LCS notification is hired. Additional violations will result in the revocation of the permit and may impact the processing of future encroachment permit application packages.

You can check your lane closure status at the following website:
https://lcswebreports.dot.ca.gov/

Special Notifications

If permitted activities such as road closures or traffic detours may result in significant traffic congestion, Permittee shall be responsible for coordinating advance notification to local newspapers, television and radio stations, and emergency response providers with both the State Inspector and the Caltrans Public Information Officer, telephone (805) 549-3237. Public notice may include press releases and/or traffic signing.

Permittee shall complete and submit the attached form entitled **PUBLIC AFFAIRS – PERMITTED ACTIVITY NOTIFICATION** to the Caltrans Public Affairs Office as early as possible (One Week Ahead is Best) prior to beginning of permitted activity. Additional information or clarification may be required in the form of a written description of the activities in a format that is suitable for a press release. The form may be delivered by fax to (805) 549-3638 or emailed

to the PIO contact on the form.

Horizontal and Vertical Requirements for Extra-Legal Load Vehicles

Permittee shall provide written notification to the Caltrans Permit Inspector or Caltrans Representative, of proposed horizontal or vertical lane restrictions which will affect extra-legal loads up to 16' wide and 18' high, or ramp closures/re-openings that may affect extra-legal loads traveling through the project area. Said notification shall be delivered to the Inspector no fewer than 25 days prior to proposed change. Permittee shall immediately notify the Caltrans Permit Inspector or Caltrans Representative as soon as the restriction is no longer present.

Attention: Payman Hamed

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

PERMITS

WEEKLY TRAFFIC UPDATE

For the Week of: _____

Please provide this form to your designated **PERMIT INSPECTOR** each week if you will be performing work that will impact traffic (lane closures, ramp closures, shoulder closure, traffic control, etc.)

Weekly Traffic Updates must be received by Monday 12:00 PM (noon) the week prior to the requested date(s) of the planned traffic control. Failure to meet the deadline may result in the denial of the requested traffic control. The State Permit Inspector may also require changes to the requested traffic control prior to its approval.

We appreciate your cooperation. These updates need to be done in a timely manner to provide information to the traveling public we serve. THANKS!!!!

DATE	TIME (begin / end)	Location – Cross Streets, County Route, and Post Mile (from / to)	Impact on Traffic (Description)	Reason

Send, fax, or email to: **Your PERMIT INSPECTOR - Payman Hamed, Fax #: , Email: payman.hamed@dot.ca.gov**

Your Name: _____ Phone: _____FAX: _____

Company/Dept.: _____ Email: _____

PERMIT #: **0523 NSV 0472**

2023 Holiday and Special Day Lane Closure Restrictions

For maintenance, permits and construction projects using blanket chart hours

January

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

March

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

April

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

July

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

Su	Mo	Tu	We	Th	Fr	Sa
27	*28*	*29*	*30*	*31*	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

October

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

December

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	*1*	*2*	*3*	*4*	*5*	*6*

Designated Holidays	Date observed 2023
New Year's Day	January 2nd (Observed)
Presidents' Day	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4th
Labor Day	1st Monday in September
Veterans Day	November 11th
Thanksgiving Day	4th Thurs and Fri in November
Christmas Day	December 25th

Caltrans Holiday/Special Day	Date observed 2023
Martin Luther King Jr. Day	3rd Monday in January
Cesar Chaves Day	March 31st

	No closures after 12:00 Noon
	No closures allowed
	Designated Holiday - No closures allowed
	Caltrans Holiday/Special Day - No closures allowed
	No closures until 08:00
	No closures until 20:00

Replace *Reserved* in section 12-4.02C(3)(f) with:

Closure restrictions for designated holidays and special days are shown in the following table:

Lane Closure Restrictions For Designated Holidays And Special Days											
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun	Mon
x	**H** xx	xx	xx	xxx							
	SD xx										
x	xx	**H** xx	xx	xxx							
		SD xx									
	xx	xx	**H** xx	xx	xxx						
			SD xx								
x	xx	xx	xx	**H** xx	xxx						
				SD xx	xxx						
				xx	**H** xx	xxx					
					SD xx						
					xx	**H** xx	xxx				
						SD xx					
						x	**H** xx	xxx			
					x	xx	**H*** xx	xx	xx	xx	xxx
							SD xx				

Legend:	
	Refer to lane requirement charts.
x	The full width of the traveled way must be open for use by traffic after 1200.
xx	The full width of the traveled way must be open for use by traffic.
xxx	The full width of the traveled way must be open for use by traffic until 0800.
H	Designated holiday
H*	Thanksgiving Holiday-The full width of the traveled way must be open for use by traffic between Tuesday at 1200 until the following Monday at 0800.
SD	Special day

PUBLIC AFFAIRS - PERMITTED ACTIVITY NOTIFICATION

This Project Notification should be emailed (preferred) or faxed to Public Affairs as early as possible (One Week Ahead is Best) prior to beginning of permitted activity. Please fill out this form as thoroughly as possible and use additional paper if needed. **Include all information that the traveling public needs to know.**

TO: PUBLIC AFFAIRS

ATTN: Jim Shivers (San Luis Obispo and Santa Barbara) jim.shivers@dot.ca.gov
Kevin Drabinski (Monterey and Santa Cruz) kevin.drabinski@dot.ca.gov
Heidi Crawford (San Benito) heidi.crawford@dot.ca.gov

Phone: (805) 549-3318, **FAX: (805) 549-3326**, Calnet: 629-3318

E.A. or PERMIT NUMBER: **0523 NSV 0472**

COUNTY, ROUTE & POSTMILE: **05-SB-33-6.046-6.779**

PERMITTED ACTIVITY LIMITS (location in miles, distance from nearest landmarks or cities, etc.):

PROJECT DESCRIPTION AND PURPOSE FOR PROJECT:

conduct a geophysical survey using the electrical resistivity method along a 3,600 ft. transect in unpaved soil; transect to consist of 100 to 112 electrodes at a 10 meter spacing to determine the location of any buried utilities as shown on the attached plans and as directed by the permit provisions in State Route 33 right of way between postmiles 6.046-6.779 in the County of Santa Barbara.

PERMIT INSPECTOR: **Payman Hamed** PHONE: **(805) 276-1570** FAX:

CONTRACTOR: FROM (CITY)

PERMIT ESTIMATE AMOUNT:

ANTICIPATED DATE TO *BEGIN CONSTRUCTION:

ALLOTED WORKING DAYS:

ANTICIPATED *COMPLETION DATE:

ANTICIPATED TRAFFIC CONTROL **& HOURS OF CLOSURE**:

ANTICIPATED TRAFFIC DELAYS:

ANY IMPACTS TO BICYCLE RIDERS/PEDESTRIANS:

COMMENTS: (What else does the public need to know? Diagrams, maps also helpful.)

*Please let Public Affairs know of any changes in Startup or Completion dates.

NOTICE OF MATERIALS TO BE USED
INSTRUCTIONS TO PERMITTEE/CONTRACTOR

Section 6 of the *State Standard Specifications* states that, "Before the preconstruction conference, submit material source information on a Notice of Materials to Be Used form".

To avoid delay in approval of materials, the Department of Transportation must receive, in a timely manner, Form CEM-3101, "Notice of Materials to Be Used." When filing this form, please comply with the following instructions:

1. The Contract Number/Permit Number and job limits should be the same as they appear on the special provisions/encroachment permit.

2. The column headed "Contract Bid Item Number" refers to the sequential item number of the contract, *if applicable*.

3. The column headed "Item Code" refers to the number for which the material is to be used, *if applicable*. It is a six-digit number.

4. The column headed "Contract Item Description" refers to an item description of the material as described in the special provisions or an item description to be used on the permitted project.

5. The columns headed "Item Component" refer to the specific description of material to be used, not necessarily the name of the contract item.

For Example:

Contract Bid Item Number	Item Code	Contract Item Description	Item Component	Item Sub-Component
1	520101	Bar Reinforcing steel	Coupler (service splice)	Service Splice, CJP welded

6. The column headed "Manufacturer/Provider" refers to the manufacturer/fabricator of the item. List the name, address, and email of the Manufacturer/Fabricator. Also, list the name and address of the location where inspection will occur, if different from the Manufacturer/Fabricator.

7. Form CEM-3101, "Notice of Materials to Be Used," must be submitted to the resident engineer (RE). The RE will email Form CEM-3101 to the materials administrator to:

   MaterialsAdministratorMETS@dot.ca.gov or fax to (916) 227-7084, Attn: Materials Administrator or postal mail to: Materials Engineering and Testing Services, 5900 Folsom Blvd., Sacramento, CA 95819, MS-5.

If the sources of materials are not known at the beginning of a contract, submit a Form CEM-3101, "Notice of Materials to Be Used," for a given bid item as soon as a provider is known. Multiple submissions may be necessary. Submit a Form CEM-3101, "Notice of Materials to Be Used," for all changes or revisions.

When placing orders for materials that require inspection prior to shipment, be sure to indicate on your request form that state inspection is required before shipment.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE OF MATERIALS TO BE USED

CEM-3101 (REV 09/2015)

ADA Notice
For individuals with sensory disabilities, this document is available in alternate formats. For alternate format information, contact the Forms Management Unit at (916) 445-1233, TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

Resident Engineer: ***Caltrans Permit Inspector - Payman Hamed*** Date:

Materials required for use under Contract Number (1) ***Encroachment Permit Number - 0523 NSV 0472***

District: ***05*** County: ***SB*** Route: ***33*** Post Mile: ***6.046-6.779***

will be obtained from the following sources:

Contract Bid Item Number (2)	Item Code (3)	Contract Item Description (4)	Item Component (5)	Manufacturer/Provider Name and Address (5)	Manufacturer/Provider Email Address (6)

It is requested that you arrange for sampling, testing and inspection of materials prior to delivery in accordance with Section 6 of the *Standard Specifications*. It is understood that source inspection does not relieve the prime contractor of the full responsibility for incorporating into the work, materials that comply in all respects with the contract plans and specifications, nor does it preclude the subsequent rejection of materials found to be unsuitable.

(7) Copies: Materials Administrator, Mail Station #5
Materials Engineering & Testing Services
5900 Folsom Blvd, Sacramento, CA 95819
MaterialsAdministratorMETS@dot.ca.gov
Fax: (916) 227-7084

Contractor		
Address		
Business Phone	Business Fax	E-Mail Address

At the completion of the permitted work, please complete the form below and submit an electronic copy of this page sent by email to jesse.cline@dot.ca.gov.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE OF COMPLETION

TR-0128 (REV. 6/2001) CT #7541-5529-1

PERMIT # 0523 NSV 0472
Permit Inspector: Payman Hamed

Dear Sir or Madam:
All work authorized by the above numbered permit was completed on:

DATE: _____

SIGNATURE OF PERMITTEE: _____
Cuyama Basin Groundwater Sustainability Agency

FM 92 1546 M

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For alternate format information, contact the Forms Management Unit at (916) 445-1233, TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT APPLICANT: CONTRACTOR(S) AUTHORIZATION FORM

DOT TR-0429 (NEW 12/2022)

I/We, the Permittee, hired the following prime contractor(s) to perform the approved encroachment activities under Encroachment Permit # _____ on my/our behalf as agents in accordance with Encroachment Permit General Provision #4 of the Encroachment Permit. I/we have provided a copy of the Encroachment Permit to the prime contractor(s) listed below, and I/we, the Permittee, warrant and represent that the activities related to the Encroachment Permit, whether performed by the Permittee or by any person or entity acting for or on behalf of the Permittee, will be performed in compliance with all terms, conditions, specifications, standards, provisions, and other requirements of the subject Encroachment Permit. The person(s) signing warrant and represent he/she/it/they have authority to agree to and so bind the Permittee to this page.

List of authorized prime contractors for the encroachment permit:

Contractor Name	Scope of work (Traffic Control/civil work etc.)	Contact Person	Contact Person's Information (Phone # and E-mail)

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Name of Permittee	**Name and Title of Person Signing for Permittee (Print)**	**Signature**	**Date**

ENCROACHMENT PERMIT APPLICANT: CONTRACTOR(S) AUTHORIZATION FORM

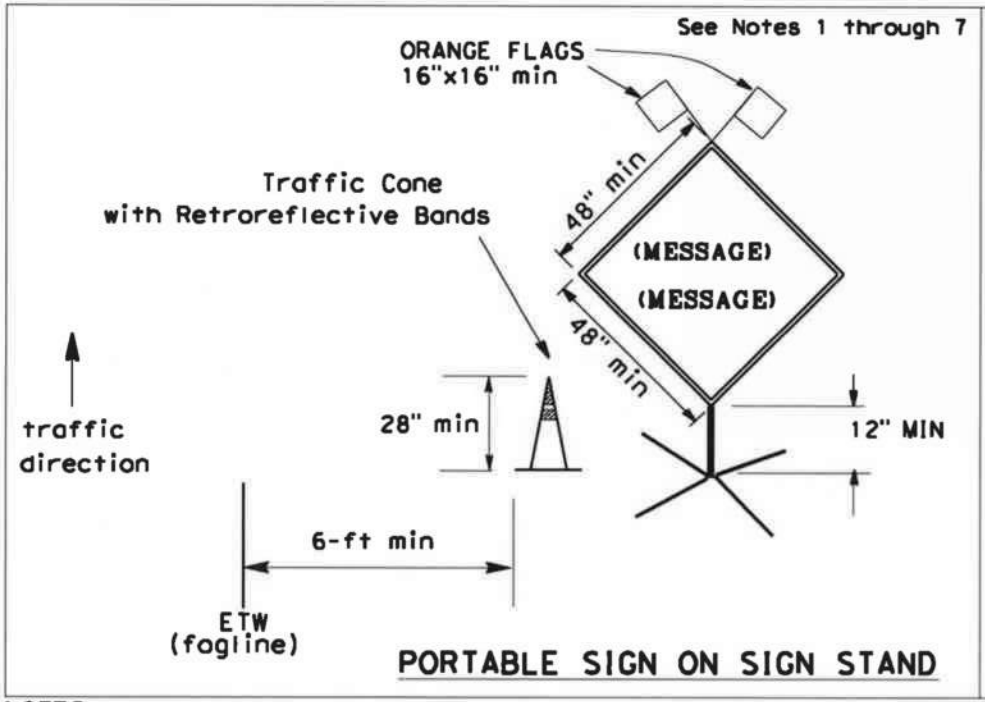
DOT TR-0429 (NEW 12/2022)

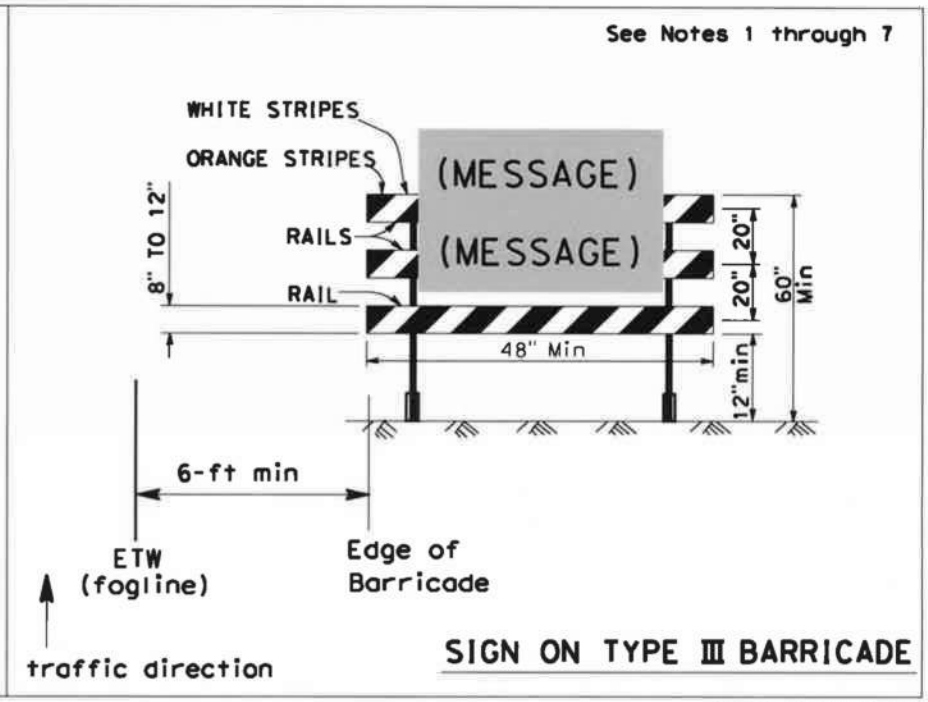
By signing below, the prime contractor entities each acknowledge that they have received a copy of Encroachment Permit #_____ and agree they, and their employees, managers, officers, directors, agents, subcontractors, and suppliers, will comply with, and will perform all activities in accordance with, all terms, conditions, specifications, standards, provisions, and other requirements of the Encroachment Permit, including but not limited to notifying the permit inspector as required in the Encroachment Permit and the lane closure notifications and the Encroachment Permit General Provisions (TR-0045). The person(s) signing on behalf of each prime contractor warrant and represent he/she/it/they have authority to agree to and so bind the named contractor to this paragraph.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Name of Prime Contractor	Name and Title of Person Signing for Contractor (Print)	Signature	Date
Name of Prime Contractor	Name and Title of Person Signing for Contractor (Print)	Signature	Date
Name of Prime Contractor	Name and Title of Person Signing for Contractor (Print)	Signature	Date
Name of Prime Contractor	Name and Title of Person Signing for Contractor (Print)	Signature	Date

TYPICAL TEMPORARY SIGN SUPPORTS DETAILS





NOTES

(REV. 3/18/2016)

1. Maintain a 4-foot minimum clearance on sidewalks at all times and a minimum 5-foot clearance adjacent to a drop off, such as a curb face or gutter.
2. Signs shall not interfere with the visibility of other existing signs.
3. Sign supports must be NCHRP Report 350 eligible or MASH (Manual for Assessing Safety Hardware) crashworthy.
   Information on NCHRP Report 350 eligible devices can be found at:
   http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/wzd/workzone_pdmenu.cfm
   Information on MASH can be found at:
   http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/ctrmeasures/mash/
4. Sign message, color, shape, and size must conform to the current Caltrans Standards Specifications and current CA MUTCD (California Manual on Uniform Traffic Control Devices). (i.e. Rectangular or diamond shape)
   Information on Caltrans Sign Specifications can be found at:
   http://www.dot.ca.gov/hq/traffops/engineering/control-devices/specs.htm
5. Signs mounted on Type III barricades shall not cover the bottom rail.
6. Sign stands should be weighted down per the stand manufacturer's recommendations. (i.e. sand/gravel bags)
7. Signs to be placed for more than 3 consecutive days, shall be post mounted per Caltrans Standard Plans RS1 through RS4.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

TABLE 1

TAPER LENGTH CRITERIA AND CHANNELIZING DEVICE SPACING							
SPEED (S)	MINIMUM TAPER LENGTH * FOR WIDTH OF OFFSET 12 FEET (W)				MAXIMUM CHANNELIZING DEVICE SPACING		
					X	Y	Z **
	TANGENT 2L	MERGING L	SHIFTING L/2	SHOULDER L/3	TAPER	TANGENT	CONFLICT
mph	ft	ft	ft	ft	ft	ft	ft
20	160	80	40	27	20	40	10
25	250	125	63	42	25	50	12
30	360	180	90	60	30	60	15
35	490	245	123	82	35	70	17
40	640	320	160	107	40	80	20
45	1080	540	270	180	45	90	22
50	1200	600	300	200	50	100	25
55	1320	660	330	220	50	100	25
60	1440	720	360	240	50	100	25
65	1560	780	390	260	50	100	25
70	1680	840	420	280	50	100	25
75	1800	900	450	300	50	100	25

* - For other offsets, use the following merging taper length formula for L:
For speed of 40 mph or less, $L = WS^2/60$
For speed of 45 mph or more, $L = WS$

Where: L = Taper length in feet
W = Width of offset in feet
S = Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

** - Use for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA).

TABLE 2

LONGITUDINAL BUFFER SPACE AND FLAGGER STATION SPACING				
SPEED *	Min D **	DOWNGRADE Min D ***		
		-3%	-6%	-9%
mph	ft	ft	ft	ft
20	115	116	120	126
25	155	158	165	173
30	200	205	215	227
35	250	257	271	287
40	305	315	333	354
45	360	378	400	427
50	425	446	474	507
55	495	520	553	593
60	570	598	638	686
65	645	682	728	785
70	730	771	825	891
75	820	866	927	1003

* - Speed is posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

** - Longitudinal buffer space or flagger station spacing

*** - Use on sustained downgrade steeper than -3 percent and longer than 1 mile.

TABLE 3

ADVANCE WARNING SIGN SPACING			
ROAD TYPE	DISTANCE BETWEEN SIGNS *		
	A	B	C
	ft	ft	ft
URBAN - 25 mph OR LESS	100	100	100
URBAN - MORE THAN 25 mph TO 40 mph	250	250	250
URBAN - MORE THAN 40 mph	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1000	1500	2640

* - The distances are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommmended distances.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM TABLES FOR LANE AND RAMP CLOSURES

T9

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D. Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

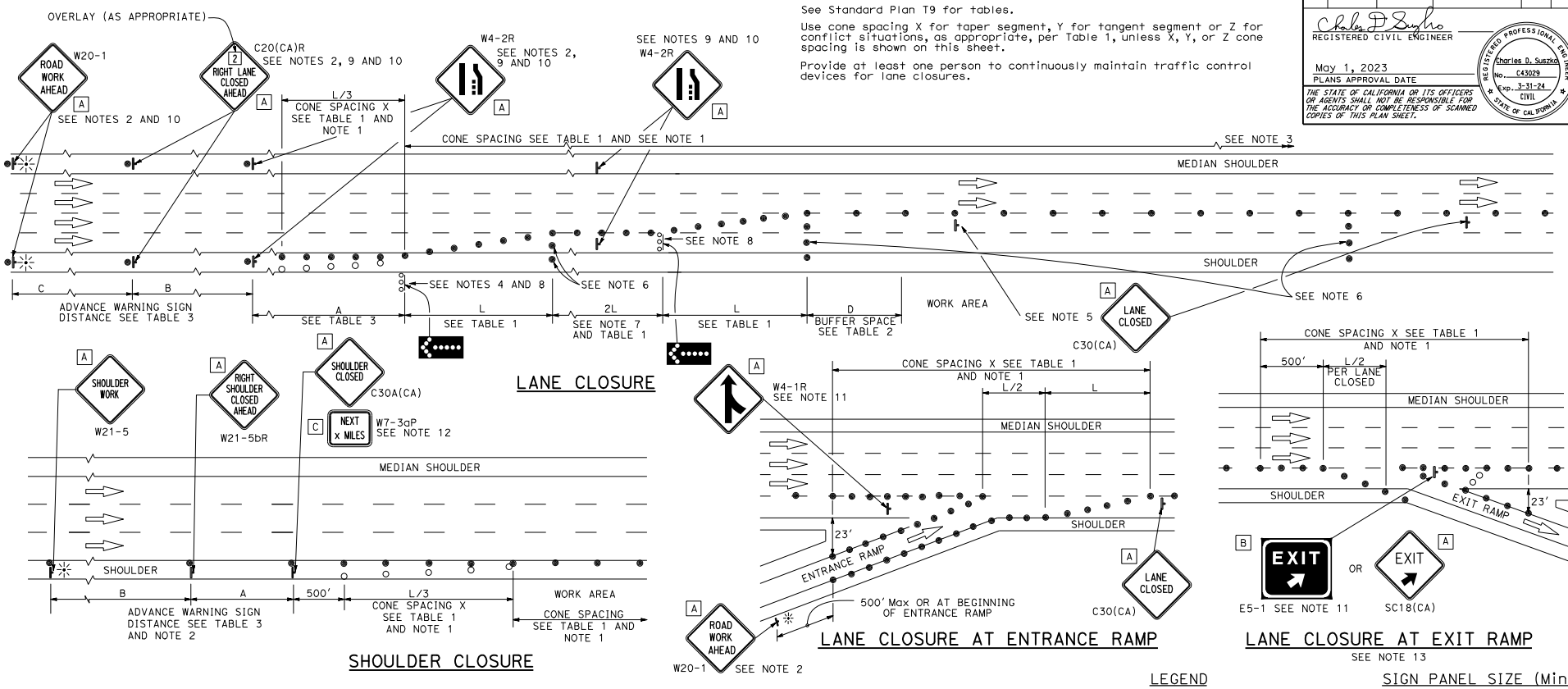
REGISTERED PROFESSIONAL ENGINEER — Charles D. Suszko — No. C43029 — Exp. 3-31-24 — CIVIL — STATE OF CALIFORNIA

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.



NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest verticle curve or on a horizontal curve.
5. Place a C30(CA) sign every 1000 ' throughout length of lane closure.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 1000' as shown on the "Lane Closure" detail. Two type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
7. The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
8. Use one flashing arrow sign for each lane closed. The flashing arrow sign shall be Type I.
9. Median lane closures shall conform to the details as shown except that C20(CA)L and W4-2L signs shall be used.
10. Duplicate sign installations are not required:
    a) On opposite shoulder if at least one-half of the available lanes remain open to traffic.
    b) In the median if the width of the median shoulder is less than 8' and the outside lanes are to be closed.
11. The E5-1 or SC18(CA) and W4-1 signs shall be used as shown.
12. A W7-3aP "NEXT _____ MILES" plaque must be used if the shoulder closure extends beyond the distance that can be perceived by road users.
13. For the warning sign requirements at the Exit Ramp, when work is proposed on the local street, see CA MUTCD Figure 6H-22 to 6H-27.

LEGEND		SIGN PANEL SIZE (Min)	
●	TRAFFIC CONE	A	48" x 48"
○	TRAFFIC CONE (OPTIONAL TAPER)	B	72" x 60"
	TEMPORARY TRAFFIC CONTROL SIGN	C	36" x 30"
	FLASHING ARROW SIGN (FAS)		
	FAS SUPPORT OR TRAILER		
✳	PORTABLE FLASHING BEACON		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS

NO SCALE

T10

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D. Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Charles D. Suszko — No. C43029 — Exp. 3-31-24 — CIVIL — STATE OF CALIFORNIA

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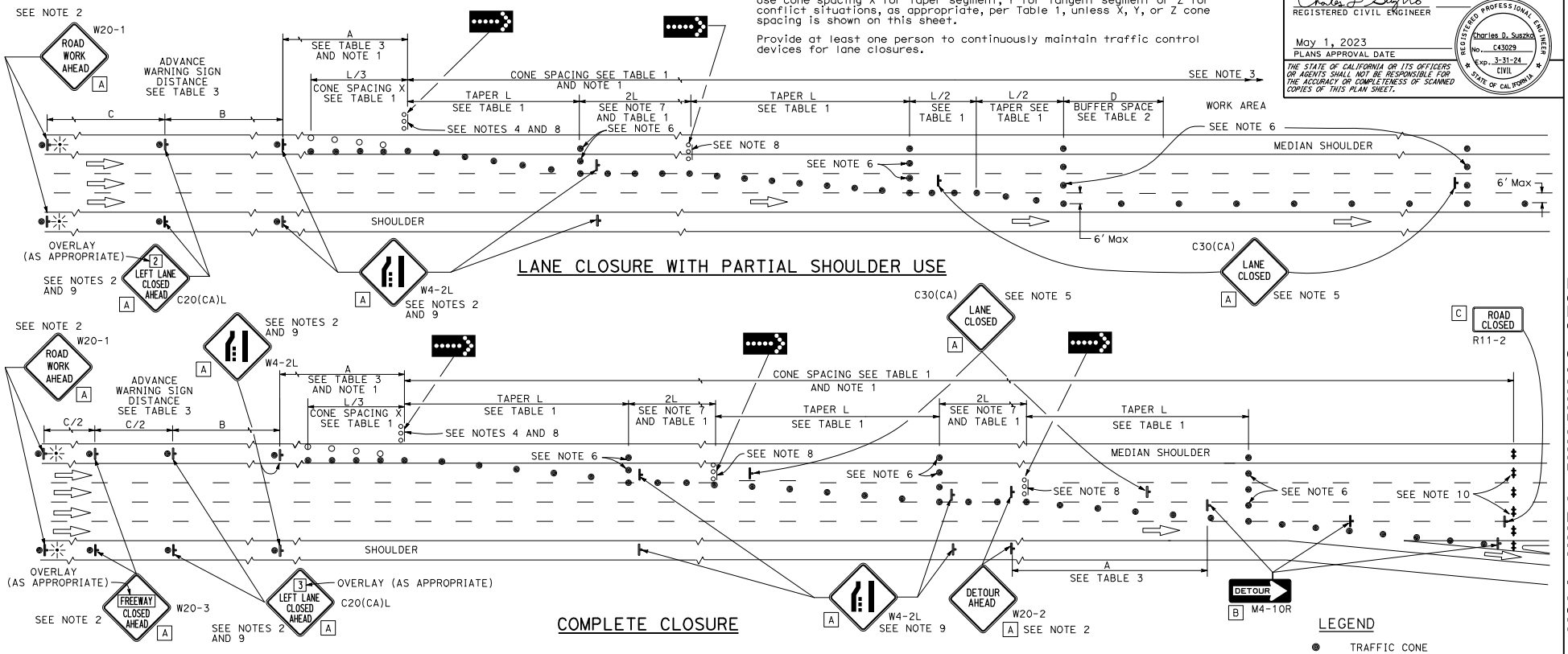
NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.



NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within a larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place a C30(CA) sign every 1000 ' throughout length of lane closure.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 1000' as shown on the "Lane Closure with Partial Shoulder USE" detail. Two type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
7. The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
8. Use one flashing arrow sign for each lane closed. The flashing arrow sign shall be Type I.
9. Lane closures on the right side using partial median shoulder as a traffic lane shall conform to the details shown except that C20(CA)R and W4-2R signs shall be used.
10. A minimum of Two Type II or III barricades shall be placed across each closed lane and shoulder at the location shown and every 2000' within the complete closure area. Within the complete closure area, the transverse alignment of the barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.

SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 48" x 18"
- C 48" x 30"

LEGEND

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS

NO SCALE

T10A

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

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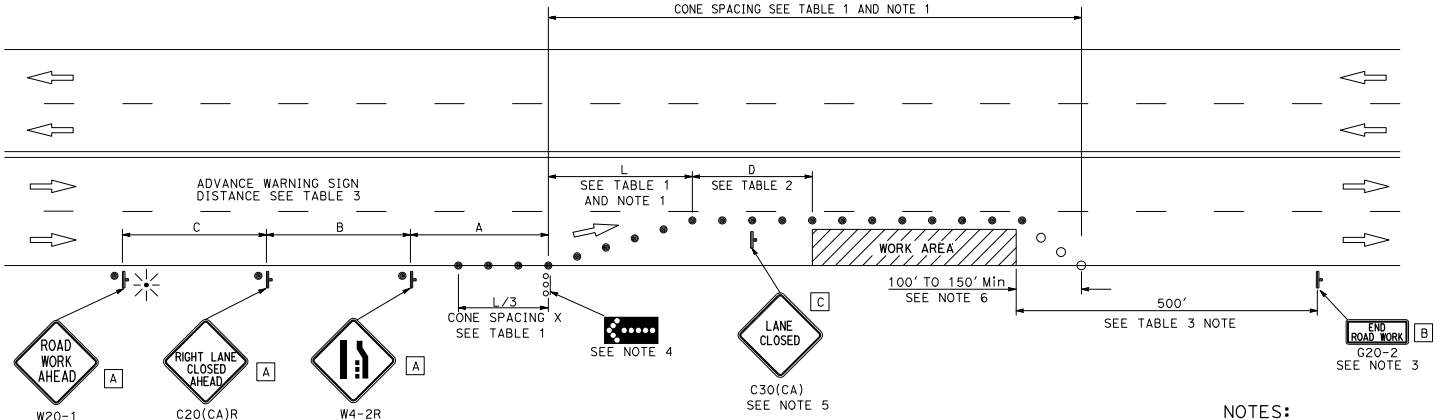

TYPICAL LANE CLOSURE

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

LEGEND

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 36" x 18"
- C 30" x 30"

NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area.
6. Length may be reduced by the Engineer to address site conditions.
7. Median lane closures shall conform to the details shown except that C20(CA)L and W4-2L signs shall be used.
8. For approach speeds over 50 MPH, use the "Traffic Control System for Lane Closure on Freeways and Expressways" plan for lane closure details and requirements.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS

NO SCALE

T11

2023 STANDARD PLAN T11

2-2-23

LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

SIGN PANEL SIZE (Min)

- [A] 48" x 48"
- [B] 24" x 24"
- [C] 36" x 18"

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Charles D. Suszko — No. C43029 — Exp. 3-31-24 — CIVIL — STATE OF CALIFORNIA

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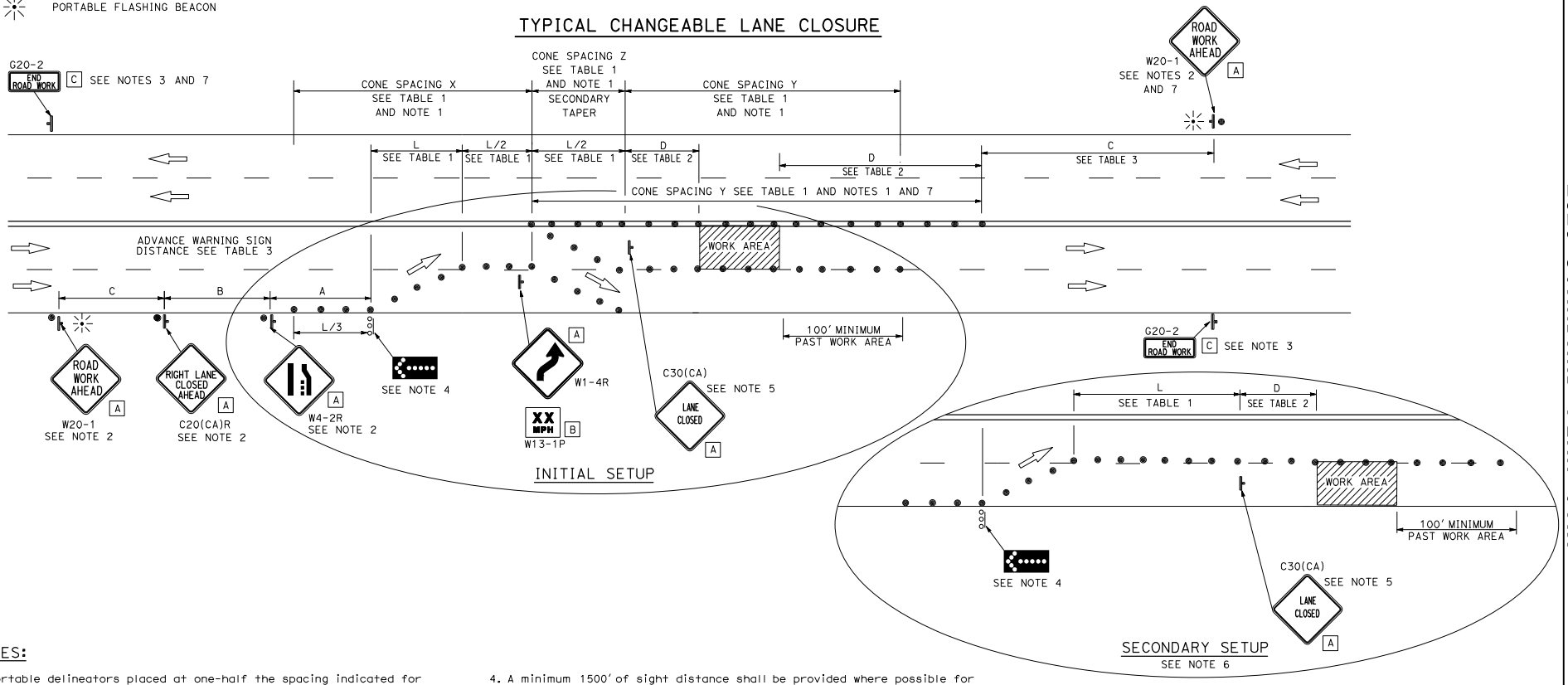
TYPICAL CHANGEABLE LANE CLOSURE



NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacon shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area.
6. Relocate secondary taper to tangent location and relocate C30(CA) sign. Remove W1-4R/W13-1P sign package.
7. Sign installations and cones are not required when a median barrier is in place.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR CHANGEABLE LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS

NO SCALE

T11A

2-2-23

LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

SIGN PANEL SIZE (Min)

- [A] 48" x 48"
- [B] 24" x 24"
- [C] 36" x 18"

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

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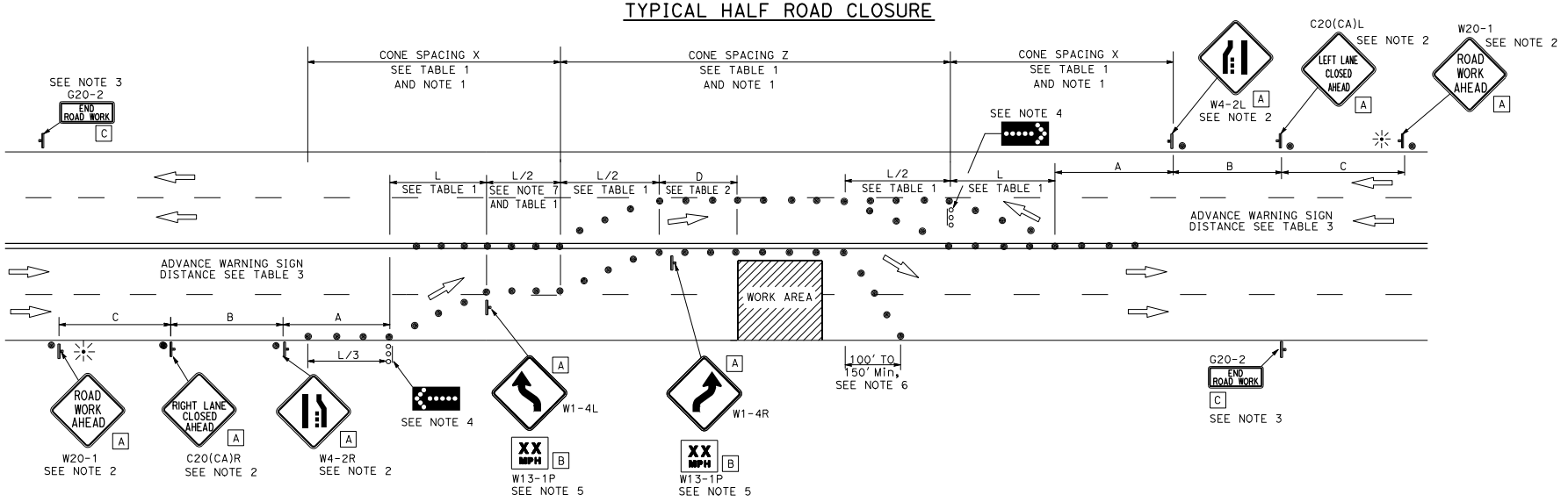
TYPICAL HALF ROAD CLOSURE



NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest verticle curve or on a horizontal curve.
5. Advisory speed will be determined by the Engineer. The W13-1P Plaque will not be required when advidory speed is more than the posted or maximum speed limit.
6. Length may be reduced by the Engineer to address site conditions.
7. The tangent (L/2) shall be used.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR HALF ROAD CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS

NO SCALE

T12

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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NOTES:

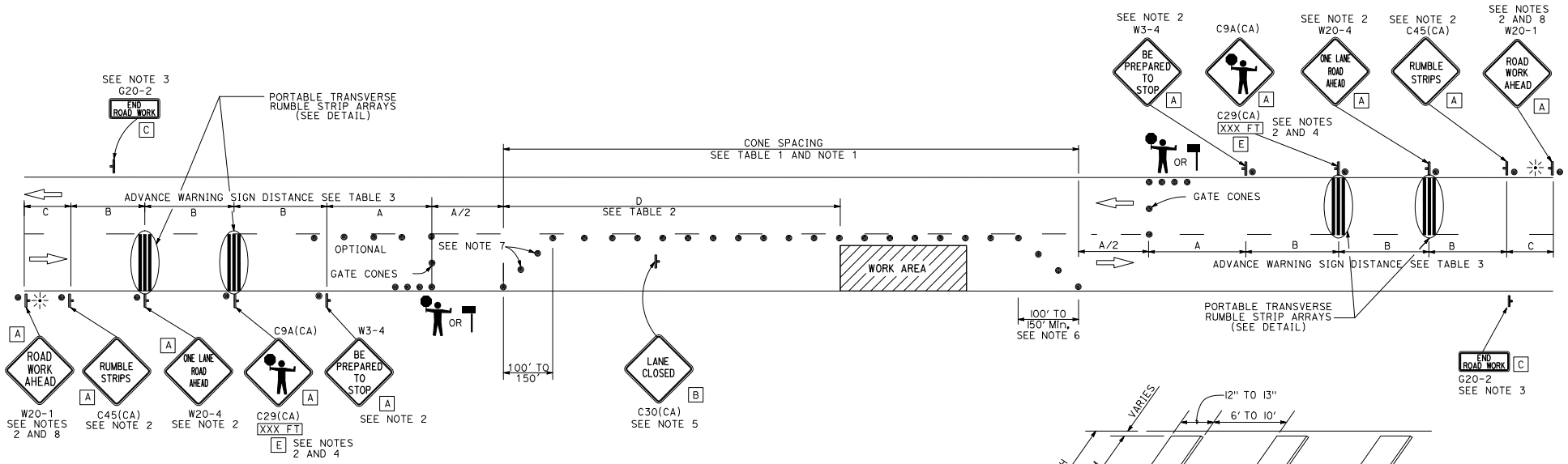
See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 30" x 30"
- C 36" x 18"
- D 36" x 42"
- E 20" x 7"

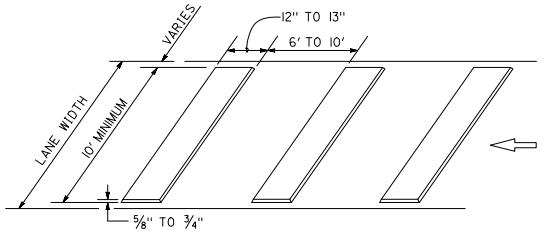


NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Sign must be equipped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. An optional C29(CA) sign may be placed below the C9A(CA) sign.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area. They are optional if the work area is visible from the flagger station.
6. Length may be reduced by the Engineer to address site conditions.
7. Either traffic cones or barricades shall be placed on the taper. Barricades shall be Type I, II, or III.
8. If C45(CA) is not used, measure distance C from W20-4.

LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- FLAGGER
- AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)



PORTABLE TRANSVERSE RUMBLE STRIP ARRAY DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM WITH REVERSIBLE CONTROL ON TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

T13

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Charles D. Suszko — No. C43029 — Exp. 3-31-24 — CIVIL — STATE OF CALIFORNIA

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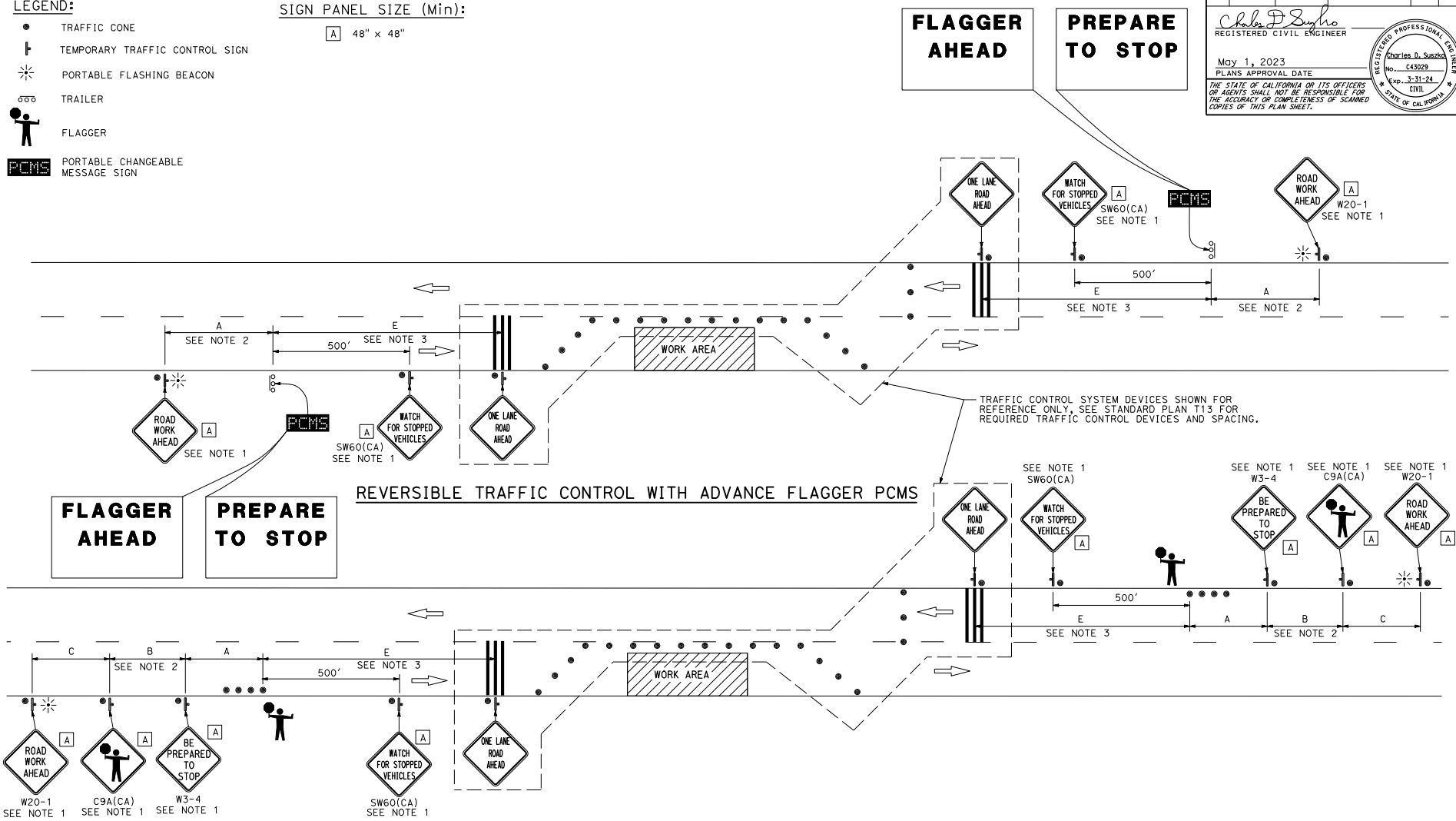
LEGEND:

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- TRAILER
- FLAGGER
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN

SIGN PANEL SIZE (Min):

[A] 48" x 48"



NOTES:

1. Sign must be equiped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
2. See Standard Plan T9, Table 3 for advanced warning sign spacing.
3. See Standard Specification 12-4.02C.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

T13A

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

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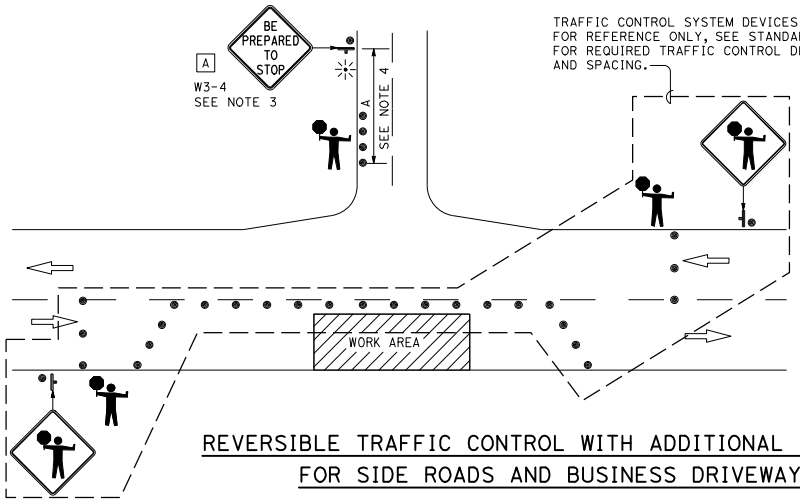
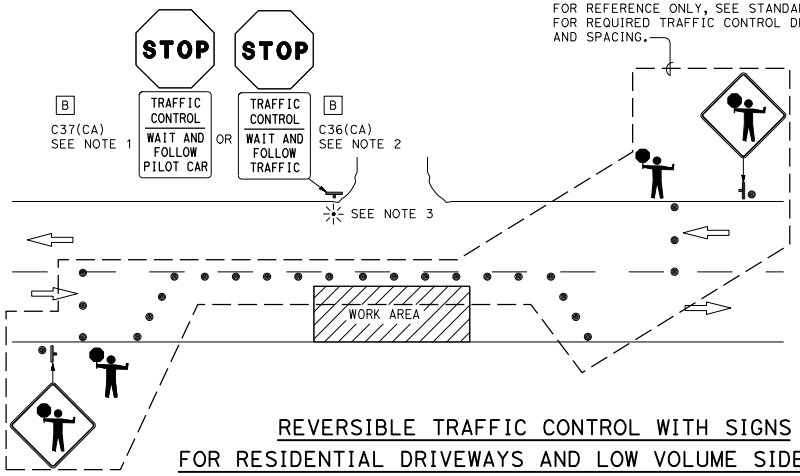
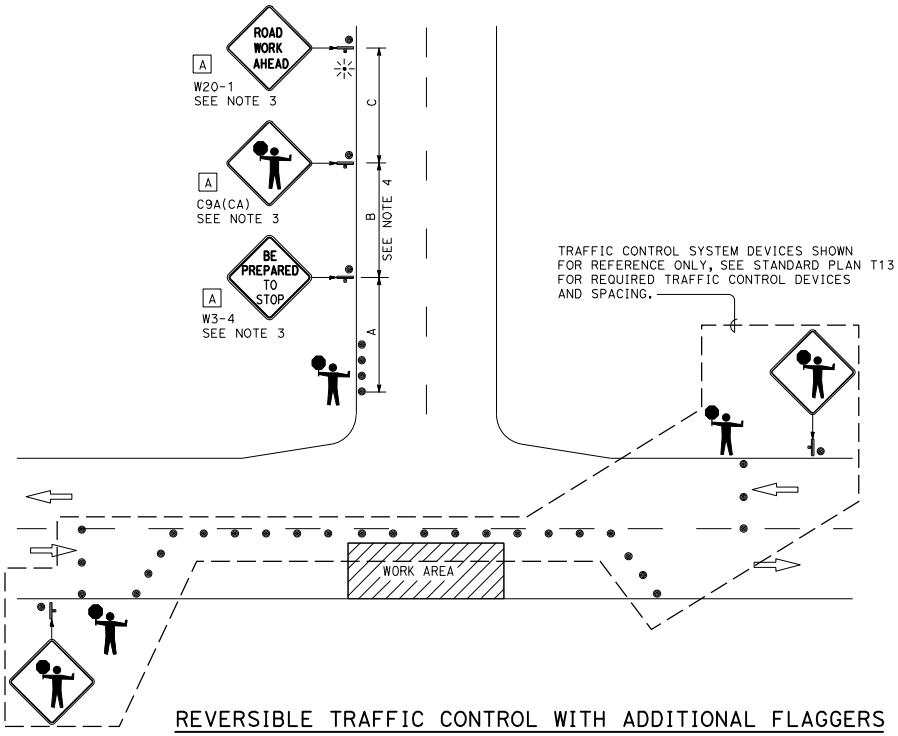


REVERSIBLE TRAFFIC CONTROL WITH ADDITIONAL FLAGGERS
FOR SIDE ROADS AND BUSINESS DRIVEWAYS



REVERSIBLE TRAFFIC CONTROL WITH SIGNS
FOR RESIDENTIAL DRIVEWAYS AND LOW VOLUME SIDE ROADS



REVERSIBLE TRAFFIC CONTROL WITH ADDITIONAL FLAGGERS
AT HIGH VOLUME INTERSECTIONS

NOTES:

1. Place C37(CA) sign when pilot car is used.
2. Place C36(CA) sign when pilot car is not used.
3. Sign must be equipped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
4. See Standard Plan T9, Table 3 for advance warning sign spacing.

LEGEND:

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- FLAGGER

SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 36" x 42"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM
TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

T13B

2-2-23

TYPICAL RAMP CLOSURES

SIGN PANEL SIZE (Min)

A	48" x 48"
B	48" x 30"
C	36" x 36"
D	48" x 36"

LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- BARRICADES
- PORTABLE FLASHING BEACON

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Charles D. Suszko — No. C43029 — Exp. 3-31-24 — CIVIL — STATE OF CALIFORNIA

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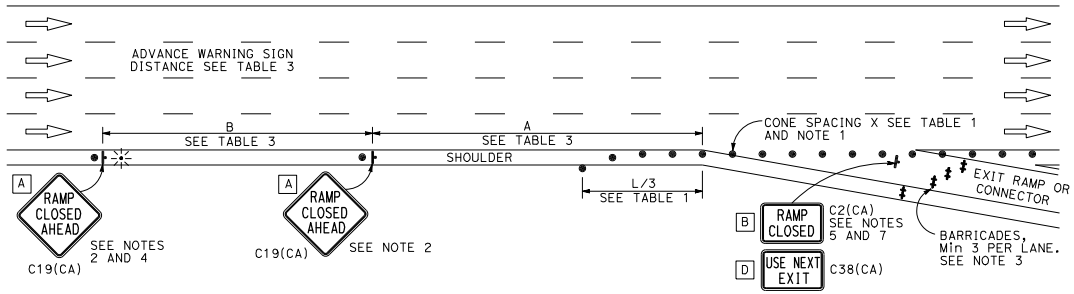
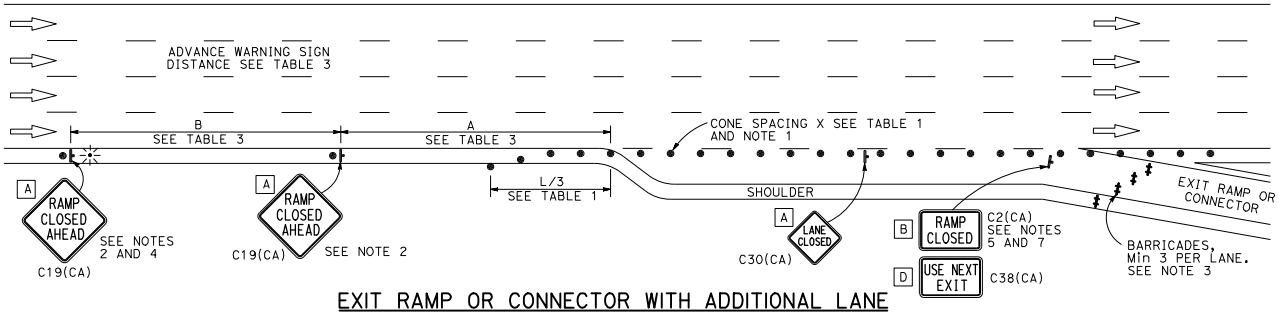
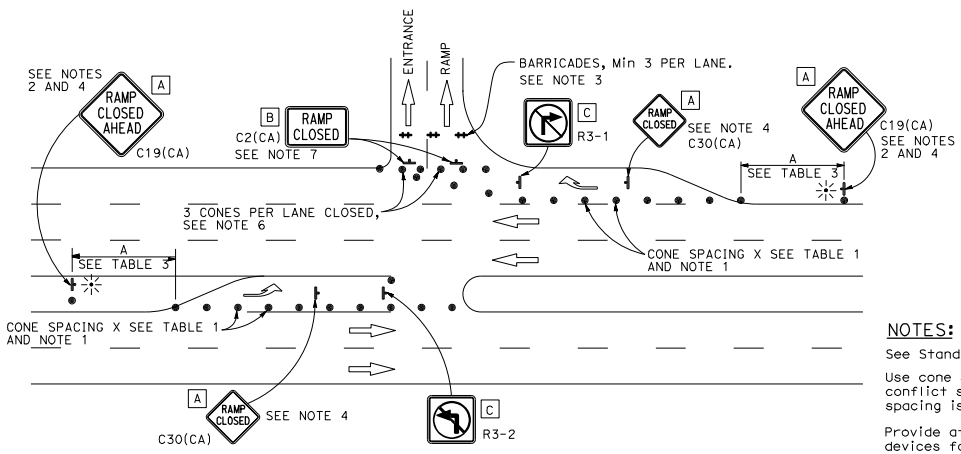


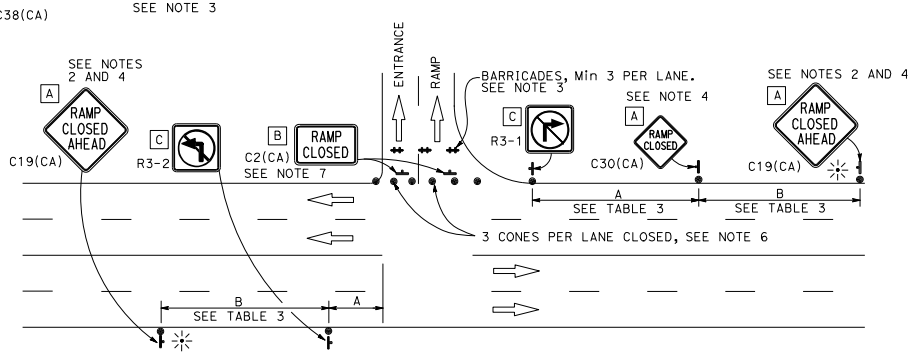
EXIT RAMP OR CONNECTOR



EXIT RAMP OR CONNECTOR WITH ADDITIONAL LANE



ENTRANCE RAMP WITH TURNING POCKETS



ENTRANCE RAMP WITHOUT TURNING POCKETS

NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning C19(CA) "RAMP CLOSED AHEAD" sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. A flashing beacon shall be placed on top of the first C19(CA) sign during hours of darkness.
3. Barricades shall be Type I, II or III for closures lastind one week or less and Type III for closures lasting longer than one week.
4. In addition to placing the C19(CA) "RAMP CLOSED AHEAD" and C30(CA) "RAMP CLOSED" signs, black on orange overlay plates with the word "closed" may be mounted. As directed by the Engineer on all guide signs that refer to the closed ramp. The letter size on the overlay shall be the same as the guide sign.
5. The existing "EXIT" signs shall be covered during ramp closures.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder.
7. C2(CA) sign shall be black and white.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURE

NO SCALE

T14

2023 STANDARD PLAN T14

2-2-23

NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Barricades closing sidewalk shall cover the full width of the sidewalk. Use R9-11 sign when there are destination points between the detour and the work area. Locate the R9-11 sign to allow pedestrian access.
3. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

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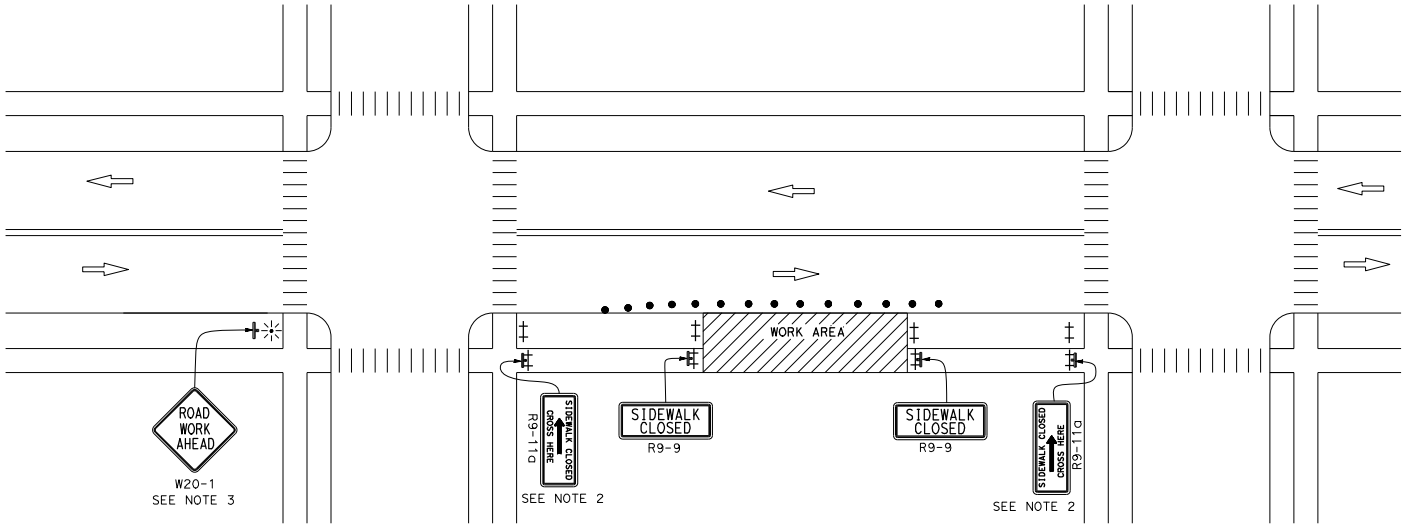

LEGEND:

- BARRICADE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

SIGN DESIGNATION	SIGN OR PLAQUE	SIGN SIZE
R9-9	SIDEWALK CLOSED	24" x 12"
R9-11	SIDEWALK CLOSED AHEAD CROSS HERE	24" x 18"
R9-11a	SIDEWALK CLOSED CROSS HERE	24" x 12"
W20-1	ROAD WORK AHEAD	36" x 36"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK CLOSURE AND PEDESTRIAN DETOUR

NO SCALE

T30

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
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STATE OF CALIFORNIA

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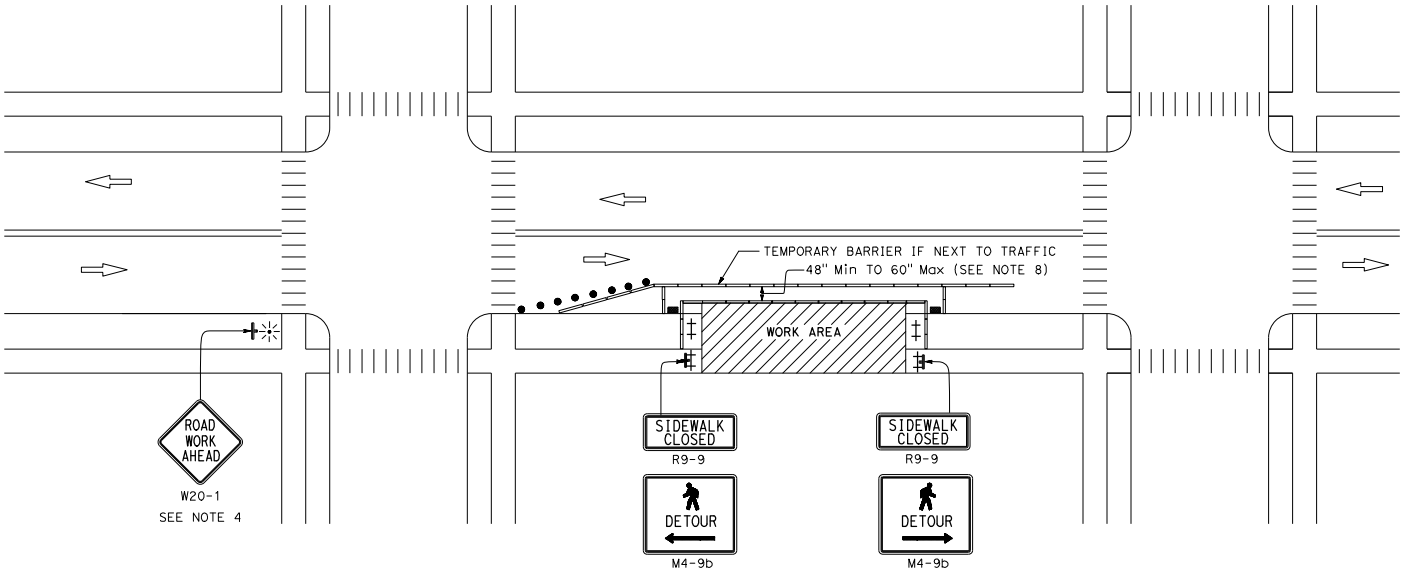
NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Separate pedestrian walkway from traffic and work zone activities, when temporary walkway is adjacent to traffic.
3. The temporary pedestrian access route must not lead into conflict with vehicles or work.
4. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.
5. All devices used to channelize pedestrian flow must connect such that gaps do not allow pedestrians to stray from the channelized path.
6. Barricades closing sidewalk shall cover the full width of the sidewalk.
7. Separate the temporary pedestrian access route from traffic using a temporary barrier and a crash cushion if necessary.
8. When it is not possible to maintain a minumum of 60 inches throughout the length of the pedestrian route, maintain a minimum width of 48 inches and provide a 60 X 60-inch passing space at least every 200 feet.
9. See Standard Plan A88A for detectable warning surface for curb ramps to apply to temporary curb ramps.
10. See Standard Plan T34 for temporary curb ramp options.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.



LEGEND:

- BARRICADE
- TEMPORARY CURB RAMP
- CHANNELIZING DEVICE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

SIGN DESIGNATION	SIGN OR PLAQUE	SIGN SIZE
M4-9b	PEDESTRIAN DETOUR	30" x 24"
R9-9	SIDEWALK CLOSED	24" x 12"
W20-1	ROAD WORK AHEAD	36" x 36"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK DIVERSION WITHIN ROADBED

NO SCALE

T31

2-2-23

NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Barricades closing sidewalk shall cover the full width of the sidewalk. Use R9-11 sign when there are destination points between the detour and the work area. Locate the R9-11 sign to allow pedestrian access.
3. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

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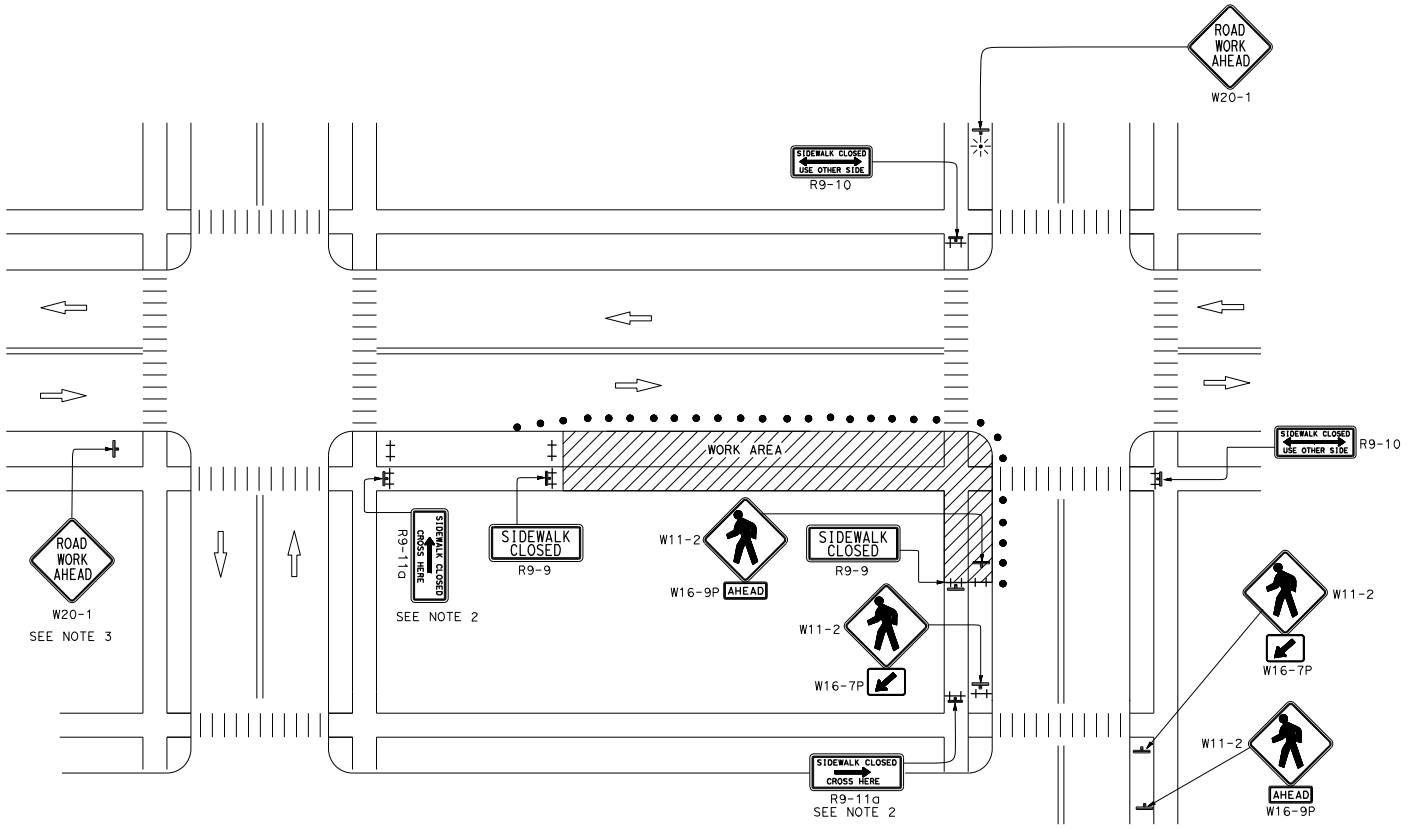

LEGEND:

- BARRICADE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

SIGN DESIGNATION	SIGN OR PLAQUE	SIGN SIZE
R9-9	SIDEWALK CLOSED	24" x 12"
R9-10	SIDEWALK CLOSED USE OTHER SIDE	24" x 12"
R9-11	SIDEWALK CLOSED AHEAD CROSS HERE	24" x 18"
R9-11a	SIDEWALK CLOSED CROSS HERE	24" x 12"
W11-2	PEDESTRIAN	36" x 36"
W16-7P	DIAGONAL DOWNWARD POINTING ARROW (PLAQUE)	24" x 12"
W16-9P	AHEAD (PLAQUE)	24" x 12"
W20-1	ROAD WORK AHEAD	36" x 36"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK/CROSSWALK CLOSURE AND PEDESTRIAN DETOUR

NO SCALE

T32

2-2-23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
REGISTERED CIVIL ENGINEER

May 1, 2023
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Charles D. Suszko
No. C43029
Exp. 3-31-24
CIVIL
STATE OF CALIFORNIA

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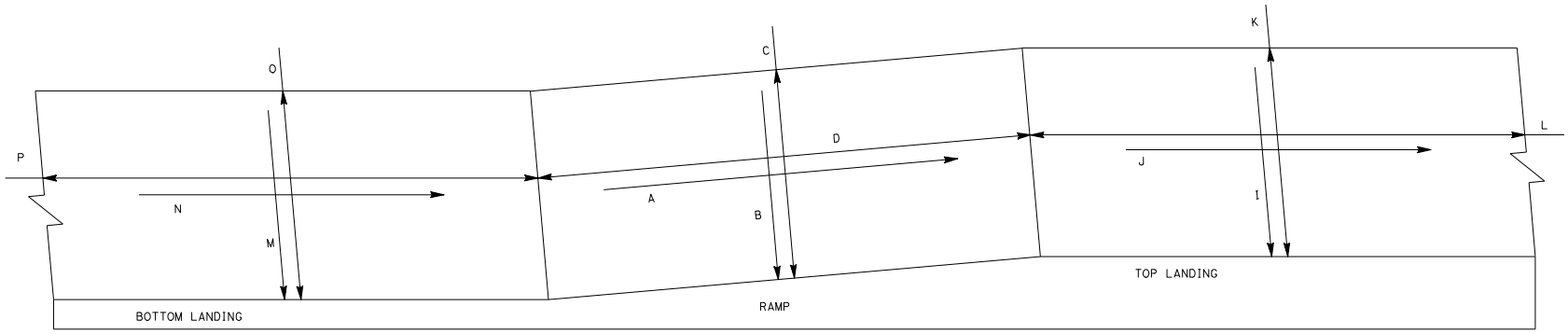
RAMP				HAND RAIL		EDGE PROTECTION	
SLOPE	CROSS SLOPE	WIDTH	LENGTH	HEIGHT RIGHT SIDE	HEIGHT LEFT SIDE	RAIL RIGHT SIDE	RAIL LEFT SIDE
A	B	C	D	E	F	G	H
8.3% OR LESS	2.0% OR LESS	48 INCHES OR GREATER	30 FEET OR LESS	34 TO 38 INCHES	34 TO 38 INCHES	WITHIN 2 INCHES FROM GROUND	WITHIN 2 INCHES FROM GROUND
TOP LANDING				BOTTOM LANDING			
CROSS SLOPE	SLOPE	WIDTH	DEPTH	CROSS SLOPE	SLOPE	WIDTH	DEPTH
I	J	K	L	M	N	O	P
2.0% OR LESS	2.0% OR LESS	48 INCHES OR GREATER	60 INCHES OR GREATER	2.0% OR LESS	2.0% OR LESS	48 INCHES OR GREATER	60 INCHES OR GREATER



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY PEDESTRIAN ACCESS ROUTES RAMP

NO SCALE

T33

2-2-23

CURB RAMP			TOP LANDING				DETECTABLE WARNING SURFACE
SLOPE	CROSS SLOPE	WIDTH	CROSS SLOPE	SLOPE	WIDTH	DEPTH	DEPTH
A	B	C	D	E	F	G	K
8.3% OR LESS	2.0% OR LESS	48 INCHES OR GREATER	2.0% OR LESS	2.0% OR LESS	48 INCHES OR GREATER	60 INCHES OR GREATER	MINIMUM 36 INCHES

NOTES: If the above requirements cannot be met, on existing sites with space limitations, the following slopes are allowed:

For a maximum rise of 6 inches a slope between 1:12 to 1:10 is allowed.
For a maximum rise of 3 inches a slope between 1:10 to 1:8 is allowed.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Charles D Suszko
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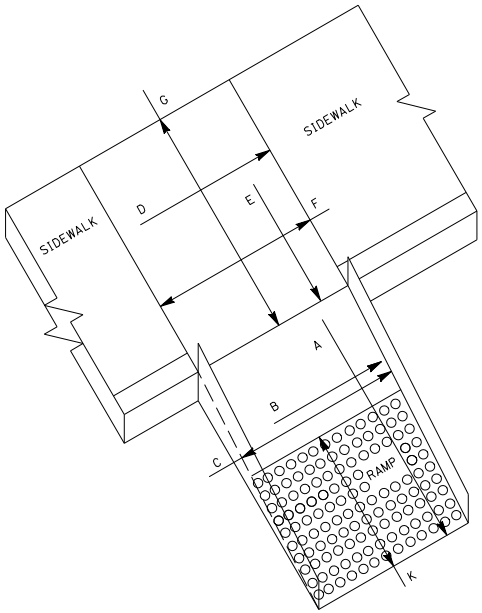
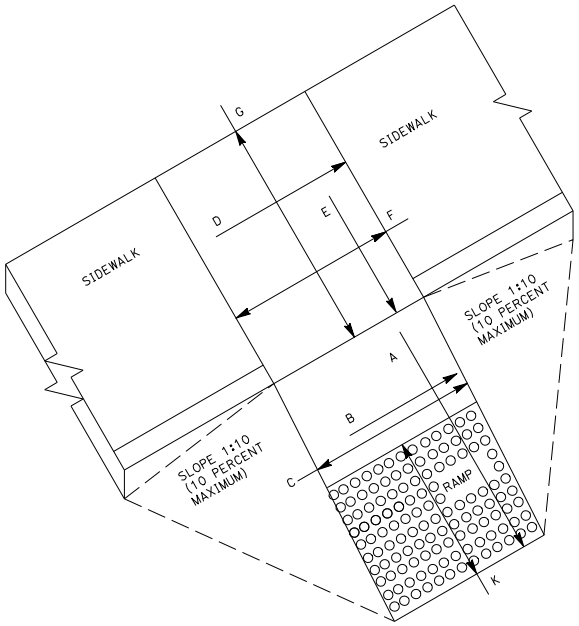


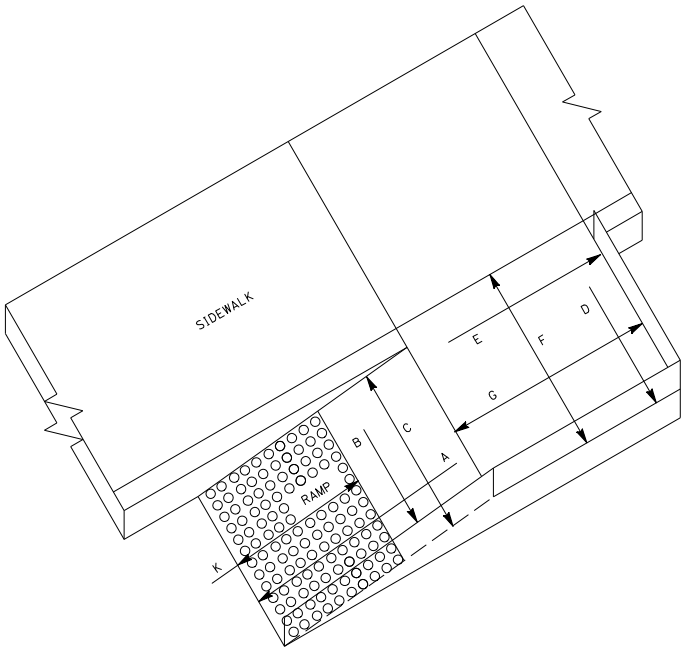
OPTION A

SHOWN WITH SIDE EDGE



OPTION B

SHOWN WITH SIDE APRON



OPTION C

PARALLEL RAMP
SHOWN WITH SIDE EDGE

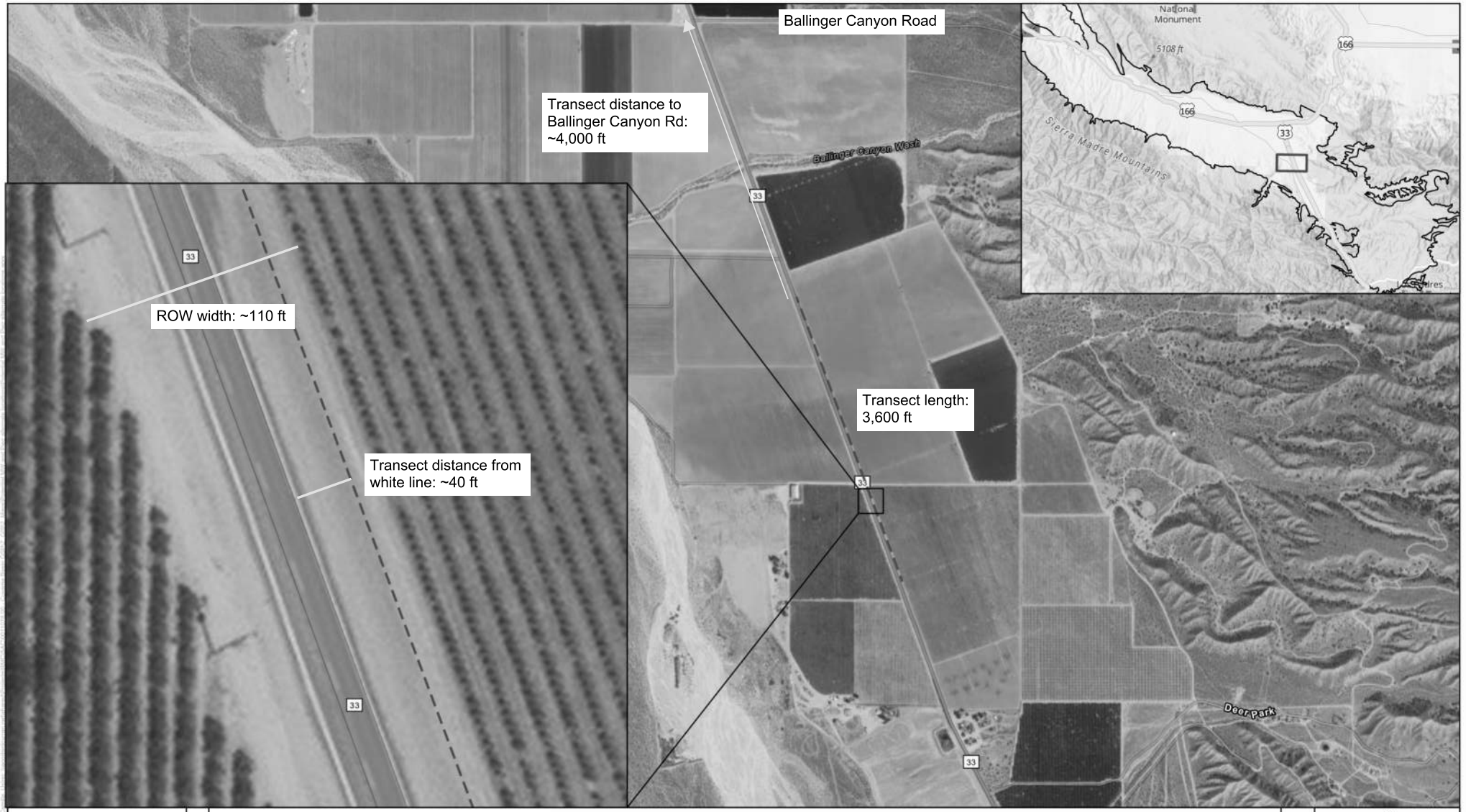
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY PEDESTRIAN ACCESS ROUTES CURB RAMP OPTIONS

NO SCALE

T34

2-2-23



SBC Fault

Geophysics Transect

Legend

- - - Geophysics Transect

——— Cuyama Basin

0 345 690 1,380 Feet

N

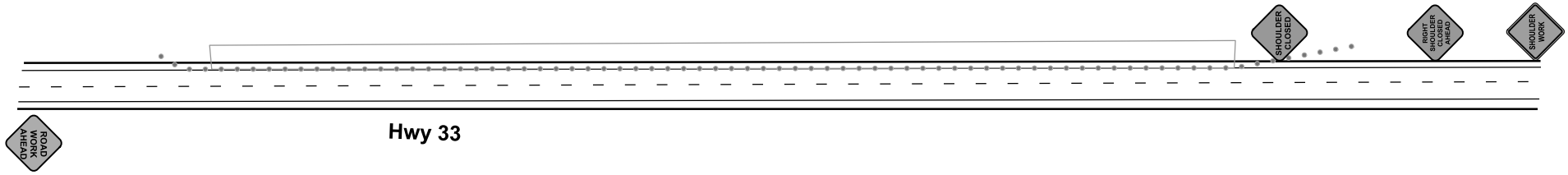
Woodard & Curran

Project #: 0011078.00

Map Created: May 2023

Bess Testlabs

Cuyama Valley



Hwy 33

SBC Fault

SPEED (MPH)	SIGN SPACING	MERGING TAPER	SHIFTING TAPER	SHOULDER TAPER	BUFFER SPACE	CHANNELIZER SPACING TAPER	CHANNELIZER SPACING TANGENT
25	100'	125'	63'	42'	158'	25	50
30	250'	180'	90'	60'	205'	30	60
35	250'	245'	123'	82'	257'	35	70
40	250'	320'	160'	107'	315'	40	80
45	350'	540'	270'	180'	378'	45	90
50	350'	600'	300'	200'	446'	50	100
55	500'	660'	330'	220'	520'	50	100
60	500'	720'	360'	240'	598'	50	100
65	500'	780'	390'	260'	682'	50	100

SAFETY NETWORK Est. 1999

Contractor: Bess Testlabs

Field Contact:

Contact Number:

Start Date: --

End Date: --

Work Hours: --

Drafted by: SG

Scale: None

Plan Number:

Job Number:

Permit #:

Phase: 6

Page: 6

Civil Engineer Stamp

Acknowledgement of Approval

Signature:

Date:

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STANDARD ENCROACHMENT PERMIT APPLICATION

DOT TR-0100 (REV 05/2023)

FOR CALTRANS USE
TRACKING NO. 0523 NSV 0472
DIST/CO/RTE/PM 05/SB/33/ 6.046-6.779
SIMPLEX STAMP
DATE OF SIMPLEX STAMP 10/12/2023

Complete ALL fields, write "N/A" if not applicable. Type or print clearly.
This application is not complete until all requirements have been approved.

Permission is requested to encroach on the State Highway right-of-way as follows:

1. COUNTY	2. ROUTE	3. POST MILE
Santa Barbara	*33*	

4. ADDRESS OR STREET NAME	5. CITY
Highway 33	*Cuyama*

6. CROSS STREET (Distance and direction from project site)
Ballinger Canyon Road (about 0.7 miles north)

7. WORK TO BE PERFORMED BY
○ APPLICANT ⦿ CONTRACTOR

8. IS THIS APPLICATION FOR A RIDER?
⦿ NO ○ YES. If "YES", provide the Parent Permit Number *N/A*

9. ESTIMATE START DATE
10/16/2023

10. ESTIMATED COMPLETION DATE
10/17/2023

11. ESTIMATED NUMBER OF WORKING DAYS WITHIN STATE HIGHWAY RIGHT-OF-WAY
2

12. ESTIMATED CONSTRUCTION COSTS WITHIN STATE HIGHWAY RIGHT-OF-WAY
N/A

13. HAS THE PROJECT BEEN REVIEWED BY ANOTHER CALTRANS BRANCH?
⦿ NO ○ YES. If "YES", which branch?

14. FUNDING SOURCE(S)
☐ FEDERAL ☐ STATE ☑ LOCAL ☐ PRIVATE ☐ SB 1 (ROAD REPAIR AND ACCOUNTABILITY ACT OF 2017)

15. CALTRANS PROJECT CODE (ID)	16. APPLICANT'S REFERENCE / UTILITY WORK ORDER NUMBER
N/A	*0011078.01*

17. DESCRIBE WORK TO BE DONE WITHIN STATE HIGHWAY RIGHT-OF-WAY (in 20 lines or less)
Attach 6 complete sets of plans (folded to 8.5" x 11") and any applicable specifications, calculations, maps, traffic control plans, etc.

A California Professional Geophysicist will conduct a surface geophysical survey using the electrical resistivity method. The approximately 3,600-foot-ling linear transect will be located in the ROW as far from the edge of Highway 33 as possible on unpaved soil. The transect will consist of 100 to 112 electrodes at a 10-meter spacing. A utility survey will be conducted within 30 feet of the transect to identify any buried utilities. A survey chain and surveyor's chalk will be used to mark the electrode stations. Steel stakes will be hammered to a depth of 18 inches. If the surface materials are too hard to drive the electrodes, 3/4-inch holes will be drilled to the same depth. A resistivity cable will be attached to each stake with a rubber band to form an electrical circuit. A known current is sent down the cable. a voltage meter will read the resistance between pairs of adjacent electrodes. Survey equipment will be used to survey each electrode. after the survey is completed, the cable and stakes will be removed. The 3/4-inch-diameter by 18-inch deep holes are typically allowed to fill in naturally. No soil or any other materials will be generated or left in the ROW. The geophysical crew will park pickup trucks in the ROW on either end of the transect and conduct the survey on a weekday during daylight hours. Attachments to this application include a traffic control plan, Policy Variance Letter, Authorization of Agent and dimensional map.

18 (a). PORTION OF STATE HIGHWAY RIGHT-OF-WAY WHERE WORK IS BEING PROPOSED (check all that apply)
☐ Traffic lane ☐ Shoulder ☐ Sidewalk ☐ Median ☐ At or near an intersection ☐ Mobile work
☑ Outside of the shoulder, *30* feet from edge of pavement ☐ Other

18 (b). PROPOSED TRAFFIC CONTROL PLANS AND METHOD
☐ No traffic control needed ☐ State Standard Plans (T-Sheets) #
☑ Project specific Traffic Control Plans included ☐ To be submitted by contractor

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STANDARD ENCROACHMENT PERMIT APPLICATION

DOT TR-0100 (REV 05/2023)

TRACKING NO. 0523 6SV 0472

19. EXCAVATION	MAX. DEPTH (in) 18	MIN. DEPTH (in) 0	AVG. WIDTH (in) 0.75	LENGTH (ft) 0.0625	SURFACE TYPE (e.g. Asphalt, concrete, soil, etc.) Soil
20. PIPES	PRODUCT BEING TRANSPORTED N/A	DIAMETER R N/A (in.)	MATERIAL N/A	DIAMETER R N/A (in.)	MATERIAL N/A

PROPOSED INSTALLATION METHOD (e.g. HDD, Bore & Jack, Open Cut, etc.)
Hand-held hammer

VOLTAGE / PSIG

DOES THE PROPOSED PROJECT INVOLVE THE REPLACEMENT AND/OR ABANDONMENT OF AN EXISTING FACILITY?

◉ NO ○ YES. If "YES", provide a description

21. IS A CITY, COUNTY OR OTHER PUBLIC AGENCY INVOLVED IN THE APPROVAL OF THIS PROJECT?

○ YES (if "YES", check the type of project AND attach the environmental documentation and conditions of approval)

☐ COMMERCIAL DEVELOPMENT ☐ BUILDING ☐ GRADING ☐ OTHER _____

☐ CATEGORICALLY EXEMPT ☐ NEGATIVE DECLARATION ☐ ENVIRONMENTAL IMPACT REPORT ☐ OTHER _____

◉ NO (if "NO", check the category below which best describes the project AND answer questions A-K)

☐ DRIVEWAY OR ROAD APPROACH, RECONSTRUCTION, MAINTENANCE OR RESURFACING ☐ FENCE ☐ EROSION CONTROL

☐ PUBLIC UTILITY MODIFICATION, EXTENSIONS, HOOKUPS ☐ MAILBOX ☐ LANDSCAPING

☐ FLAGS, SIGNS, BANNERS, DECORATIONS, PARADES AND CELEBRATIONS ☑ OTHER *Surface geophysical survey*

The following questions must be answered when a City, County or other public agency IS NOT involved in the approval of this project.

Your answers to these questions will assist Caltrans staff in identifying any physical, biological, social or economic resources that may be affected by your proposed project within State Highway right-of-way and to determine which type of environmental studies may be required to approve your application for an encroachment permit. It is the applicant's responsibility for the production of all required environmental documentation and supporting studies and in some cases this may be costly and time consuming. If possible, attach photographs of the location of the proposed project. Answer these questions to the best of your ability. Provide a description of any "YES" answers (type, name, number, etc.).

A. Will any existing vegetation and/or landscaping within State Highway right-of-way be disturbed?
No

B. Are there waterways (e.g. river, creek, pond, natural pool or dry streambed) adjacent to or within the limits of the proposed project?
No

C. Is the proposed project located within five miles of the coast line?
No

D. Will the proposed project generate construction noise levels greater than 86 decibels (dBA) (e.g. Jack-hammering, pile driving)?
No

E. Will the proposed project incorporate land from a public park, recreation area or wildlife refuge open to the public?
No

F. Are there any recreational trails or paths within the limits of the proposed project?
No

G. Will the proposed project impact any structures, buildings, rail lines or bridges within State Highway right-of-way?
No

H. Will the proposed project impact access to any businesses or residences?
No

I. Will the proposed project impact any existing public utilities or public services?
No

J. Will the proposed project impact any existing pedestrian facilities, such as sidewalks, crosswalks or overcrossings?
No

K. Will new lighting be constructed within or adjacent to State Highway right-of-way?
No

STANDARD ENCROACHMENT PERMIT APPLICATION

DOT TR-0100 (REV 05/2023)

TRACKING NO. 0523 6SV 0472

22. Will the proposed project cause a substantial change in the significance of a historical resource (45 years or older), or cultural resource? ○ YES ◉ NO (if "YES", provide a description)

23. Will the proposed project be on an existing State Highway or street where the activity involves removal of a scenic resource? (e.g. A significant tree or stand of trees, a rock outcropping or a historic building) ○ YES ◉ NO (if "YES", provide a description)

24. Is work being done on the applicant's property in addition to State Highway right-of-way? ○ YES ◉ NO (If "YES", attach 6 complete sets of site and grading plans)

25. Will the proposed project require the disturbance of soil? ◉ YES ○ NO

If "YES", estimate the area of disturbed soil within State Highway right-of-way in acres: *0.75-inch-diameter circle (N/A in acres)*

and estimate the area of disturbed soil outside State Highway right-of-way in acres: _____

26. Will the proposed project require dewatering? ○ YES ◉ NO

If "YES", estimate Total gallons AND _____ (Total gallons) AND _____ (gallons/month).

SOURCE*: ☐ STORMWATER ☐ NON-STORMWATER

*(*See Caltrans SWMP for definition of non-storm water discharge:*
https://www.dot.ca.gov/programs/environmental-analysis/stormwater-management-program)

27. How will any storm water or ground water be disposed?

☐ Storm Drain System ☐ Combined Sewer / Stormwater System ☐ Stormwater Retention Basin ☑ N/A

☐ Other (explain) _____

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STANDARD ENCROACHMENT PERMIT APPLICATION

DOT TR-0100 (REV 05/2023)

TRACKING NO. 0523 6SV 0472

READ THE FOLLOWING CLAUSES PRIOR TO SIGNING THIS ENCROACHMENT PERMIT APPLICATION.

The applicant's submission of this application to the California Department of Transportation constitutes the applicant's agreement and representation that the work or other activity contemplated by the encroachment permit application shall comply with all applicable standards, specifications, policies, requirements, conditions, and regulations of the California Department of Transportation, and the applicant understands the application may be denied if there is non-compliance with any of the above. An exception process exists and may result in approval of a non-compliant encroachment, in the discretion of the California Department of Transportation, but the exception process may require additional time to complete. The applicant understands and agrees all work or other activity contemplated by the encroachment permit application is subject to inspection and oversight by the California Department of Transportation. The applicant understands and agrees encroachment permit fees must still be paid if an application is withdrawn or denied. The applicant understands a denial may be appealed, in accordance with California Streets and Highways Code, Section 671.5, and the related regulations found in California Code of Regulations, Title 21, Division 2, Chapter 8, Article 2.

The applicant understands and agrees that immediately upon issuance of the encroachment permit the applicant is bound by, subject to, and must comply with the "Encroachment Permit General Provisions" (TR-0045), "Stormwater Special Provisions" (TR-0400) and any other applicable Special Provisions and Conditions of the encroachment permit. The "Encroachment Permit General Provisions" (TR-0045), and the Stormwater Special Provisions (TR-0400) are available at:

If a paper copy is needed of the "Encroachment Permit General Provisions" (TR-0045) and/or "Stormwater Special Provisions" (TR-0400), please contact the District Office of Encroachment Permits. Their contact information is available at: https://dot.ca.gov/programs/traffic-operations/ep/district-contacts. The "Encroachment Permit General Provisions" (TR-0045) and any other applicable Special Provisions and Conditions will be provided as part of the encroachment permit. Information about Stormwater requirements is available at the Internet address: https://dot.ca.gov/programs/environmental-analysis/stormwater-management-program.

The applicant understands an encroachment permit may be denied, revoked, and/or a bond may be required, for non-payment of prior or present encroachment permit fees. An encroachment permit is not a property right and does not transfer with the property to a new owner.

Each of the persons purporting to execute this application on behalf of the applicant and/or on behalf of the applicant's authorized agent or engineer represents and warrants such person has full and complete legal authority to do so and to thereby bind applicant to the terms and conditions herein and to the terms and/or conditions of the encroachment permit. Applicant understands and agrees this application may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Executed copies of this application and/or its counterparts may be reproduced and/or exchanged by copy machine, mailing, facsimile, or electronic means (such as e-mail), and such copies shall be deemed to be effective as originals.

28. NAME OF APPLICANT (Project or Property Owner or Organization)
Cuyama Basin Groundwater Sustainability Agency

ADDRESS OF APPLICANT (Include City, State and Zip Code)
4900 California Ave, Tower B, 2nd Floor, Bakersfield, CA 93309

E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
tblakslee@hgcpm.com	*(661) 477-3385*	*N/A*

29. NAME OF AUTHORIZED AGENT / ENGINEER(A "Letter of Authorization" is required if different from #28)
Woodard & Curran, Inc.

IS A LETTER OFAUTHORIZATION ATTACHED? ⦿ YES ○ NO

ADDRESS OF AUTHORIZED AGENT / ENGINEER (Include City, State and Zip Code)
2175 N. California Blvd., Suite 315, Walnut Creek, CA 94596

E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
jstrandberg@woodardcurran.com	*(925) 627-4122*	*N/A*

30. NAME OF BILLING CONTACT (Same as #28 ○ Same as #29 ⦿)

BILLING ADDRESS WHERE INVOICE(S) IS / ARE TO BE MAILED (Include City, State and Zip Code)

E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER

* *I hereby certify under penalty of perjury under the laws of the State of California that the information in this application and any document submitted with or in support of this application are true and correct to the best of my knowledge and belief, and that copies of any documents submitted with or in support of this application are true and correct copies of unaltered original documents. I further understand that if I have provided information that is false, intentionally incomplete, or misleading I may be charged with a crime and subjected to fine or imprisonment, or both fine and imprisonment. (Penal Code Section 72)*

31. SIGNATURE OF APPLICANT OR AUTHORIZED AGENT*	32. PRINT OR TYPE NAME	
James F. Strandberg	*James Strandberg*	
33. TITLE *Senior Project Manager*		34. DATE *06/30/2023*

2175 N California Blvd
Suite 315
Walnut Creek, CA 94596
www.woodardcurran.com

T 800.426.4262
T 925.627.4100

Via Electronic Mail

July 5, 2023

Encroachment Permit Office
Caltrans District 5
50 Higuera Street
San Luis Obispo, CA 93401

Re: Policy Variance Request to Conduct Surface Geophysical Survey in Caltrans Right-of-Way of Highway 33

Dear Sir or Madam:

On behalf of the Cuyama Basin Groundwater Sustainability Agency (GSA), Woodard & Curran is requesting a policy variance to conduct a surface geophysical survey within the Caltrans right-of-way (ROW) of Highway 33 in Santa Barbara County. This request is necessitated by the requirements of the Sustainable Groundwater Management Act (SGMA) and implementation of the Cuyama Valley Groundwater Basin Sustainability Plan (GSP) adopted by the California Department of Water Resources (DWR) on May 25, 2023.

The purpose of this project is to fulfill the requirements of the SGMA, which requires high-priority, critically over-drafted groundwater basins like the Cuyama Basin to develop and implement a GSP. The successful implementation of the Cuyama Valley Groundwater Basin GSP requires an understanding of groundwater flow throughout the Cuyama Basin.

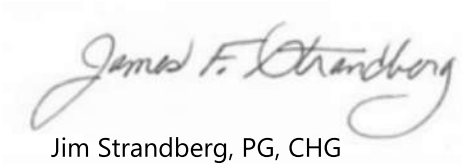
An area identified as a data gap in the GSP is near the Santa Barbara Canyon Fault along Highway 33 between Cuyama and Venticopa. We propose to conduct a surface geophysical survey at this location to eliminate an existing data gap and improve our understanding of groundwater conditions in this portion of the Cuyama Basin.

Despite our best efforts, private landowners in this area have not granted consent for the surface geophysical survey on their properties. Unfortunately, there are no suitable locations within a county ROW in the area either. Our exhaustive search and analysis have concluded that the Caltrans ROW along Highway 33 is the most viable option for the surface geophysical survey.

Considering the importance of this area and the lack of feasible alternatives, we kindly request a policy variance for a surface geophysical survey within the Caltrans ROW. I can be reached at (925) 627-4122.

Sincerely,

WOODARD & CURRAN, INC.



Jim Strandberg, PG, CHG
Senior Project Manager/Hydrogeologist

cc: Brian Van Lienden, Woodard & Curran
Taylor Blakslee, Hallmark Group on behalf of the Cuyama Basin GSA

DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT OFFICE
50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3152
FAX (805) 549-3062
TTY 711
http://www.dot.ca.gov/dist05

Serious drought
Help save water!

AUTHORIZATION OF AGENT

I, the owner as the Permit Applicant or legal representative for the Permit Applicant identified below, hereby authorize my agent, listed below, to apply for a State of California Department of Transportation Encroachment Permit and act on my behalf. In completing and signing this form I acknowledge that I have reviewed the State of California Department of Transportation Standard Encroachment Permit Application Form and agree to its terms and conditions.

Property Information, Encroachment Location, or Description

Property Address or Facility Description: East side of Highway 33 off of the shoulder approximately 4000 feet south of Ballinger Canyon Road

State Route Number: 33

City or County: Santa Barbara

Additional Information: transect length is 3,600 feet
(Project Reference No., APN, Tract Number, Subdivision Name, etc.)

Permit Applicant Information:

Name: Cuyama Basin Groundwater Sustainability Agency

Street Address: 4900 California Ave, Tower B, 2nd Floor

City, State, Zip Code: Bakersfield, CA 93309

Phone Number: (661) 477 3385

Print Name: Taylor Blakslee

Signature: Taylor Blakslee

Title: Assistant Executive Director
(Owner, Partner, Corporation Officer, Specify Other)

Date: 6-28-2023

Agent Information:

Name: James Strandberg

Firm Name: Woodard & Curran, Inc.

Street Address: 2175 N. California Blvd, Suite 315

City, State, Zip Code: Walnut Creek, CA 94596

Phone Number: (925) 627 4122

Print Name: James Strandberg

Signature of Agent: James F. Strandberg

Date: 6/21/2023

ENCROACHMENT PERMIT GENERAL PROVISIONS

TR-0045 (REV. 12/2022)

1. **AUTHORITY:** The California Department of Transportation ("Department") has authority to issue encroachment permits under Division 1, Chapter 3, Article 1, Sections 660 through 734 of the Streets and Highways Code.
2. **REVOCATION:** Encroachment permits are revocable on five (5) business days' notice unless otherwise stated on the permit or otherwise provided by law, and except as provided by law for public corporations, franchise holders, and utilities. Notwithstanding the foregoing, in an emergency situation as determined by the Department, an encroachment permit may be revoked immediately. These General Provisions and any applicable Special Provisions are subject to modification or abrogation by the Department at any time. Permittees' joint use agreements, franchise rights, reserved rights or any other agreements for operating purposes in State of California ("State") highway right-of-way may be exceptions to this revocation.
3. **DENIAL FOR NONPAYMENT OF FEES:** Failure to pay encroachment permit fees when due may result in rejection of future applications, denial of encroachment permits, and revocation of the encroachment permit if already issued.
4. **PERMITTEE AUTHORIZATION FOR OTHERS TO PERFORM WORK:** This encroachment permit allows only the Permittee and/or Permittee's authorized contractor or agent to work within or encroach upon the State highway right-of-way, and the Permittee may not assign or transfer this encroachment permit. Any attempt to assign or transfer this encroachment permit shall be null and void. Permittee shall provide to the Department a list of Permittee's authorized contractors/agents, in the form and at the time specified by the Department but if no time is specified then no later than the pre-construction meeting. Permittee shall keep the list current and shall provide updates to the Department immediately upon any change to the list of authorized contractors/agents, including but not limited the addition, removal, or substitution of an authorized contractor/agent, or a new address or contact information for an existing authorized contractor/agent. Permittee is responsible for the acts and/or omissions of any person or entity acting on behalf of the Permittee, even if such person or entity is not included on Permittee's list of authorized contractors and/or agents.
5. **ACCEPTANCE OF PROVISIONS:** Permittee, and the Permittee's authorized contractors and/or agents, understand and agree to accept and comply with these General Provisions, the Special Provisions, any and all terms and/or conditions contained in or incorporated into the encroachment permit, and all attachments to the encroachment permit (collectively "the Permit Conditions"), for any encroachment, work, and/or activity to be performed under this encroachment permit and/or under color of authority of this encroachment permit. Permittee understands and agrees the Permit Conditions are applicable to and enforceable against Permittee as long as the encroachment remains in, under, or over any part of the State highway right-of-way. The Permittee's authorized contractors and/or agents, are also bound by the Permit Conditions. Non-compliance with the Permit Conditions by the Permittee's authorized contractor and/or agent will be deemed non-compliance by the Permittee.
6. **BEGINNING OF WORK:** When traffic is not impacted (see General Provision Number 35), the Permittee must notify the Department's representative two (2) business days before starting permitted work. Permittee must notify the Department's representative if the work is to be interrupted for a period of five (5) business days or more, unless otherwise agreed upon. All work must be performed on weekdays during regular work hours, excluding holidays, unless otherwise specified in this encroachment permit.
7. **STANDARDS OF CONSTRUCTION:** All work performed within State highway right-of-way must conform to all applicable Departmental construction standards including but not limited to: Standard Specifications, Standard Plans, Project Development Procedures Manual, Highway Design Manual and Special Provisions.

   Other than as expressly provided by these General Provisions, the Special Provisions, the Standard Specifications, Standard Plans, and other applicable Departmental standards, nothing in these General Provisions is intended to give any third party any legal or equitable right, remedy, or claim with respect to the encroachment permit and/or to these General Provisions or any provision herein. These General Provisions are for the sole and exclusive benefit of the Permittee and the Department.

   Where reference is made in such standards to "Contractor" and "Engineer," these are amended to be read as "Permittee" and "Department's representative," respectively, for purposes of this encroachment permit.
8. **PLAN CHANGES:** Deviations from plans, specifications, and/or the Permit Conditions as defined in General Provision Number 5 are not allowed without prior approval from the Department's representative and the Federal Highway Administration ("FHWA") representative if applicable.
9. **RIGHT OF ENTRY, INSPECTION AND APPROVAL:** All work is subject to monitoring and inspection. The United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, and other state, and federal agencies, and the FHWA, through their agents or representatives, must have full access to highway

facilities/encroachment area, at any and all times for the purpose of inspection, maintenance, activities needed for construction/reconstruction, and operation of the State highway right-of-way.

Upon completion of work, Permittee must request a final inspection for acceptance and approval by the Department. The local public agency Permittee must not give final construction approval to its contractor until final acceptance and approval by the Department is obtained.

10. **PERMIT AT WORKSITE:** Permittee and Permittee's authorized contractors/agents must keep the permit package and current list of authorized contractors/agents, or copies thereof, at the work site at all times and must show such documents upon request to any Department representative or law enforcement officer. If the permit package or current list of authorized contractors/agents, or copies thereof, are not kept and made available at the work site at all times, then all work must be suspended.
11. **CONFLICTING ENCROACHMENTS:** Permittee must yield start of work to ongoing, prior authorized work adjacent to or within the limits of the Permittee's project site. When existing encroachments conflict with Permittee's work, the Permittee must bear all cost for rearrangements (e.g., relocation, alteration, removal, etc.).
12. **PERMITS, APPROVALS, AND CONCURRENCES FROM OTHER AGENCIES AND/OR ENTITIES:** This encroachment permit is invalidated if the Permittee has not obtained all permits, approvals, and concurrences necessary and required by law, including but not limited to those from the California Public Utilities Commission ("CPUC"), California Occupational Safety and Health Administration ("Cal-OSHA"), local and state and federal environmental agencies, the California Coastal Commission, and any other public agency and/or entity having jurisdiction. Permittee is responsible for providing notice of the encroachment to, and obtaining concurrence from, any person or entity (whether public or private) affected by the scope of work described in the encroachment permit, regardless of whether such notice or concurrence is required by law; the Department is not responsible to provide such notice or obtain such concurrence. Permittee warrants all such permits, approvals, and concurrences have been obtained before beginning work under this encroachment permit. The Department may, at the Department's discretion, require the Permittee to demonstrate that Permittee has obtained all such permits, approvals, and concurrences, and Permittee shall demonstrate this at the time and in the manner specified by the Department.
13. **PEDESTRIAN AND BICYCLIST SAFETY:** A safe continuous passageway must be maintained through the work area at existing pedestrian or bicycle facilities. At no time must pedestrians be diverted onto a portion of the street used for vehicular traffic. At locations where safe alternate passageways cannot be provided, appropriate signs and barricades must be installed at the limits of construction and in advance of the limits of construction at the nearest crosswalk or intersection to detour pedestrians to facilities across the street. Attention is directed to Section 7-1.04 "Public Safety," and to Section 12-4.04 "Temporary Pedestrian Access Routes," and to Section 16-2.02 "Temporary Pedestrian Facility," of the Department's Standard Specifications, and to California Vehicle Code section 21760, subdivision (c).
14. **PUBLIC TRAFFIC CONTROL:** The Permittee must provide traffic control protection, warning signs, lights, safety devices, etc., and take all other measures necessary for the traveling public's safety as required by law and/or the Department. While providing traffic control, the needs of all road users, including but not limited to motorists, bicyclists and pedestrians, including persons with disabilities in accordance with the Americans with Disabilities Act, must be an essential part of the work activity.

    Lane, Bike Lane, Sidewalk, Crosswalk, and/or shoulder closures must comply with the Department's Standard Specifications and Standard Plans for Temporary Traffic Control Systems & Temporary Pedestrian Access Routes, and with the applicable Special Provisions. Where issues are not addressed in the Standard Specifications, Standard Plans, and/or Special Provisions, the California Manual on Uniform Traffic Control Devices (Part 6, Temporary Traffic Control) must be followed.
15. **MINIMUM INTERFERENCE WITH TRAFFIC:** Permittee must plan and conduct work so as to create the least possible inconvenience to the traveling public (motorized vehicles, unmotorized vehicles such as bicycles, pedestrians, person(s) with disabilities, etc.), such that traffic is not unreasonably delayed.
16. **STORAGE OF EQUIPMENT AND MATERIALS:** The storage of equipment or materials is not allowed within State highway right-of-way, unless specified within the Special Provisions of this encroachment permit. If encroachment permit Special Provisions allow for the storage of equipment or materials within the State highway right-of-way, the equipment and material storage must also comply with Section 7-1.04, Public Safety, of the Department's Standard Specifications.
17. **CARE OF DRAINAGE:** Permittee must provide alternate drainage for any work interfering with an existing drainage facility in compliance with the Department's Standard Specifications, Standard Plans, and/or as directed by the Department's representative.
18. **RESTORATION AND REPAIRS IN STATE HIGHWAY RIGHT-OF-WAY:** Permittee is responsible for restoration and repair of State highway right-of-way resulting from permitted work (Streets and Highways Code, section 670 et seq.).
19. **STATE HIGHWAY RIGHT-OF-WAY CLEAN UP:** Upon completion of work, Permittee must remove and dispose of all scraps, refuse, brush, timber, materials, etc. off the State highway right-of-way. The aesthetics of the highway must be as it was before work started or better.
20. **COST OF WORK:** Unless stated otherwise in the encroachment permit or a separate written agreement with the Department, the Permittee must bear all costs

incurred for work within the State highway right-of-way and waives all claims for indemnification or contribution from the United States, the State, the Department, and from the Directors, officers, and employees of the State and/or the Department. Removal of Permittee's personal property and improvements shall be at no cost to the United States, the State, and the Department.

21. **ACTUAL COST BILLING:** When specified in the permit, the Department will bill the Permittee actual costs at the currently set Standard Hourly Rate for encroachment permits.
22. **AS-BUILT PLANS:** When required, Permittee must submit one (1) set of folded as-built plans within thirty (30) calendar days after completion and acceptance of work in compliance with requirements listed as follows:
    a) Upon completion of the work provided herein, the Permittee must submit a paper set of As-Built plans to the Department's representative.
    b) All changes in the work will be shown on the plans, as issued with the permit, including changes approved by Encroachment Permit Rider.
    c) The plans are to be prominently stamped or otherwise noted "AS-BUILT" by the Permittee's representative who was responsible for overseeing the work. Any original plan that was approved with a Department stamp, or by signature of the Department's representative, must be used for producing the As-Built plans.
    d) If construction plans include signing or striping, the dates of signing or striping removal, relocation, or installation must be shown on the As-Built plans when required as a condition of the encroachment permit. When the construction plans show signing and striping for staged construction on separate sheets, the sheet for each stage must show the removal, relocation, and installation dates of the appropriate staged striping and signing.
    e) As-Built plans must contain the Encroachment Permit Number, County, Route, and Post Mile on each sheet.
    f) The As-Built Plans must not include a disclaimer statement of any kind that differs from the obligations and protections provided by sections 6735 through 6735.6 of the California Business and Professions Code. Such statements constitute non-compliance with Encroachment Permit requirements and may result in the Department retaining Performance Bonds or deposits until proper plans are submitted. Failure to comply may also result in denial of future encroachment permits or a provision requiring a public agency to supply additional bonding.
23. **PERMITS FOR RECORD PURPOSES ONLY:** When work in the State highway right-of-way is within an area under a Joint Use Agreement (JUA) or a Consent to Common Use Agreement (CCUA), a fee exempt encroachment permit is issued to the Permittee for the purpose of providing a notice and record of work. The Permittee's prior rights must be preserved without the intention of creating new or different rights or obligations. "Notice and Record Purposes Only" must be stamped across the face of the encroachment permit.
24. **BONDING:** The Permittee must file bond(s), in advance, in the amount(s) set by the Department and using forms acceptable to the Department. The bonds must name the Department as obligee. Failure to maintain bond(s) in full force and effect will result in the Department stopping all work under this encroachment permit and possibly revoking other encroachment permit(s). Bonds are not required of public corporations or privately-owned utilities unless Permittee failed to comply with the provisions and/or conditions of a prior encroachment permit. The surety company is responsible for any latent defects as provided in California Code of Civil Procedure section 337.15. A local public agency Permittee also must comply with the following requirements:
    a) In recognition that project construction work done on State property will not be directly funded and paid by State, for the purpose of protecting stop notice claimants and the interests of State relative to successful project completion, the local public agency Permittee agrees to require the construction contractor to furnish both a payment and performance bond in the local public agency's name with both bonds complying with the requirements set forth in Section 3-1.05 Contract Bonds of the Department's Standard Specifications before performing any project construction work.
    b) The local public agency Permittee must defend, indemnify, and hold harmless the United States, the State and the Department, and the Directors, officers, and employees of the State and/or Department, from all project construction related claims by contractors, subcontractors, and suppliers, and from all stop notice and/or mechanic's lien claimants. The local public agency also agrees to remedy, in a timely manner and to the Department's satisfaction, any latent defects occurring as a result of the project construction work.
25. **FUTURE MOVING OF INSTALLATIONS:** Permittee understands and agrees to relocate a permitted installation upon notice by the Department. Unless under prior property right or agreement, the Permittee must comply with said notice at the Permittee's sole expense.
26. **ENVIRONMENTAL:**
    a) ARCHAEOLOGICAL/HISTORICAL: If any archaeological or historical resources are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified archaeologist who must evaluate the site at Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.
    b) HAZARDOUS MATERIALS: If any hazardous waste or materials (such as underground storage tanks, asbestos pipes, contaminated soil, etc.) are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified hazardous

waste/material specialist who must evaluate the site at the Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.

Attention is directed to potential aerially deposited lead (ADL) presence in unpaved areas along highways. It is the Permittee's responsibility to take all appropriate measures to protect workers in conformance with California Code of Regulations Title 8, Section 1532.1, "Lead," and with Cal-OSHA Construction Safety Orders, and to ensure roadway soil management is in compliance with Department of Toxic Substances Control (DTSC) requirements.

c) BIOLOGICAL: If any regional, state, or federally listed biological resource is identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified biologist who must evaluate the site at Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.

27. **PREVAILING WAGES:** Work performed by or under an encroachment permit may require Permittee's contractors and subcontractors to pay appropriate prevailing wages as set by the California Department of Industrial Relations. Inquiries or requests for interpretations relative to enforcement of prevailing wage requirements must be directed to the California Department of Industrial Relations.
28. **LIABILITY, DEFENSE, AND INDEMNITY:** The Permittee agrees to indemnify and save harmless the United States, the State, the Department, and the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind, and description, including but not limited to those brought for or on account of property damage, invasion of privacy, violation or deprivation of a right under a state or federal law, environmental damage or penalty, or injury to or death of any person including but not limited to members of the public, the Permittee, persons employed by the Permittee, and/or persons acting on behalf of the Permittee, arising out of or in connection with: (a) the issuance and/or use of this encroachment permit; and/or (b) the encroachment, work, and/or activity conducted pursuant to this encroachment permit, or under color of authority of this encroachment permit but not in full compliance with the Permit Conditions as defined in General Provision Number 5 ("Unauthorized Work or Activity"); and/or (c) the installation, placement, design, existence, operation, and/or maintenance of the encroachment, work, and/or activity; and/or (d) the failure by the Permittee, or by anyone acting for or on behalf of the Permittee, to perform the Permittee's obligations under any part of the Permit Conditions as defined in General Provision Number 5, in respect to maintenance or any other obligation; and/or (e) any change to the Department's property or adjacent property, including but not limited to the features or conditions of either of them, made by the Permittee or anyone acting on behalf of the Permittee; and/or (f) a defect or obstruction related to or caused by the encroachment, work, and/or activity whether conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constituting Unauthorized Work or Activity, or from any cause whatsoever. The duty of the Permittee to indemnify and save harmless includes the duties to defend as set forth in Section 2778 of the Civil Code.

It is the intent of the Department and the Permittee that except as prohibited by law, the Permittee will defend, indemnify, and hold harmless as set forth in this General Provision Number 28 regardless of the existence or degree of fault or negligence, whether active or passive, primary or secondary, on the part of: the United States, the State; the Department; the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors; the Permittee; persons employed by the Permittee; and/or persons acting on behalf of the Permittee.

The Permittee waives any and all rights to any type of expressed or implied indemnity from or against the United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors.

The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the encroachment, work, and/or activity whether conducted pursuant to this encroachment permit or constituting Unauthorized Work or Activity, and further agrees to defend, indemnify, and save harmless the United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, penalties, liability, suits, or actions of every name, kind, and description arising out of or by virtue of the Americans with Disabilities Act.

The Permittee understands and agrees the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, are not personally responsible for any liability arising from or by virtue of this encroachment permit.

For the purpose of this General Provision Number 28 and all paragraphs herein, "contractors of the State and/or of the Department" includes contractors, and their subcontractors, under contract to the State and/or the Department.

This General Provision Number 28 and all paragraphs herein take effect immediately upon issuance of this encroachment permit, and apply before, during, and after the encroachment, work, and/or activity

contemplated under this encroachment permit, whether such work is in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, except as otherwise provided by California law. The Permittee's obligations to defend, indemnify, and save harmless under this General Provision Number 28 take effect immediately upon issuance of this encroachment permit and have no expiration date, including but not limited to situations in which this encroachment permit expires or is revoked, the work or activity performed under this encroachment permit is accepted or not accepted by the Department, the encroachment, work, and/or activity is conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, and/or no work or activity is undertaken by the Permittee or by others on the Permittee's behalf.

If the United States or an agency, department, or board of the United States is the Permittee, the first two paragraphs of this General Provision Number 28 (beginning "The Permittee agrees to indemnify…" and "It is the intent of the parties…") are replaced by the following paragraph:

Claims for personal injury, death, or property damage allegedly caused by the negligent or wrongful act or omission of any employee of the United States acting within the scope of their official duties are subject to the Federal Tort Claims Act, as amended, 28 U.S.C. § 1346 and § 2671 et seq. (Chapter 171).

29. **NO PRECEDENT ESTABLISHED:** This encroachment permit is issued with the understanding that it does not establish a precedent.
30. **FEDERAL CIVIL RIGHTS REQUIREMENTS FOR PUBLIC ACCOMMODATION:**
    a) As part of the consideration for being issued this encroachment permit, the Permittee, on behalf of Permittee and on behalf of Permittee's personal representatives, successors in interest, and assigns, does hereby covenant and agree that:
        i) No person on the grounds of race, color, or national origin may be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
        ii) That in connection with the construction of any improvements on said lands and the furnishings of services thereon, no discrimination must be practiced in the selection and retention of first-tier subcontractors in the selection of second-tier subcontractors.
        iii) That such discrimination must not be practiced against the public in their access to and use of the facilities and services provided for public accommodations (such as eating, sleeping, rest, recreation), and operation on, over, or under the space of the State highway right-of-way.
        iv) That the Permittee must use the premises in compliance with all other requirements imposed pursuant to Title 15, Code of Federal Regulations, Commerce and Foreign Trade, Subtitle A. Office of the Secretary of Commerce, Part 8 (15 C.F.R. Part 8) and as said Regulations may be amended.
    b) That in the event of breach of any of the above nondiscrimination covenants, the State and the Department have the right to terminate this encroachment permit and to re-enter and repossess said land and the facilities thereon and hold the same as if said permit had never been made or issued.
31. **MAINTENANCE:** The Permittee is responsible at Permittee's sole expense for the encroachment, and the inspection, maintenance, repair, and condition thereof, and is responsible to ensure the encroachment does not negatively impact State highway safety, maintenance, operations, construction, State facilities, activities related to construction/reconstruction, or other encroachments. The Permittee's obligations in the preceding sentence take effect immediately upon issuance of this encroachment permit and continue until the encroachment is entirely and permanently removed. Additional encroachment permits or approval documents may be required authorizing work related to inspection, repair, and/or maintenance activities. Contact the Department for information.
32. **SPECIAL EVENTS:** In accordance with subdivision (a) of Streets and Highways Code section 682.5 and 682.7, the Department is not responsible for the conduct or operation of the permitted activity, and the applicant agrees to defend, indemnify, and hold harmless the United States, the State, the Department, and the Directors, officers, employees, agents, and contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of any activity for which this encroachment permit is issued.

    The Permittee is required, as a condition of this encroachment permit, for any event that awards prize compensation to competitors in gendered categories, for any participant level that receives prize compensation, to ensure the prize compensation for each gendered category is identical at each participant level. (Streets and Highways Code, section 682.7.)

    The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the event, and further agrees to defend, indemnify, and save harmless the United State, the State and the Department, and the Directors, officers, and employees of the State and/or Department, including but not limited to the Director of the Department and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of or by virtue of the Americans with Disabilities Act.
33. **PRIVATE USE OF STATE HIGHWAY RIGHT-OF-WAY:** State highway right-of-way must not be used for private purposes without compensation to the State. The gifting

of public property uses and therefore public funds is prohibited under the California Constitution, Article XVI, Section 6.

34. **FIELD WORK REIMBURSEMENT:** Permittee must reimburse the Department for field work performed by or on behalf of the Department to correct or remedy issues created by the Permittee or by others acting on behalf of the Permittee, including but not limited to hazards or damaged facilities, or to clear refuse, debris, etc. not attended to by the Permittee or by others acting on behalf of the Permittee.
35. **LANE CLOSURE REQUEST SUBMITTALS AND NOTIFICATION OF CLOSURES TO THE DEPARTMENT:** Lane closure request submittals and notifications must be in accordance with Section 12-4.02, and Section 12.4-04, of the Department's Standard Specifications or as directed by the Department's representative. The Permittee must notify the Department's representative and the Traffic Management Center ("TMC") before initiating a lane closure or conducting an activity that may cause a traffic impact. In emergency situations when the corrective work or the emergency itself may affect traffic, the Department's representative and the TMC must be notified as soon as possible.
36. **SUSPENSION OF TRAFFIC CONTROL OPERATION:** The Permittee, upon notification by the Department's representative, must immediately suspend all traffic lane, bike lane, sidewalk, crosswalk, and/or shoulder closure operations and any operation that impedes the flow of traffic. All costs associated with this suspension must be borne by the Permittee.
37. **UNDERGROUND SERVICE ALERT (USA) NOTIFICATION:** Any excavation requires compliance with the provisions of Government Code section 4216 et seq., including but not limited to notice to a regional notification center, such as Underground Service Alert (USA). The Permittee must provide notification to the Department representative at least five (5) business days before, and the regional notification center at least forty-eight (48) hours before, performing any excavation work within the State highway right-of-way.
38. **COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT (ADA):** All work within the State highway right-of-way to construct and/or maintain any public facility must be designed, maintained, and constructed strictly in accordance with all applicable Federal Access laws and regulations (including but not limited to Section 504 of the Rehabilitation Act of 1973, codified at 29 U.S.C. § 794), California Access laws and regulations relating to ADA, along with its implementing regulations, Title 28 of the Code of Federal Regulations Parts 35 and 36 (28 C.F.R., Ch. I, Part 35, § 35.101 et seq., and Part 36, § 36.101 et seq.), Title 36 of the Code of Federal Regulations Part 1191 (36 C.F.R., Ch. XI, Part 1191, § 1119.1 et seq.), Title 49 of the Code of Federal Regulations Part 37 (49 C.F.R., Ch. A, Part 37, § 37.1 et seq.), the United States Department of Justice Title II and Title III for the ADA, and California Government Code section 4450 et seq., which require public facilities be made accessible to persons with disabilities.

    Notwithstanding the requirements of the previous paragraph, all construction, design, and maintenance of public facilities must also comply with the Department's Design Information Bulletin 82, "Pedestrian Accessibility Guidelines for Highway Projects" and Standard Plans & Specifications on "Temporary Pedestrian Access Routes."
39. **STORMWATER:** The Permittee is responsible for full compliance with the following:
    a) For all projects, the Department's Storm Water Program and the Department's National Pollutant Discharge Elimination System (NPDES) Permit requirements under Order No. 2012-0011-DWQ, NPDES No CAS000003; and
    b) In addition, for projects disturbing one acre or more of soil, with the California Construction General Permit Order No. 2009-0009-DWQ, NPDES No CAS000002; and
    c) In addition, for projects disturbing one acre or more of soil in the Lahontan Region with Order No. R6T-2016-0010, NPDES No CAG616002.
    d) For all projects, it is the Permittee's responsibility to install, inspect, repair, and maintain all facilities and devices used for water pollution control practices (Best Management Practices/BMPs) before performing daily work activities.

SURVEYS (SV)

In addition to the attached Encroachment Permit General Provisions (TR-0045), the following special provisions are also applicable:

1. Two days before work is started under this permit, contact _____ concerning the permittee's operation.
2. All survey operations shall be conducted off the traveled way except where necessary to cross pavements and medians.
3. When survey operations are being conducted, the permittee shall furnish, place and maintain signs and safety equipment in accordance with the latest edition of the "California Manual on Uniform Traffic Control Devices" (Part 6, Temporary Traffic Control).
4. All personnel shall wear hard hats and orange vests, shirts or jackets as appropriate. Any painted markings shall be made with water soluble paint.
5. Permission is also granted to park survey vehicles temporarily within the right of way, outside the shoulders, while survey work is in progress.
6. SURVEY WORK IS PROHIBITED ON FREEWAYS.
7. Survey information and assistance may be obtained upon request to: Survey Section, Department of Transportation,_____.

STORMWATER SPECIAL PROVISIONS FOR MINIMAL OR NO IMPACT (SWSP)

TR-0400 (Rev 05/2018)

1. **GENERAL:** The purpose of these Special Provisions is to provide the Permittee with specifications for water pollution control to minimize, prevent, or control the discharge of material into the air, surface waters, groundwater, and storm sewers owned by the State or local agencies. These provisions are not intended to take the place of the Caltrans Water Pollution Control Program (WPCP) for projects where soil disturbance from work activities less than one acre, or work activities of one acre or more subject to the preparation of the Caltrans Storm Water Pollution Prevention Plan (SWPPP). The Permittee must comply with the following Special Provisions and the direction of the State Representative. All Stormwater Best Management Practices (BMPs) must conform to Section 13 Water Pollution Control of Caltrans' Standard Specifications.
2. **NPDES REQUIREMENTS:** The Permittee must be responsible for full compliance with the Caltrans Storm Water Program and the Caltrans National Pollutant Discharge Elimination System (NPDES) Permit requirements (*Order No. 2012-0011-DWQ, NPDES No CAS000003*) and for and projects disturbing one acre or more of soil, full compliance with the California Construction General Permit *(Order No. 2009-0009-DWQ, NPDES No CAS000002)* or for projects for projects that have one acre or more of soil disturbance in the Lahontan Region *(Order No. R6T-2016-0010, NPDES No CAG616002).* It is the Permittee's responsibility to install, inspect, and repair or maintain facilities and devices used for water pollution control practices (BMPs) before performing daily work activities. Installation, inspection and maintenance responsibilities on the job site include: 1) soil stabilization materials in work areas that are inactive or prior to storm events, 2) water pollution control devices to control sediment and erosion, 3) implementation of spill and leak prevention procedures for chemical and hazardous substances stored on the job site, 4) material storage, 5) stockpile management, 6) waste management, 7) non-stormwater management, 8) water conservation, 9) tracking controls and 10) illicit connection, illegal discharge detection and reporting. The Permittee must report to the State representative when discharges enter into receiving waters, adjacent property, drainage systems or when discharges could be a cause or a threat for water pollution. The Permittee must also control illicit discharges or illegal dumping prior to start of daily work schedule. Copies of written notices or orders from the Regional Water Quality Control Board or other regulatory agency must be provided to the State representative within 48 hours of reported activity. F or additional information on stormwater compliance, visit the State Water Resources Control Boards storm water Website at:

   http://www.waterboards.ca.gov/water_issues/programs/stormwater

3. **RESPONSIBILITY FOR DEBRIS REMOVAL:** The Permittee must be responsible for preventing sediment, trash, debris, and other construction waste from entering the street, the storm drains, local creeks, or any other bodies of water.
4. **SPOILS AND RESIDUE:** The Permittee must vacuum any saw-cut concrete waste material, debris, residue, etc. No spoils, debris, residue, etc. must be washed into a drainage system.
5. **SWEEPING:** Sweep paved roads at construction entrance and exit locations and surrounding paved areas daily within the job site during: 1) clearing and grubbing, 2) earthwork, 3) trenching, 4) soil disturbance, 5) pavement grinding and/or cutting, and 6) after observing tracking of material onto or off the State property. Keep dust to a minimum during sweeping activities. Use vacuum whenever dust generation is excessive or sediment pickup is ineffective.
   Roadways or work areas must not be washed down with water. Street sweeping operations must conform to Section 13 Water Pollution Control of Caltrans' Standard Specifications.
6. **VEHICLES AND EQUIPMENT:** Permittee must prevent all vehicles, equipment, etc. from leakage or mud tracking onto roadways. If leaks cannot be repaired immediately, remove the vehicle or equipment from the job site.
7. **MAINTENANCE AND FUELING OF VEHICLES AND EQUIPMENT:** Maintenance and fueling of equipment must not result in any pollution at the job site. The Permittee must immediately clean up spills/leaks, and properly dispose of contaminated soil and materials.
8. **CLEANING VEHICLES AND EQUIPMENT:** Limit vehicle and equipment cleaning or washing at the job site except what is necessary to control vehicle tracking or hazardous waste. The Permittee must clean all equipment within a bermed area or over a drip pan large enough to prevent run-off. No soaps, solvents, degreasers, etc. must be used in State right-of-way. Any water from this operation must be collected and disposed of at an appropriate site. Containment berms or dikes must be used for fueling, washing, maintaining and washing vehicles or equipment in outside areas. Containment must be performed at least 100 feet from concentrated flows of

storm water, drainage courses, and storm drain inlets if within a flood plain, otherwise at least 50 feet if outside the floodplain. Keep adequate quantities of absorbent spill- cleanup material and spill kits in the fueling or maintenance area and on fueling trucks.

9. **DIESEL FUELS:** The use of diesel fuel from petroleum or other fossil fuel as a form-oil or solvent is not allowed.
10. **WEATHER CONDITIONS AT WORKSITE:** Any activity that would generate fine particles or dust that could be transported off site by stormwater must be performed during dry weather.
11. **WIND EROSION PROTECTION**: The use of Wind Erosion BMPs must be deployed year-round in instances where dust or fine particles could be transported off site.
12. **HOT MIX ASPHALT:** Runoff from washing hot mix asphalt must not enter into any drainage conveyances.
13. **PROTECTION OF DRAINAGE FACILITIES:** The Permittee must protect/cover gutters, ditches, drainage courses, and inlets with gravel bags, fiber rolls, State approved fabric filters, etc., to the satisfaction of the State representative during grading, paving, saw-cutting, etc. and materials must conform to Section 13-6.02 Materials for Water Pollution Control of Caltrans' Standard Specifications. No such protection measures must cause an obstruction to the traveling public. The Permittee must implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site (including secondary containment requirements) in accordance with section 13-4.03B Spill Prevention and Control, and 14-11 Hazardous Waste and Contamination, Water Pollution Control of Caltrans' Standard Specifications.
14. **PAINT:** Rinsing of painting equipment and materials is not permitted in State right-of-way. When thoroughly dry, dispose of the following as solid waste: dry latex paint, paint cans, used brushes, rags, gloves, absorbent materials, and drop cloths. Oil based paint sludge and unusable thinner must be disposed of at an approved hazardous waste site.
15. **CONSTRUCTION MATERIALS:** Stockpile of all construction materials, including, but not limited to; pressure treated wood, asphalt concrete, cold mix asphalt concrete, concrete, grout, cement containing premixes, and mortar, must conform to section 13-4.03C (2) Material Storage & 13-4.03C (3) Stockpile Management of Caltrans' Standard Specifications.
16. **CONCRETE EQUIPMENT:** Concrete equipment must be washed in a designated washing area in a way that does not contaminate soil, receiving waters, or storm drain systems.
17. **EXISTING VEGETATION:** Established existing vegetation is the best form of erosion control. Minimize disturbance to existing vegetation. Damaged or removed vegetation must be replaced as directed by the State Representative.
18. **SOIL DISTURBANCE:** Soil disturbing activities must be avoided during the wet weather season. I f construction activities during wet weather are allowed in your permit, all necessary erosion control and soil stabilization measures must be implemented in advance of soil disturbing activity.
19. **SLOPE STABILIZATION AND SEDIMENT CONTROL:** Consider a certified expert in Erosion and Sediment control in cases where slopes are disturbed during construction. The Permittee is directed to comply with Section 13.5 Temporary Soil Stabilization and Section 21 Erosion Control of Caltrans' Standard Specifications during application of temporary soil stabilization measures to the soil surface. Fiber rolls or silt fences may be required down slope until permanent soil stabilization is established. Remove the accumulated sediment whenever the sediment accumulates to 1/3 of the linear sediment barrier height. The Permittee must limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist or when environmental regulations prohibit their use within the project.
20. **STOCKPILES:** Stockpiles containing aggregate and/or soil must be stored at least 100 feet from concentrated flows of storm water, drainage courses, and storm drain inlets if within a flood plain, otherwise at least 50 feet if outside the floodplain, and must be covered and protected with a temporary perimeter sediment barrier. Cold mix stockpiles must be stored on an impermeable surface and covered with 9 mil plastic to prevent contact with water. Minimize stockpiling of materials on the job site. Manage stockpiles by implementing the water pollution control practices in Section 13-4.03C (3) Stockpile Management of the State of California standard specifications for construction.
21. **DISCOVERY OF CONTAMINATION:** The State Representative must be notified in case any unusual discoloration, odor, or texture of ground water, is found in excavated material or if abandoned, underground tanks, pipes, or buried debris are encountered.
22. **SANITARY AND SEPTIC WASTE:** Do not bury or discharge wastewater from a sanitary or septic system within the highway. Properly connected sewer facilities are free from leaks. With State Representative approval place portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines. Permittee must comply with local health agency provisions when using an on-site disposal system.
23. **LIQUID WASTE:** Prevent job site liquid waste from entering storm drain systems and receiving waters. Drilling slurries, grease or oil-free waste water or rinse water, dredging, wash water or rinse water running off a surface or other non-storm water liquids not covered

under separate waste water permits must be held in structurally sound, leak-proof containers, such as portable bins or portable tanks. Store containers at least 50 feet away from moving vehicles and equipment. Liquid waste may require testing to determine hazardous material content prior to disposal. All measures must conform to section 13-4.03D (5) Liquid Waste, Water Pollution Control of Caltrans' Standard Specifications.

24. **WATER CONTROL AND CONSERVATION:** Manage water use in a w ay that will prevent erosion and the discharge of pollutants into storm drain systems and receiving waters. Direct runoff, including water from water line repair from the job site to areas where it can infiltrate into the ground. Direct water from off-site sources around the job site or from contact with jobsite runoff.
25. **PILE DRIVING:** Keep spill kits and cleanup materials at pile driving locations. Park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material, and away from stormwater run-on when not in use.
26. **DEWATERING**: Dewatering consists of discharging accumulated storm water, groundwater, or surface water from excavations or temporary containment facilities. All dewatering operations must comply with the latest Caltrans guidelines including the Field Guide for Construction Site Dewatering. Contact State representative for approval of dewatering discharge by infiltration or evaporation, otherwise, any effluent discharged into a permitted storm water system requires approval from the Regional Water Quality Control Board. Prior to the start of dewatering, the Permittee must provide the State Representative with a dewatering and discharge work plan that complies with section 13-4.03G Dewatering, Water Pollution Control of Caltrans' Standard Specifications. A copy of the Waste Discharge Permit and a copy of a valid WDID number issued by the Regional Board must be provided to the State representative.

APPENDIX C: BLM CATEGORICAL EXCLUSION AND DECISION RECORD

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Bakersfield Field Office
35126 McMurtrey Ave.
Bakersfield, CA 93308

CATEGORICAL EXCLUSION
DOI-BLM-CA-C060-2023-0099-CX

A. BACKGROUND

Proposed Action Title/Type: Cuyama Basin Groundwater Studies
Lease/Serial/Case File No (if any): N/A
Location of Proposed Action: 34.875397°, -119.513028°
Applicant: Cuyama Basin Groundwater Sustainability Agency (CBGSA)

B. DESCRIPTION OF PROPOSED ACTION:

The CBGSA has adopted a Groundwater Sustainability Plan (GSP) to comply with the California Sustainable Groundwater Management Act (SGMA). The CBGSA is responsible for implementing the GSP within its boundaries. SGMA requires the long-term monitoring of groundwater levels and water quality. To comply with this requirement, the CBGSA needs to investigate the Santa Barbara Canyon Fault within the CBGSA's boundaries to monitor groundwater elevations and water quality.

For the electrical resistivity/induced polarization survey, the transect (approximately 3,500 feet long) would be established on unpaved ground; depending on the stiffness/hardness of the surface material along each transect, ¾-inch holes may need to be drilled into the ground to approximately 18 inches deep at each 10-meter interval down the length of the line, prior to data collection. Prior to any drilling or establishment of steel stakes, utilities would need to be located and marked along each transect so that the electrode stakes would not damage any utilities. Utilities within 30 feet of each established transect would be delineated prior to drilling holes or establishing stakes in the ground. The locations of these utilities would be marked on the ground so that electrode locations can be moved (if necessary) and resistivity anomalies from utilities can be identified in the resistivity data collected. Once utilities have been marked, the geophysics crew would use a survey chain and surveyor's chalk to establish the trend of the transect and mark each electrode station at 10-meter increments along its length. Once the stations are marked on the ground and the holes are drilled (where necessary), steel stakes would then be hammered into the ground at each 10-meter station, and where necessary, salt water would be added to the soil to improve the electrical contact between the soil and the electrode. Once the stakes are established, the resistivity cable would be attached to each stake with a rubber band to form the electrical circuit.

Once the circuit has been established, all recommended manufacturer system tests would be conducted, and contact resistance tests would be run on the electrodes to ensure that enough current

is traveling through the ground to obtain accurate results. During this test, a small amount of known current is sent down the cable and the system steps down the line of electrodes and reads the voltage (and thereby the resistance) between pairs of electrodes (one pair at a time) and displays the resistance value in real time on the console. If the resistance is above 1.5 k-Ohm for a particular pair of electrodes, the geophysical survey instrument operator then stops the test and the electrode connection is checked and improved (usually by hammering the stake in deeper or re-watering the electrode), and the procedure is repeated, until all pairs of electrodes on the line have passed the requirement of contact resistance of 1.5k-Ohm or below. Once this is done, the system would be set to the "automatic measurement" mode, and both Schlumberger and dipole-dipole data would then be acquired along the length of the line using preloaded command files. Two readings would be taken for every measurement to allow a check on repeatability and noise in the data.

The surveys would be expected to take two days to complete and would be a one-time event. At the end of the second day, stakes would be removed from the ground and any other equipment would be removed from the site.

Design Features

Biological Resources

Standard safety measures must be implemented on BLM lands to protect biological resources, this includes:

- Spill trays should be maintained under the gas generator, the batteries, fuel containers, and the saltwater containers
- All containers need to be properly labeled with the contents.
- Spill kits should be available with appropriate neutralizer for a saltwater spill and for the generator, fuel, and batteries.
- Appropriate fire extinguishers need to be present.

Wildlife and botanical desktop review and reconnaissance level field surveys, completed by a BLM approved qualified Wildlife Biologist, are required prior to any ground disturbing activities. The perspective surveying Wildlife Biologist and Botanist resumes must be submitted to the BLM Bakersfield Field Office Biological Resource Staff for approval prior to initiation of survey work.

A detailed survey report must be provided to the BLM Bakersfield Field Office Biological Staff within 15 calendar days of survey completion. Emailed is preferred. In the event biological surveys result in presence of any Federally or State listed species, proposed listed, or BLM Sensitive Species within the planned work area, no ground disturbing activities will occur until written approval is received from the BLM. Project areas containing Federally listed, State listed, or proposed to be listed species will require additional guidance from the BLM and may require an onsite approved biological monitor, and conference or consultation with the US Fish and Wildlife Service and California Department of Fish and Wildlife Service at the expense of the applicant (CBGSA).

A desktop review and reconnaissance level field survey were conducted on November 27, 2023, by Rincon Consultants, Inc. biologists, Michael Robbins and Elizabeth Shoemaker, and a

biological survey report was submitted to the BLM on January 11th, 2024. The report resulted in no observations of special status species in the project area.

Ground disturbing activities will only occur on bare soils or in areas of non-native grasses when possible. No activities will occur within 4 feet of any shrub base. All wildlife burrows and nests will be avoided. No activities shall be performed during periods when the soil is too wet to adequately support operated equipment, including vehicles. If the equipment creates ruts more than 10 cm (4 in) deep, the soil shall be deemed too wet to adequately support the equipment.

Noxious & Nonnative Invasive Plant Species (NNIPS)

- Crews will be mindful to not park in or traverse through know invasive species populations.
- Crews will ensure clean socks, shoes, and clothing before traveling to each plot.
- Vehicles shall only stay on open public roads. Off road travel is prohibited.

Cultural Resources

In the event of inadvertent discovery of cultural resources during project implementation, personnel responsible for the project shall immediately notify the BLM Bakersfield Field Office Cultural Resource Staff and Field Manager (661-391-6000). All work at the site of discovery, and in any other locations where damage to the discovery could occur, shall cease until written approval is received from the BLM.

If human remains are inadvertently discovered on BLM surface land, all activity will immediately cease surrounding the unanticipated discovery. The holder will ensure that the discovery is secured and protected and will immediately notify the BLM Field Manager (661-391-6000). The BLM will adhere to current regulations regarding the treatment of human remains (Native American Graves Protection and Repatriation Act, 43 CFR 10). Access and use of the area can proceed with written approval from the Field Manager once the appropriate level of review has been determined and completed.

Hazardous Waste/Waste Disposal

Project sites shall be always maintained in a sanitary condition; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

A litter policing program shall be implemented by the holder, and approved of in writing by the BLM, which covers all roads and sites associated with the project.

The holder(s) shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the project or on facilities authorized under this project grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) more than the

reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government because of a reportable release or spill of any toxic substances shall be furnished to the BLM concurrent with the filing of the reports to the involved Federal agency or State government.

The implementor of this project agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.0 9601, et. seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et. seq.) on the project (unless the release or threatened release is wholly unrelated to the project holder's activity on the project). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

C. LAND USE PLAN CONFORMANCE

Land Use Plan Name: Bakersfield Resource Management Plan (RMP)
Date Approved: December 2014

The Proposed Action is in conformance with the applicable LUP because it is clearly consistent with the following LUP decision(s) (objectives, terms, and conditions) even though it is not specifically provided for:

[WR-D-1] Design BLM program and management activities and authorize projects to meet water quality standards and maintain beneficial uses by implementing such measures as State approved BMPs (Management Measures for Polluted Runoff, see Appendix 3) within the Central Coast, South Coast and Tulare basins. (pg. 46)

D. COMPLIANCE WITH NEPA

The Proposed Action is categorically excluded from further documentation under the National Environmental Policy Act (NEPA) in accordance with 516 DM 11.9. K(3):

Conducting preliminary hazardous materials assessments and site investigations, site characterization studies and environmental monitoring. Included are siting, construction, installation and/or operation of small monitoring devices such as wells, particulate dust counters and automatic air or water samples.

E. CONCLUSION

This categorical exclusion is appropriate in this situation because there are no extraordinary circumstances potentially having effects that may significantly affect the environment. The proposed action has been reviewed, and none of the extraordinary circumstances described in 43 CFR Part 46.215 apply (see Attachment 1).

I considered the above proposed project and design features as well as the attached extraordinary circumstances review and have determined that the proposed action is in conformance with the approved land use plans and that no further environmental analysis is required.

F. SIGNATURE

Authorized Officer: _____ Date: 1/22/2024

Gabriel Garcia
Field Manager, Bakersfield Field Office

Contact Person
For additional information concerning this CX review, please contact Rebecca Daniels, Planning and Environmental Coordinator, Bakersfield Field Office, 35126 McMurtrey Avenue, Bakersfield, CA, (661) 391-6146.

ATTACHMENTS:
1 – Extraordinary Circumstances Review

ATTACHMENT 1
Extraordinary Circumstances Review

The proposed action will not:

(a) Have significant impacts on public health.

Rationale: The project would not impact public health and safety because it is limited to minimally invasive survey methods and utilities will be marked prior to any ground-disturbing activities.

(b) Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); national monuments; migratory birds; and other ecologically significant or critical areas.

Rationale: Temporarily displacing birds from perches or foraging areas is not expected to have a measurable negative impact. Displacing birds during egg incubation or when immature chicks are present in the nest could result in loss of individual birds, including migratory birds. However, the proposed activity would be of short duration and avoid active nests; therefore, it will not significantly impact migratory birds. Additionally, no other natural resources or unique geographic characteristics will be significantly impacted by the project. None of the other resources occur within the project area.

(c) Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources [NEPA section 102 (2) (E)].

Rationale: The survey methods proposed are routine and not highly controversial.

(d) Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks.

Rationale: The proposed studies are not expected to cause highly uncertain or potentially significant environmental effects or involve unique or unknown environmental risks.

(e) Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.

Rationale: The proposed studies will not set a precedent for future actions.

(f) Have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects.

Rationale: The project does not have a direct relationship with any other projects.

(g) Have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by the bureau.

Rationale: The limited disturbance footprint for the proposed action meets the threshold for the application of Exemption A1, Appendix A of the *State Protocol Agreement Among the California State Director of the Bureau of Land Management and the California State Historic Preservation Officer (2019).* As a result, the agency has determined that the proposed action is unlikely to result in significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by the bureau.

(h) Have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species.

Rationale: The proposed activities and duration are expected to have a negligible impact on wildlife species occupying the areas. Design features require pre work biological surveys to identify species presence for avoidance measures. Critical habitat does not occur in the project area. A desktop review and reconnaissance level field survey was conducted on November 27, 2023, by Rincon Consultants, Inc. biologists, Michael Robbins and Elizabeth Shoemaker, and a biological survey report was submitted to the BLM on January 11th, 2024. The report resulted in no observations of special status species in the project area. Additionally, BLM requires a qualified biological monitor on site during all project activities. Consequently, significant impact to listed or proposed species or designated critical habitat is not expected. Avoidance measures restrict activity in areas containing special status species, therefore no significant impacts are expected.

(i) Violate a Federal law, or a State, local or tribal law or requirement imposed for the protection of the environment.

Rationale: The project does not violate any Federal, State, local or tribal laws.

(j) Have a disproportionately high and adverse effect on low income or minority populations (Executive Order 12898).

Rationale: The project would not impact low income or minority populations because no residential areas are located within the project's area of impact.

(k) Limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007).

Rationale: Due to the location of the proposed action within an active water course, the limited ground disturbance, and the temporary nature of the placement and use of the testing equipment, there will be no impact to access to and ceremonial use of Indian sacred sites on

Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007).

(l) To contribute to the introduction, continued existence or spread of Noxious and Non-native Invasive Plant Species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species that are covered by the Federal Noxious Weed Act of 1974, DOI 524 DM 1 (15 July 2020), that establishes policy to manage the risk of invasive species in federal activities, and minimize that risk where applicable and practicable, in cooperation with others as appropriate, DOI 517 DM 1 (31 May 2007) stipulates policy and requirements for Department of the Interior (DOI) bureaus and offices to incorporate Integrated Pest Management (IPM) into their pest management activities), The Plant Protection Act of 2007 U.S.C. 7701, Executive Order 13751 of 5 December 2016, The Noxious Weed Control and Eradication Act of 2004 Pub. L 108-412, and Federal Noxious Weed Act of 1974 Pub. L 93–629, (as amended 1990). This review does not assess the potential for invasive biological resources including Animal, Bacterial and Viral.

Rationale: The proposed action will not be expected to contribute to the introduction, continued existence or spread of noxious or non-native invasive plant species when the associated resource design features and/or stipulations relating to noxious and non-native invasive plant species are implemented. The BKFO Noxious & Nonnative Invasive Plant Species BMPs 2022 (provided in NEPA record folder) are pursued, and the goals, objectives, and decisions relating to noxious and non-native invasive plant species in Bakersfield Resource Management Plan (2014), Section 2.2, page 18-25 conformance are followed.

DECISION RECORD
DOI-BLM-CA-C060-2023-0099-CX

INTRODUCTION AND BACKGROUND

The CBGSA has adopted a Groundwater Sustainability Plan (GSP) to comply with the California Sustainable Groundwater Management Act (SGMA). The CBGSA is responsible for implementing the GSP within its boundaries. SGMA requires the long-term monitoring of groundwater levels and water quality. To comply with this requirement, the CBGSA needs to investigate the Santa Barbara Canyon Fault within the CBGSA's boundaries to monitor groundwater elevations and water quality.

For the electrical resistivity/induced polarization survey, the transect (approximately 3,500 feet long) would be established on unpaved ground; depending on the stiffness/hardness of the surface material along each transect, ¾-inch holes may need to be drilled into the ground to approximately 18 inches deep at each 10-meter interval down the length of the line, prior to data collection. Prior to any drilling or establishment of steel stakes, utilities would need to be located and marked along each transect so that the electrode stakes would not damage any utilities. Utilities within 30 feet of each established transect would be delineated prior to drilling holes or establishing stakes in the ground. The locations of these utilities would be marked on the ground so that electrode locations can be moved (if necessary) and resistivity anomalies from utilities can be identified in the resistivity data collected. Once utilities have been marked, the geophysics crew would use a survey chain and surveyor's chalk to establish the trend of the transect and mark each electrode station at 10-meter increments along its length. Once the stations are marked on the ground and the holes are drilled (where necessary), steel stakes would then be hammered into the ground at each 10-meter station, and where necessary, salt water would be added to the soil to improve the electrical contact between the soil and the electrode. Once the stakes are established, the resistivity cable would be attached to each stake with a rubber band to form the electrical circuit.

Once the circuit has been established, all recommended manufacturer system tests would be conducted, and contact resistance tests would be run on the electrodes to ensure that enough current is traveling through the ground to obtain accurate results. During this test, a small amount of known current is sent down the cable and the system steps down the line of electrodes and reads the voltage (and thereby the resistance) between pairs of electrodes (one pair at a time) and displays the resistance value in real time on the console. If the resistance is above 1.5 k-Ohm for a particular pair of electrodes, the geophysical survey instrument operator then stops the test and the electrode connection is checked and improved (usually by hammering the stake in deeper or re-watering the electrode), and the procedure is repeated, until all pairs of electrodes on the line have passed the requirement of contact resistance of 1.5k-Ohm or below. Once this is done, the system would be set to the "automatic measurement" mode, and both Schlumberger and dipole-dipole data would then be acquired along the length of the line using preloaded command files. Two readings would be taken for every measurement to allow a check on repeatability and noise in the data.

The surveys would be expected to take two days to complete and would be a one-time event. At the end of the second day, stakes would be removed from the ground and any other equipment would be removed from the site.

LAND USE PLAN CONFORMANCE

Land Use Plan Name: Bakersfield Resource Management Plan (RMP)
Date Approved: December 2014

The Proposed Action is in conformance with the applicable LUP because it is clearly consistent with the following LUP decision(s) (objectives, terms, and conditions) even though it is not specifically provided for:

[WR-D-1] Design BLM program and management activities and authorize projects to meet water quality standards and maintain beneficial uses by implementing such measures as State approved BMPs (Management Measures for Polluted Runoff, see Appendix 3) within the Central Coast, South Coast and Tulare basins. (pg. 46)

COMPLIANCE WITH THE NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED.

Section 106 of the National Historic Preservation Act (NHPA) requires agencies to make a reasonable and good faith effort to identify historic properties that may be affected by an agency's undertakings and take those effects into account in making decisions. The BLM process for implementing this NHPA requirement is set forth in the *2012 Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers regarding the manner in which the BLM will meet its responsibilities under the National Historic Preservation Act* and in the 2014 *State Protocol Agreement Among the California State Director of the Bureau of Land Management and the California State Preservation Officer and the Nevada State Historic Preservation Officer…(CA Protocol 2019).*

PERSONS AND AGENCIES CONSULTED

A summary of this project was published on the BLM's national register for Land Use Planning (LUP) and National Environmental Policy Act (NEPA) documents (ePlanning) on 20 September 2023, to notify the public of this project and invite comments from those interested. The entire document will be published when complete.

National Historic Preservation Act: For the purposes of public notification and review, as required under Section 106 of the National Historic Preservation Act, a description of this project was posted on the BLM public NEPA project webpage. This description included a statement that indicated that this action had been determined of no historic properties affected as defined in the 2014 State Protocol. As required under the Protocol, this determination was posted for a period of 7 days. There was no response by the public to this decision. The required documentation has been filed with this categorical exclusion DOI-BLM-CA-C060-2023-0099-CX NHPA Paleo form.

IMPLEMENTATION DATE

This project will be implemented on or after 22 January 2024.

DECISION AND RATIONALE ON ACTION

This decision has been recorded to support the above action in accordance with the 36 CFR § 220.6 (e).

In addition, I have reviewed the plan conformance statement and have determined that the proposed action is in conformance with the approved land use plans and that no further environmental analysis is required.

In accordance with 43 CFR 2931.8, this decision is in full force and effective immediately.

ADMINISTRATIVE REMEDIES

Administrative remedies may be available to those who believe they will be adversely affected by this decision. Appeals may be made to the Office of Hearings and Appeals, Office of the Secretary, U.S. Department of Interior, Board of Land Appeals (Board) in strict compliance with the regulations in 43 CFR Part 4. Notices of appeal must be filed in this office within 30 days after publication of this decision. If a notice of appeal does not include a statement of reasons, such statement must be filed with this office and the Board within 30 days after the notice of appeal is filed. The notice of appeal and any statement of reasons, written arguments, or briefs must also be served upon the Regional Solicitor, Pacific Southwest Region, U.S. Department of Interior, 2800 Cottage Way, E-1712, Sacramento, CA 95825.

SIGNATURE

Based on the information provided in this categorical exclusion documentation, other information incorporated by reference, and recommendations from staff; I find that there is no potential for significant impacts associated with this proposed action and that no further analysis pursuant to the NEPA is required.

X _____

Gabriel Garcia
Field Manager, Bakersfield Field Office

APPENDIX D: LABORATORY ANALYTICAL REPORTS

- **Pace**
- **ISOTECH**
- **AR Bennett**
- **FGL Environmental Agricultural**
- **Eurofins (from DWR)**

Date of Report: 07/11/2024

Jim Strandberg

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Client Project:	0011078.01
Pace Project:	Cuyama Basin GSP 0011078.01
Pace Work Order:	2408111
Invoice ID:	B497875, B500444, B500615

Enclosed are the results of analyses for samples received by the laboratory on 5/15/2024. If you have any questions concerning this report, please feel free to contact me.

Revised Report: This report supercedes Report ID 1001521958

Sincerely,

Contact Person: Ragen Williams
Client Service Rep

Stuart Buttram
Operations Manager

Table of Contents

Pace ANALYTICAL SERVICES 4100 Atlas Ct. – Bakersfield, CA 93308 – 661.327.4911 – Fax: 661.327.1918 – www.pacelabs.com

...ly Form

2408111 age____ of____

Report To:			
Client:	Woodard & Curran	Project #:	0011078.01
Attn:	Jim Strandberg	Project Name:	Lyons GSP Implementation
Street Address:	2175 N. California Blvd	BID#	
City, State, Zip:	Walnut Creek, CA 94596	Sampler(s) Name Printed:	BN
Phone:	925-627-4122 Fax:		
Email:	JStrandberg@woodardcurran.com		
Work Order #:	24-08111		

Comments: EPA300.0 = chloride, ~~total Phosphate~~, Nitrogen, Nitrate, Sulfate, and bromide

Sample #	Description	Date Sampled	Time Sampled	EPA300.0	Alkalinity as CaCO3	Phosphate, total	TDS	Metal Analysis	Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Notes
-1	Well 904	5/13/24	15:19	X	X	X	X	X				✓			
-2	NF-20	5/14/24	9:23	X	X	X	X	X				✓			
-3	Well 902	5/14/24	11:49	X	X	X	X	X				✓			
-4	Well 901	5/14/24	12:46	X	X	X	X	X				✓			
-5	Well 916	5/15/24	9:17	X	X	X	X	X				✓			
-6	Well 915	5/15/24	12:19	X	X	X	X	X				✓			unfiltered

Result Request **Surcharge: ☐ STD (10 Days) ☐ 5 Day** ☐ 4 Day** ☐ 3 Day** ☐ 2 Day** ☐ 1 Day** Rush requests must be approved

CHK BY: pko DISTRIBUTION: MT TD SUB OUT ☐

SHORT HOLDING TIME: Cr^{+6} NO_2 (NO_3 circled) OP SS DO Cl_2 BOD MBAS COT

Billing ☐ Same as above

Client: ____
Address: ____
City: ____ State ____ Zip ____
Attn: ____
P.O. #: ____

System # (Needed for CLIP) ____
GISKey ☐ Well Star ☐

EDF Required Geotracker ☐ Yes ☐ No Global ID

Relinquished By	Date	Time	Received By	Date	Time
1. [signature]	5/15/24	15:39	1. [signature]	5/15/24	1539
2.			2.		
3.			3.		

Pace Analytical Bakersfield does not accept samples containing radioactive material above background levels. Samples containing radioactive material must be disclosed prior to receipt. Any samples suspected of containing radioactive material above background levels will not be accepted and will be returned to client.

REV 12/2021

PACE ANALYTICAL — COOLER RECEIPT FORM — Page 1 Of 2

Submission #: 24-08111

SHIPPING INFORMATION
Fed Ex ☐ UPS ☐ GSO / GLS ☐ Hand Delivery ☒
Pace Lab Field Service ☐ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☒ None ☐ Box ☐
Other ☐ (Specify)_____

FREE LIQUID
YES ☐ NO ☐
(W) / S

Refrigerant: Ice ☒ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☒ Comments:

All samples received? Yes ☒ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☒ No ☐ (6)

COC Received ☒ YES ☐ NO

Emissivity: 0.97 Container: N/A Thermometer ID: 337

Temperature: (A) 5.7 °C / (C) 4.9 °C

Date/Time 5/15/24

Analyst Init VJB1 1539

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT PE UNPRES	A	A	A	A						
4oz / 8oz / 16oz PE UNPRES										
2oz Cr^{+6}										
QT INORGANIC CHEMICAL METALS										
INORGANIC CHEMICAL METALS 4oz (8oz) 16oz	AB	B	B	B						
PT CYANIDE										
PT NITROGEN FORMS	C	C	C	C						
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 1664B										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608.3/8081A										
QT EPA 515.1/8151A										
QT EPA 525.2										
QT EPA 525.2 TRAVEL BLANK										
40ml EPA 547										
40ml EPA 531.1										
8oz EPA 548.1										
QT EPA 549.2										
QT EPA 8015M										
QT EPA 8270C										
8oz / 16oz / 32oz AMBER										
8oz / 16oz / 32oz JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
TEDLAR BAG										
FERROUS IRON										
ENCORE										
SMART KIT										
SUMMA CANISTER										

Comments: (No time on -4 samples) (-1 received expired)

Sample Numbering Completed By: PAS Date/Time: 5/15/24 1650

A = Actual / C = Corrected

Rev 23 05/20/22

[S:\WPDocs\WordPerfect\LAB_DOCS\FORMS\SAMREC rev 20]

PACE ANALYTICAL — COOLER RECEIPT FORM — Page 2 Of 2

Submission #: 24-08111

SHIPPING INFORMATION
Fed Ex ☐ UPS ☐ GSO / GLS ☐ Hand Delivery ☒
Pace Lab Field Service ☐ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☒ None ☐ Box ☐
Other ☐ (Specify)_____

FREE LIQUID
YES ☐ NO ☐
W / S

Refrigerant: Ice ☒ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☒ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☒YES ☐ NO

Emissivity: 0.97 Container: N/A Thermometer ID: 337

Temperature: (A) 2.7 °C / (C) 1.9 °C

Date/Time 5/15/24 1539

Analyst Init VBJ

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT PE UNPRES					A	A				
4oz / 8oz / 16oz PE UNPRES					A					
2oz Cr+6					pH 5/15/24					
QT INORGANIC CHEMICAL METALS										
INORGANIC CHEMICAL METALS 4oz / 8oz / 16oz					B	B				
PT CYANIDE										
PT NITROGEN FORMS					C	C				
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 1664B										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608.3/8081A										
QT EPA 515.1/8151A										
QT EPA 525.2										
QT EPA 525.2 TRAVEL BLANK										
40ml EPA 547										
40ml EPA 531.1										
8oz EPA 548.1										
QT EPA 549.2										
QT EPA 8015M										
QT EPA 8270C										
8oz / 16oz / 32oz AMBER										
8oz / 16oz / 32oz JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
TEDLAR BAG										
FERROUS IRON										
ENCORE										
SMART KIT										
SUMMA CANISTER										

Comments:_____

Sample Numbering Completed By: PW Date/Time: 5/15/24 1650

A = Actual / C = Corrected

Rev 23 05/20/22

(S:\WPDocs\WordPerfect\LAB_DOCS\FORMS\SAMREC rev 20)

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
2408111-01	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/13/2024 15:19
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 904	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis:	1-Field Filtered and Acidified
2408111-02	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/14/2024 09:23
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	NF-20	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis:	1-Field Filtered and Acidified
2408111-03	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/14/2024 11:49
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 902	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis:	1-Field Filtered and Acidified
2408111-04	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/14/2024 12:46
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 901	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis:	1-Field Filtered and Acidified
2408111-05	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/15/2024 09:17
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 916	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis:	1-Field Filtered and Acidified

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek 2175 N. California Boulevard Suite 315 Walnut Creek, CA 94596	**Reported:** 07/11/2024 21:14 Project: Cuyama Basin GSP 0011078.01 Project Number: 0011078.01 Project Manager: Jim Strandberg

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
2408111-06	**COC Number:**	---	**Receive Date:**	05/15/2024 15:39
	Project Number:	---	**Sampling Date:**	05/15/2024 12:19
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 915	**Lab Matrix:**	Water
	Sampled By:	BN	**Sample Type:**	Groundwater
			Metal Analysis: 2-Lab Filtered and Acidified past 15 minute holding time	

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-01 | **Client Sample Name:** Well 904, 5/13/2024 3:19:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**230**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**91**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**90**	**mg/L**	**0.50**	**0.051**	**EPA-200.7**	**ND**		**1**
Dissolved Potassium	**4.1**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**150**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**2**
Bromide	ND	mg/L	0.40	0.14	EPA-300.0	ND	A10	3
Chloride	**17**	**mg/L**	**1.0**	**0.26**	**EPA-300.0**	**ND**	**A10**	**3**
Nitrate as N	**1.6**	**mg/L**	**0.20**	**0.048**	**EPA-300.0**	**ND**	**A10,A26,S05**	**3**
Sulfate	**920**	**mg/L**	**5.0**	**0.70**	**EPA-300.0**	**0.80**	**A10**	**4**
Total Dissolved Solids @ 180 C	**1500**	**mg/L**	**50**	**25**	**SM-2540C**	**ND**	**A10**	**5**
Total Phosphate as P	ND	mg/L	0.050	0.018	EPA-365.4	ND		6

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:31	SDA	ICP5	1	B190376	200.7/ No Digest
2	SM-2320B	05/22/24 08:00	05/22/24 09:47	ELR	MET-1	2	B189062	No Prep
3	EPA-300.0	05/15/24 20:00	05/16/24 00:32	RML	IC9	2	B189707	No Prep
4	EPA-300.0	05/15/24 20:00	05/16/24 16:10	ANN	IC9	5	B189707	No Prep
5	SM-2540C	05/17/24 15:30	05/17/24 15:30	IJC	MANUAL	5	B189837	No Prep
6	EPA-365.4	05/16/24 10:45	05/21/24 13:59	EC1	SC-2	1	B189746	EPA 365.4

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-01 | **Client Sample Name:** Well 904, 5/13/2024 3:19:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**37**	**ug/L**	**50**	**23**	**EPA-200.7**	**ND**	**J**	**1**
Dissolved Arsenic	ND	ug/L	50	9.2	EPA-200.7	ND		1

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:31	SDA	ICP5	1	B190376	EPA 200.7 Dissolved

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-02 | **Client Sample Name:** NF-20, 5/14/2024 9:23:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**97**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**37**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**160**	**mg/L**	**0.50**	**0.051**	**EPA-200.7**	**ND**		**2**
Dissolved Potassium	**2.2**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**280**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**3**
Bromide	**0.32**	**mg/L**	**0.20**	**0.070**	**EPA-300.0**	**ND**		**4**
Chloride	**99**	**mg/L**	**0.50**	**0.13**	**EPA-300.0**	**ND**		**4**
Nitrate as N	ND	mg/L	0.20	0.048	EPA-300.0	ND	A10	5
Sulfate	**290**	**mg/L**	**1.0**	**0.14**	**EPA-300.0**	**0.16**		**4**
Total Dissolved Solids @ 180 C	**900**	**mg/L**	**50**	**25**	**SM-2540C**	**ND**	**A10**	**6**
Total Phosphate as P	**0.041**	**mg/L**	**0.050**	**0.018**	**EPA-365.4**	**ND**	**J**	**7**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:17	SDA	ICP5	1	B190376	200.7/ No Digest
2	EPA-200.7	05/28/24 10:18	05/28/24 14:17	JEH	ICP5	1	B190376	200.7/ No Digest
3	SM-2320B	05/22/24 08:00	05/22/24 09:52	ELR	MET-1	2	B189062	No Prep
4	EPA-300.0	05/15/24 20:00	05/16/24 16:50	ANN	IC9	1	B189707	No Prep
5	EPA-300.0	05/15/24 20:00	05/16/24 00:46	RML	IC9	2	B189707	No Prep
6	SM-2540C	05/17/24 15:30	05/17/24 15:30	IJC	MANUAL	5	B189837	No Prep
7	EPA-365.4	05/16/24 10:45	05/21/24 14:00	EC1	SC-2	1	B189746	EPA 365.4

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-02 | **Client Sample Name:** NF-20, 5/14/2024 9:23:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	ND	ug/L	50	23	EPA-200.7	ND		1
Dissolved Arsenic	ND	ug/L	50	9.2	EPA-200.7	ND		1

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:17	SDA	ICP5	1	B190376	EPA 200.7 Dissolved

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-03 | **Client Sample Name:** Well 902, 5/14/2024 11:49:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**880**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**250**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**1900**	**mg/L**	**2.5**	**0.26**	**EPA-200.7**	**ND**	**A10**	**2**
Dissolved Potassium	**48**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**310**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**3**
Bromide	**11**	**mg/L**	**4.0**	**1.4**	**EPA-300.0**	**ND**	**A10**	**4**
Chloride	**3600**	**mg/L**	**10**	**2.6**	**EPA-300.0**	**ND**	**A10**	**4**
Nitrate as N	ND	mg/L	2.0	0.48	EPA-300.0	ND	A10	4
Sulfate	**2200**	**mg/L**	**20**	**2.8**	**EPA-300.0**	**3.2**	**A10**	**4**
Total Dissolved Solids @ 180 C	**9800**	**mg/L**	**500**	**250**	**SM-2540C**	**ND**	**A10**	**5**
Total Phosphate as P	**0.019**	**mg/L**	**0.050**	**0.018**	**EPA-365.4**	**ND**	**J**	**6**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:33	SDA	ICP5	1	B190376	200.7/ No Digest
2	EPA-200.7	05/28/24 10:18	07/10/24 09:36	JEH	ICP5	5	B190376	200.7/ No Digest
3	SM-2320B	05/22/24 08:00	05/22/24 09:58	ELR	MET-1	2	B189062	No Prep
4	EPA-300.0	05/15/24 20:00	05/16/24 00:59	RML	IC9	20	B189707	No Prep
5	SM-2540C	05/17/24 15:30	05/17/24 15:30	IJC	MANUAL	50	B189837	No Prep
6	EPA-365.4	05/16/24 10:45	05/21/24 14:00	EC1	SC-2	1	B189746	EPA 365.4

DCN = Data Continuation Number

Pace Analytical
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Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-03 | **Client Sample Name:** Well 902, 5/14/2024 11:49:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**74**	**ug/L**	**50**	**23**	**EPA-200.7**	**ND**		**1**
Dissolved Arsenic	**11**	**ug/L**	**50**	**9.2**	**EPA-200.7**	**ND**	**J**	**1**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:33	SDA	ICP5	1	B190376	EPA 200.7 Dissolved

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Pace Analytical
ENVIRONMENTAL SCIENCES

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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-04 | **Client Sample Name:** Well 901, 5/14/2024 12:46:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**690**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**280**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**1100**	**mg/L**	**2.5**	**0.26**	**EPA-200.7**	**ND**	**A10**	**2**
Dissolved Potassium	**20**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**360**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**3**
Bromide	**5.6**	**mg/L**	**2.0**	**0.70**	**EPA-300.0**	**ND**	**A10**	**4**
Chloride	**1800**	**mg/L**	**5.0**	**1.3**	**EPA-300.0**	**ND**	**A10**	**4**
Nitrate as N	ND	mg/L	1.0	0.24	EPA-300.0	ND	A10	4
Sulfate	**2300**	**mg/L**	**10**	**1.4**	**EPA-300.0**	**1.6**	**A10**	**4**
Total Dissolved Solids @ 180 C	**6800**	**mg/L**	**500**	**250**	**SM-2540C**	**ND**	**A10**	**5**
Total Phosphate as P	**0.17**	**mg/L**	**0.050**	**0.018**	**EPA-365.4**	**ND**		**6**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:35	SDA	ICP5	1	B190376	200.7/ No Digest
2	EPA-200.7	05/28/24 10:18	07/10/24 09:38	JEH	ICP5	5	B190376	200.7/ No Digest
3	SM-2320B	05/22/24 08:00	05/22/24 10:04	ELR	MET-1	2	B189062	No Prep
4	EPA-300.0	05/15/24 20:00	05/16/24 01:12	RML	IC9	10	B189707	No Prep
5	SM-2540C	05/17/24 15:30	05/17/24 15:30	IJC	MANUAL	50	B189837	No Prep
6	EPA-365.4	05/16/24 10:45	05/21/24 14:01	EC1	SC-2	1	B189746	EPA 365.4

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
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Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-04 | **Client Sample Name:** Well 901, 5/14/2024 12:46:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**64**	**ug/L**	**50**	**23**	**EPA-200.7**	**ND**		**1**
Dissolved Arsenic	**20**	**ug/L**	**50**	**9.2**	**EPA-200.7**	**ND**	**J**	**1**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:35	SDA	ICP5	1	B190376	EPA 200.7 Dissolved

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-05 | **Client Sample Name:** Well 916, 5/15/2024 9:17:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**270**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**99**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**71**	**mg/L**	**0.50**	**0.051**	**EPA-200.7**	**ND**		**1**
Dissolved Potassium	**5.1**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**180**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**2**
Bromide	ND	mg/L	0.40	0.14	EPA-300.0	ND	A10	3
Chloride	**10**	**mg/L**	**1.0**	**0.26**	**EPA-300.0**	**0.31**	**A10**	**3**
Nitrate as N	**3.0**	**mg/L**	**0.20**	**0.048**	**EPA-300.0**	**ND**	**A10**	**3**
Sulfate	**970**	**mg/L**	**5.0**	**0.70**	**EPA-300.0**	**0.76**	**A10**	**4**
Total Dissolved Solids @ 180 C	**1700**	**mg/L**	**50**	**25**	**SM-2540C**	**ND**	**A10**	**5**
Total Phosphate as P	**0.79**	**mg/L**	**0.050**	**0.018**	**EPA-365.4**	**ND**		**6**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:37	SDA	ICP5	1	B190376	200.7/ No Digest
2	SM-2320B	05/22/24 08:00	05/22/24 10:10	ELR	MET-1	2	B189062	No Prep
3	EPA-300.0	05/16/24 22:00	05/17/24 01:32	RML	IC5	2	B189811	No Prep
4	EPA-300.0	05/17/24 13:40	05/17/24 22:42	RC1	IC12	5	B189979	No Prep
5	SM-2540C	05/21/24 15:15	05/21/24 15:15	IJC	MANUAL	5	B190023	No Prep
6	EPA-365.4	05/16/24 10:45	05/21/24 14:03	EC1	SC-2	1	B189746	EPA 365.4

DCN = Data Continuation Number

Pace Analytical
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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-05 | **Client Sample Name:** Well 916, 5/15/2024 9:17:00AM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**40**	**ug/L**	**50**	**23**	**EPA-200.7**	**ND**	**J**	**1**
Dissolved Arsenic	ND	ug/L	50	9.2	EPA-200.7	ND		1

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/28/24 10:18	05/28/24 14:37	SDA	ICP5	1	B190376	EPA 200.7 Dissolved

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2408111-06 | **Client Sample Name:** Well 915, 5/15/2024 12:19:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**37**	**mg/L**	**0.10**	**0.016**	**EPA-200.7**	**ND**		**1**
Dissolved Magnesium	**12**	**mg/L**	**0.050**	**0.019**	**EPA-200.7**	**ND**		**1**
Dissolved Sodium	**490**	**mg/L**	**0.50**	**0.051**	**EPA-200.7**	**0.059**		**1**
Dissolved Potassium	**8.8**	**mg/L**	**1.0**	**0.10**	**EPA-200.7**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**910**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**2**
Bromide	ND	mg/L	0.40	0.14	EPA-300.0	ND	A10	3
Chloride	**17**	**mg/L**	**1.0**	**0.26**	**EPA-300.0**	**0.31**	**A10**	**3**
Nitrate as N	**1.4**	**mg/L**	**0.20**	**0.048**	**EPA-300.0**	**ND**	**A10**	**3**
Sulfate	**940**	**mg/L**	**5.0**	**0.70**	**EPA-300.0**	**0.76**	**A10**	**4**
Total Dissolved Solids @ 180 C	**13000**	**mg/L**	**100**	**50**	**SM-2540C**	**ND**	**A10**	**5**
Total Phosphate as P	**11**	**mg/L**	**1.0**	**0.36**	**EPA-365.4**	**ND**	**A10**	**6**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/21/24 11:30	05/29/24 14:19	SDA	ICP5	1	B190051	200.7/ No Digest
2	SM-2320B	05/22/24 08:00	05/22/24 10:15	ELR	MET-1	2	B189062	No Prep
3	EPA-300.0	05/16/24 22:00	05/17/24 01:50	RML	IC5	2	B189811	No Prep
4	EPA-300.0	05/17/24 13:40	05/17/24 23:22	RC1	IC12	5	B189979	No Prep
5	SM-2540C	05/21/24 15:15	05/21/24 15:15	IJC	MANUAL	10	B190023	No Prep
6	EPA-365.4	05/16/24 10:45	05/21/24 14:32	EC1	SC-2	20	B189746	EPA 365.4

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Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2408111-06 | **Client Sample Name:** Well 915, 5/15/2024 12:19:00PM, BN

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**480**	**ug/L**	**50**	**23**	**EPA-200.7**	**ND**		**1**
Dissolved Arsenic	ND	ug/L	50	9.2	EPA-200.7	ND		1

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-200.7	05/21/24 11:30	05/29/24 14:19	SDA	ICP5	1	B190051	EPA 200.7 Dissolved

DCN = Data Continuation Number

Pace Analytical
ENVIRONMENTAL SCIENCES

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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals	Run #
QC Batch ID: B189062							
Bicarbonate Alkalinity as CaCO3	B189062-BLK1	ND	mg/L	4.1	4.1		1
QC Batch ID: B189707							
Bromide	B189707-BLK1	ND	mg/L	0.20	0.070		2
Chloride	B189707-BLK1	ND	mg/L	0.50	0.13		2
Nitrate as N	B189707-BLK1	ND	mg/L	0.10	0.024		2
Sulfate	**B189707-BLK1**	**0.15930**	**mg/L**	**1.0**	**0.14**	**J**	2
QC Batch ID: B189746							
Total Phosphate as P	B189746-BLK1	ND	mg/L	0.050	0.018		3
QC Batch ID: B189811							
Bromide	B189811-BLK1	ND	mg/L	0.20	0.070		4
Chloride	**B189811-BLK1**	**0.15500**	**mg/L**	**0.50**	**0.13**	**J**	4
Nitrate as N	B189811-BLK1	ND	mg/L	0.10	0.024		4
QC Batch ID: B189837							
Total Dissolved Solids @ 180 C	B189837-BLK1	ND	mg/L	6.7	3.3		5
QC Batch ID: B189979							
Sulfate	**B189979-BLK1**	**0.15250**	**mg/L**	**1.0**	**0.14**	**J**	6
QC Batch ID: B190023							
Total Dissolved Solids @ 180 C	B190023-BLK1	ND	mg/L	6.7	3.3		7
QC Batch ID: B190051							
Dissolved Calcium	B190051-BLK1	ND	mg/L	0.10	0.016		8
Dissolved Magnesium	B190051-BLK1	ND	mg/L	0.050	0.019		8
Dissolved Sodium	**B190051-BLK1**	**0.059300**	**mg/L**	**0.50**	**0.051**	**J**	8
Dissolved Potassium	B190051-BLK1	ND	mg/L	1.0	0.10		8
QC Batch ID: B190376							
Dissolved Calcium	B190376-BLK1	ND	mg/L	0.10	0.016		9
Dissolved Magnesium	B190376-BLK1	ND	mg/L	0.050	0.019		9
Dissolved Sodium	B190376-BLK1	ND	mg/L	0.50	0.051		9
Dissolved Potassium	B190376-BLK1	ND	mg/L	1.0	0.10		9

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Water Analysis (General Chemistry)

Quality Control Report - Method Blank Analysis

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B189062-BLK1	PB	SM-2320B	05/22/24	05/22/24 09:11	ELR	MET-1	1
2	B189707-BLK1	PB	EPA-300.0	05/15/24	05/15/24 22:58	RML	IC9	1
3	B189746-BLK1	PB	EPA-365.4	05/16/24	05/21/24 13:57	EC1	SC-2	1
4	B189811-BLK1	PB	EPA-300.0	05/16/24	05/17/24 10:12	RML	IC5	1
5	B189837-BLK1	PB	SM-2540C	05/17/24	05/17/24 15:30	IJC	MANUAL	0.667
6	B189979-BLK1	PB	EPA-300.0	05/20/24	05/20/24 13:58	RML	IC9	1
7	B190023-BLK1	PB	SM-2540C	05/21/24	05/21/24 15:15	IJC	MANUAL	0.667
8	B190051-BLK1	PB	EPA-200.7	05/21/24	05/29/24 14:06	SDA	ICP5	1
9	B190376-BLK1	PB	EPA-200.7	05/28/24	05/28/24 14:13	SDA	ICP5	1

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Water Analysis (General Chemistry)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals	Run #
QC Batch ID: B189707											
Bromide	B189707-BS1	LCS	1.9339	2.0000	mg/L	96.7		90 - 110			1
Chloride	B189707-BS1	LCS	49.200	50.000	mg/L	98.4		90 - 110			1
Nitrate as N	B189707-BS1	LCS	4.8782	5.0000	mg/L	97.6		90 - 110			1
Sulfate	B189707-BS1	LCS	98.618	100.00	mg/L	98.6		90 - 110			1
QC Batch ID: B189746											
Total Phosphate as P	B189746-BS1	LCS	1.0043	1.0000	mg/L	100		85 - 115			2
QC Batch ID: B189811											
Bromide	B189811-BS1	LCS	1.8120	2.0000	mg/L	90.6		90 - 110			3
Chloride	B189811-BS1	LCS	50.387	50.000	mg/L	101		90 - 110			3
Nitrate as N	B189811-BS1	LCS	5.0080	5.0000	mg/L	100		90 - 110			3
QC Batch ID: B189837											
Total Dissolved Solids @ 180 C	B189837-BS1	LCS	610.00	586.00	mg/L	104		90 - 110			4
QC Batch ID: B189979											
Sulfate	B189979-BS1	LCS	100.70	100.00	mg/L	101		90 - 110			5
	B189979-BSD1	LCSD	100.69	100.00	mg/L	101	0.0	90 - 110	10		6
QC Batch ID: B190023											
Total Dissolved Solids @ 180 C	B190023-BS1	LCS	565.00	586.00	mg/L	96.4		90 - 110			7
	B190023-BSD1	LCSD	580.00	586.00	mg/L	99.0	2.6	90 - 110	200		8
QC Batch ID: B190051											
Dissolved Calcium	B190051-BS1	LCS	10.593	10.000	mg/L	106		85 - 115			9
Dissolved Magnesium	B190051-BS1	LCS	10.514	10.000	mg/L	105		85 - 115			9
Dissolved Sodium	B190051-BS1	LCS	9.9720	10.000	mg/L	99.7		85 - 115			9
Dissolved Potassium	B190051-BS1	LCS	10.126	10.000	mg/L	101		85 - 115			9
QC Batch ID: B190376											
Dissolved Calcium	B190376-BS1	LCS	11.119	10.000	mg/L	111		85 - 115			10
Dissolved Magnesium	B190376-BS1	LCS	10.806	10.000	mg/L	108		85 - 115			10
Dissolved Sodium	B190376-BS1	LCS	10.019	10.000	mg/L	100		85 - 115			10
Dissolved Potassium	B190376-BS1	LCS	10.065	10.000	mg/L	101		85 - 115			10

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Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Laboratory Control Sample

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B189707-BS1	LCS	EPA-300.0	05/15/24	05/15/24 23:12	RML	IC9	1
2	B189746-BS1	LCS	EPA-365.4	05/16/24	05/21/24 13:56	EC1	SC-2	1
3	B189811-BS1	LCS	EPA-300.0	05/16/24	05/17/24 05:43	RML	IC5	1
4	B189837-BS1	LCS	SM-2540C	05/17/24	05/17/24 15:30	IJC	MANUAL	5
5	B189979-BS1	LCS	EPA-300.0	05/20/24	05/20/24 14:11	RML	IC9	1
6	B189979-BSD1	LCSD	EPA-300.0	05/20/24	05/20/24 14:25	RML	IC9	1
7	B190023-BS1	LCS	SM-2540C	05/21/24	05/21/24 15:15	IJC	MANUAL	5
8	B190023-BSD1	LCSD	SM-2540C	05/21/24	05/21/24 15:15	IJC	MANUAL	5
9	B190051-BS1	LCS	EPA-200.7	05/21/24	05/29/24 14:08	SDA	ICP5	1
10	B190376-BS1	LCS	EPA-200.7	05/28/24	05/28/24 14:15	SDA	ICP5	1

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals	R#
QC Batch ID: B189062	Used client sample: N											
Bicarbonate Alkalinity as CaCO3	DUP	2408100-13	199.37	201.63		mg/L	1.1		10			1
QC Batch ID: B189707	Used client sample: N											
Bromide	DUP	2408093-04	0.10730	0.10930		mg/L	1.8		10		J	2
	MS	2408093-04	0.10730	1.9903	2.0202	mg/L		93.2		80 - 120		3
	MSD	2408093-04	0.10730	1.9934	2.0202	mg/L	0.2	93.4	10	80 - 120		4
Chloride	DUP	2408093-04	17.425	17.457		mg/L	0.2		10			2
	MS	2408093-04	17.425	71.342	50.505	mg/L		107		80 - 120		3
	MSD	2408093-04	17.425	71.378	50.505	mg/L	0.1	107	10	80 - 120		4
Nitrate as N	DUP	2408093-04	7.3869	7.4068		mg/L	0.3		10			2
	MS	2408093-04	7.3869	12.438	5.0505	mg/L		100		80 - 120		3
	MSD	2408093-04	7.3869	12.449	5.0505	mg/L	0.1	100	10	80 - 120		4
Sulfate	DUP	2408093-04	21.275	21.306		mg/L	0.1		10			2
	MS	2408093-04	21.275	129.57	101.01	mg/L		107		80 - 120		3
	MSD	2408093-04	21.275	129.64	101.01	mg/L	0.1	107	10	80 - 120		4
QC Batch ID: B189746	Used client sample: N											
Total Phosphate as P	DUP	2408037-01	0.58900	0.63200		mg/L	7.0		20			5
	MS	2408037-01	0.58900	1.6312	1.0000	mg/L		104		80 - 120		6
	MSD	2408037-01	0.58900	1.6337	1.0000	mg/L	0.2	104	20	80 - 120		7
QC Batch ID: B189811	Used client sample: N											
Bromide	DUP	2408203-01	3.4040	3.3580		mg/L	1.4		10			8
	MS	2408203-01	3.4040	7.3434	4.0404	mg/L		97.5		80 - 120		9
	MSD	2408203-01	3.4040	7.3556	4.0404	mg/L	0.2	97.8	10	80 - 120		10
Chloride	DUP	2408203-01	247.96	251.71		mg/L	1.5		10			8
	MS	2408203-01	247.96	347.74	101.01	mg/L		98.8		80 - 120		9
	MSD	2408203-01	247.96	347.09	101.01	mg/L	0.2	98.1	10	80 - 120		10
Nitrate as N	DUP	**2408203-01**	**5.6260**	**6.5780**		**mg/L**	**15.6**		**10**		**Q01**	8
	MS	**2408203-01**	**5.6260**	**16.788**	**10.101**	**mg/L**		**111**		**80 - 120**		9
	MSD	**2408203-01**	**5.6260**	**16.780**	**10.101**	**mg/L**	**0.0**	**110**	**10**	**80 - 120**		10
QC Batch ID: B189837	Used client sample: Y - Description: Well 904, 05/13/2024 15:19											
Total Dissolved Solids @ 180 C	DUP	2408111-01	1535.0	1535.0		mg/L	0		10			11
QC Batch ID: B189979	Used client sample: N											
Sulfate	DUP	2408183-02	3.4677	3.4678		mg/L	0.0		10			12
	MS	2408183-02	3.4677	107.18	101.01	mg/L		103		80 - 120		13
	MSD	2408183-02	3.4677	107.17	101.01	mg/L	0.0	103	10	80 - 120		14
QC Batch ID: B190023	Used client sample: N											
Total Dissolved Solids @ 180 C	DUP	2408294-11	1550.0	1535.0		mg/L	1.0		10			15

Pace Analytical
ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals	R#
QC Batch ID: B190051	Used client sample: N											
Dissolved Calcium	DUP	2408332-02	149.56	149.42		mg/L	0.1		20			16
	MS	2408332-02	149.56	159.04	10.204	mg/L		92.9		85 - 115		17
	MSD	2408332-02	149.56	158.70	10.204	mg/L	0.2	89.6	20	85 - 115		18
Dissolved Magnesium	DUP	2408332-02	43.294	43.492		mg/L	0.5		20			16
	MS	2408332-02	43.294	54.634	10.204	mg/L		111		85 - 115		17
	MSD	2408332-02	43.294	54.631	10.204	mg/L	0.0	111	20	85 - 115		18
Dissolved Sodium	DUP	2408332-02	152.36	153.49		mg/L	0.7		20			16
	MS	2408332-02	152.36	163.89	10.204	mg/L		113		85 - 115		17
	MSD	2408332-02	152.36	163.60	10.204	mg/L	0.2	110	20	85 - 115		18
Dissolved Potassium	DUP	2408332-02	7.2415	7.2379		mg/L	0.0		20			16
	MS	2408332-02	7.2415	17.846	10.204	mg/L		104		85 - 115		17
	MSD	2408332-02	7.2415	17.880	10.204	mg/L	0.2	104	20	85 - 115		18
QC Batch ID: B190376	Used client sample: Y - Description: NF-20, 05/14/2024 09:23											
Dissolved Calcium	DUP	2408111-02	97.207	97.054		mg/L	0.2		20			19
	MS	2408111-02	97.207	108.64	10.204	mg/L		112		85 - 115		20
	MSD	2408111-02	97.207	108.09	10.204	mg/L	0.5	107	20	85 - 115		21
Dissolved Magnesium	DUP	2408111-02	36.634	36.913		mg/L	0.8		20			19
	MS	2408111-02	36.634	47.807	10.204	mg/L		109		85 - 115		20
	MSD	2408111-02	36.634	47.358	10.204	mg/L	0.9	105	20	85 - 115		21
Dissolved Sodium	DUP	**2408111-02**	**158.70**	**159.36**		**mg/L**	**0.4**		**20**			19
	MS	**2408111-02**	**158.70**	**168.02**	**10.204**	**mg/L**		**91.4**		**85 - 115**		20
	MSD	**2408111-02**	**158.70**	**166.99**	**10.204**	**mg/L**	**0.6**	**81.3**	**20**	**85 - 115**	**A03**	21
Dissolved Potassium	DUP	2408111-02	2.2012	2.1847		mg/L	0.8		20			19
	MS	2408111-02	2.2012	12.744	10.204	mg/L		103		85 - 115		20
	MSD	2408111-02	2.2012	12.717	10.204	mg/L	0.2	103	20	85 - 115		21

Woodard & Curran-Walnut Creek
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Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B189062-DUP1	DUP	SM-2320B	05/22/24	05/22/24 09:23	ELR	MET-1	1
2	B189707-DUP1	DUP	EPA-300.0	05/15/24	05/15/24 23:52	RML	IC9	1
3	B189707-MS1	MS	EPA-300.0	05/15/24	05/16/24 00:05	RML	IC9	1.010
4	B189707-MSD1	MSD	EPA-300.0	05/15/24	05/16/24 00:19	RML	IC9	1.010
5	B189746-DUP1	DUP	EPA-365.4	05/16/24	05/22/24 10:16	EC1	SC-2	1
6	B189746-MS1	MS	EPA-365.4	05/16/24	05/21/24 13:58	EC1	SC-2	1
7	B189746-MSD1	MSD	EPA-365.4	05/16/24	05/21/24 13:59	EC1	SC-2	1
8	B189811-DUP1	DUP	EPA-300.0	05/16/24	05/17/24 06:37	RML	IC5	2
9	B189811-MS1	MS	EPA-300.0	05/16/24	05/17/24 06:55	RML	IC5	2.020
10	B189811-MSD1	MSD	EPA-300.0	05/16/24	05/17/24 07:13	RML	IC5	2.020
11	B189837-DUP1	DUP	SM-2540C	05/17/24	05/17/24 15:30	IJC	MANUAL	5
12	B189979-DUP1	DUP	EPA-300.0	05/20/24	05/20/24 14:38	RML	IC9	1
13	B189979-MS1	MS	EPA-300.0	05/20/24	05/20/24 15:18	RML	IC9	1.010
14	B189979-MSD1	MSD	EPA-300.0	05/20/24	05/20/24 15:32	EEC	IC9	1.010
15	B190023-DUP1	DUP	SM-2540C	05/21/24	05/21/24 15:15	IJC	MANUAL	5
16	B190051-DUP1	DUP	EPA-200.7	05/21/24	05/29/24 14:12	SDA	ICP5	1
17	B190051-MS1	MS	EPA-200.7	05/21/24	05/29/24 14:15	SDA	ICP5	1.020
18	B190051-MSD1	MSD	EPA-200.7	05/21/24	05/29/24 14:17	SDA	ICP5	1.020
19	B190376-DUP1	DUP	EPA-200.7	05/28/24	05/28/24 14:19	SDA	ICP5	1
20	B190376-MS1	MS	EPA-200.7	05/28/24	05/28/24 14:23	SDA	ICP5	1.020
21	B190376-MSD1	MSD	EPA-200.7	05/28/24	05/28/24 14:25	SDA	ICP5	1.020

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals	Run #
QC Batch ID: B190051							
Dissolved Aluminum	B190051-BLK1	ND	ug/L	50	23		1
Dissolved Arsenic	B190051-BLK1	ND	ug/L	50	9.2		1
QC Batch ID: B190376							
Dissolved Aluminum	B190376-BLK1	ND	ug/L	50	23		2
Dissolved Arsenic	B190376-BLK1	ND	ug/L	50	9.2		2

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B190051-BLK1	PB	EPA-200.7	05/21/24	05/29/24 14:06	SDA	ICP5	1
2	B190376-BLK1	PB	EPA-200.7	05/28/24	05/28/24 14:13	SDA	ICP5	1

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Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals	Run #
QC Batch ID: B190051											
Dissolved Aluminum	B190051-BS1	LCS	1019.5	1000.0	ug/L	102		85 - 115			1
Dissolved Arsenic	B190051-BS1	LCS	197.90	200.00	ug/L	99.0		85 - 115			1
QC Batch ID: B190376											
Dissolved Aluminum	B190376-BS1	LCS	1026.5	1000.0	ug/L	103		85 - 115			2
Dissolved Arsenic	B190376-BS1	LCS	201.40	200.00	ug/L	101		85 - 115			2

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B190051-BS1	LCS	EPA-200.7	05/21/24	05/29/24 14:08	SDA	ICP5	1
2	B190376-BS1	LCS	EPA-200.7	05/28/24	05/28/24 14:15	SDA	ICP5	1

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Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals	R#
QC Batch ID: B190051	Used client sample: N											
Dissolved Aluminum	DUP	2408332-02	73.300	73.000		ug/L	0.4		20			1
	MS	2408332-02	73.300	1143.5	1020.4	ug/L		105		85 - 115		2
	MSD	2408332-02	73.300	1140.1	1020.4	ug/L	0.3	105	20	85 - 115		3
Dissolved Arsenic	DUP	2408332-02	ND	ND		ug/L			20			1
	MS	2408332-02	ND	218.78	204.08	ug/L		107		85 - 115		2
	MSD	2408332-02	ND	220.92	204.08	ug/L	1.0	108	20	85 - 115		3
QC Batch ID: B190376	Used client sample: Y - Description: NF-20, 05/14/2024 09:23											
Dissolved Aluminum	DUP	2408111-02	ND	ND		ug/L			20			4
	MS	2408111-02	ND	1091.5	1020.4	ug/L		107		85 - 115		5
	MSD	2408111-02	ND	1091.1	1020.4	ug/L	0.0	107	20	85 - 115		6
Dissolved Arsenic	DUP	2408111-02	ND	ND		ug/L			20			4
	MS	2408111-02	ND	222.45	204.08	ug/L		109		85 - 115		5
	MSD	2408111-02	ND	220.51	204.08	ug/L	0.9	108	20	85 - 115		6

Run #	QC Sample ID	QC Type	Method	Prep Date	Run Date Time	Analyst	Instrument	Dilution
1	B190051-DUP1	DUP	EPA-200.7	05/21/24	05/29/24 14:12	SDA	ICP5	1
2	B190051-MS1	MS	EPA-200.7	05/21/24	05/29/24 14:15	SDA	ICP5	1.020
3	B190051-MSD1	MSD	EPA-200.7	05/21/24	05/29/24 14:17	SDA	ICP5	1.020
4	B190376-DUP1	DUP	EPA-200.7	05/28/24	05/28/24 14:19	SDA	ICP5	1
5	B190376-MS1	MS	EPA-200.7	05/28/24	05/28/24 14:23	SDA	ICP5	1.020
6	B190376-MSD1	MSD	EPA-200.7	05/28/24	05/28/24 14:25	SDA	ICP5	1.020

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 07/11/2024 21:14
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01
Project Manager: Jim Strandberg

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected
PQL	Practical Quantitation Limit
A03	The sample concentration was more than 4 times the spike level.
A10	Detection and quantitation limits were raised due to matrix interference.
A26	Sample received past holding time.
Q01	Sample precision is not within the control limits.
S05	The sample holding time was exceeded.

Date of Report: 09/17/2024

Jim Strandberg

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Client Project:	0011078.01.056
Pace Project:	Cuyama Basin GSP 0011078.01
Pace Work Order:	2414379
Invoice ID:	B503987

Enclosed are the results of analyses for samples received by the laboratory on 9/6/2024. If you have any questions concerning this report, please feel free to contact me.

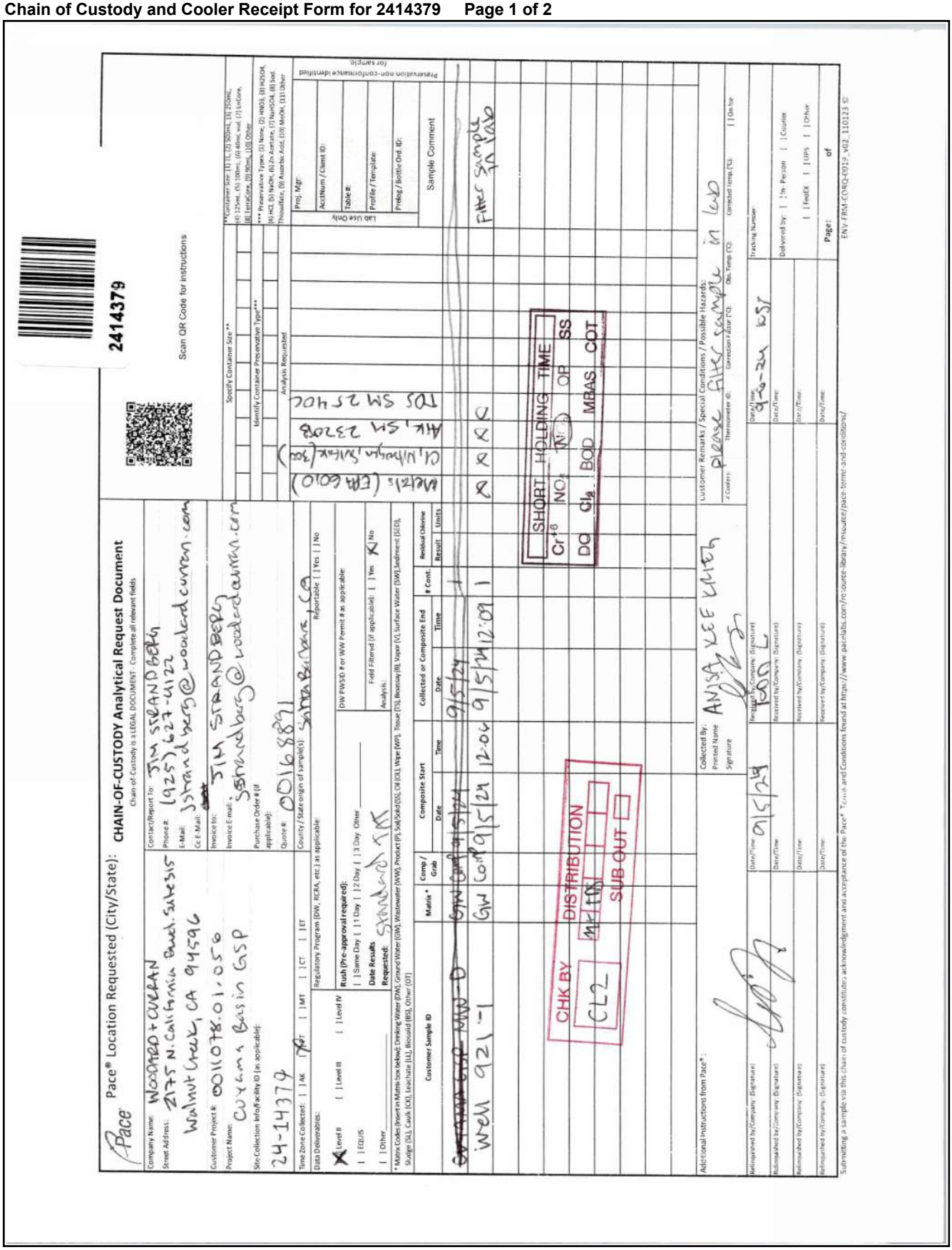
Sincerely,

Contact Person: Brianna Schutte
Client Services Rep

Stuart Buttram
Operations Manager

Table of Contents

Chain of Custody and Cooler Receipt Form for 2414379 Page 1 of 2



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ENVIRONMENTAL SCIENCES

Chain of Custody and Cooler Receipt Form for 2414379 Page 2 of 2

PACE ANALYTICAL — **COOLER RECEIPT FORM** — Page 1 Of 1

Submission #: 24-14379

SHIPPING INFORMATION
Fed Ex ☑ UPS ☐ GSO / GLS ☐ Hand Delivery ☐
Pace Lab Field Service ☐ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☑ None ☐ Box ☐
Other ☐ (Specify)_____

FREE LIQUID
YES ☑ NO ☐
W / S

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals Ice Chest ☐ Intact? Yes ☐ No ☐ Containers ☐ Intact? Yes ☐ No ☐ None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.95 Container: N/A Thermometer ID: 356

Temperature: (A) 2.5 °C / (C) 2.5 °C

Date/Time 9-6-24

Analyst Init EJC 1055

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT PE UNPRES	A									
4oz / 8oz / 16oz PE UNPRES										
2oz Cr+6										
QT INORGANIC CHEMICAL METALS										
INORGANIC CHEMICAL METALS 4oz / 8oz / 16oz										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 1664B										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608.3/8081A										
QT EPA 515.1/8151A										
QT EPA 525.2										
QT EPA 525.2 TRAVEL BLANK										
40ml EPA 547										
40ml EPA 531.1										
8oz EPA 548.1										
QT EPA 549.2										
QT EPA 8015M										
QT EPA 8270C										
8oz / 16oz / 32oz AMBER										
8oz / 16oz / 32oz JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
TEDLAR BAG										
FERROUS IRON										
ENCORE										
SMART KIT										
SUMMA CANISTER										

Comments: (Did not receive metals bottle.)
Sample Numbering Completed By: ADP C Date/Time: 9-6-24 1150
A = Actual / C = Corrected

Rev 23 05/20/22
[S:\WPDocs\WordPerfect\LAB_DOCS\FORMS\SAMREC rev 20]

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Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
2414379-01	**COC Number:**	---	**Receive Date:**	09/06/2024 10:55
	Project Number:	---	**Sampling Date:**	09/05/2024 12:06
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Well 921	**Lab Matrix:**	Water
	Sampled By:	Anisa Kee Krieg	**Sample Type:**	Groundwater

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Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Pace Sample ID: 2414379-01 | **Client Sample Name:** Well 921, 9/5/2024 12:06:00PM, Anisa Kee Krieg

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Calcium	**260000**	**ug/L**	**100**	**16**	**EPA-6010B**	**ND**		**1**
Dissolved Magnesium	**93000**	**ug/L**	**50**	**22**	**EPA-6010B**	**ND**		**1**
Dissolved Sodium	**130000**	**ug/L**	**1000**	**51**	**EPA-6010B**	**ND**		**1**
Dissolved Potassium	**7600**	**ug/L**	**1000**	**100**	**EPA-6010B**	**ND**		**1**
Bicarbonate Alkalinity as CaCO3	**170**	**mg/L**	**8.2**	**8.2**	**SM-2320B**	**ND**	**A10**	**2**
Chloride	**22**	**mg/L**	**1.0**	**0.26**	**EPA-300.0**	**0.37**	**A10**	**3**
Nitrate as N	**14**	**mg/L**	**0.20**	**0.048**	**EPA-300.0**	**0.051**	**A10**	**3**
Sulfate	**990**	**mg/L**	**5.0**	**0.70**	**EPA-300.0**	**0.99**	**A10**	**4**
Total Dissolved Solids @ 180 C	**1800**	**mg/L**	**50**	**25**	**SM-2540C**	**ND**	**A10**	**5**

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-6010B	09/12/24 07:44	09/12/24 10:22	JEH	ICP5	1	B196748	6010B/No Digestion
2	SM-2320B	09/10/24 08:30	09/10/24 12:52	ELR	MET-1	2	B195172	No Prep
3	EPA-300.0	09/07/24 00:00	09/07/24 05:12	RC1	IC12	2	B196486	No Prep
4	EPA-300.0	09/07/24 00:00	09/07/24 09:51	RC1	IC12	5	B196486	No Prep
5	SM-2540C	09/10/24 15:00	09/10/24 15:00	IJC	MANUAL	5	B196601	No Prep

DCN = Data Continuation Number

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ENVIRONMENTAL SCIENCES

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
Walnut Creek, CA 94596

Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Metals Analysis

Pace Sample ID: 2414379-01 | **Client Sample Name:** Well 921, 9/5/2024 12:06:00PM, Anisa Kee Krieg

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	DCN
Dissolved Aluminum	**28**	**ug/L**	**50**	**23**	**EPA-6010B**	**ND**	**J**	**1**
Dissolved Arsenic	ND	ug/L	50	9.2	EPA-6010B	ND		1

DCN	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID	Prep Method
1	EPA-6010B	09/12/24 07:44	09/12/24 10:22	JEH	ICP5	1	B196748	EPA 3005A

DCN = Data Continuation Number

Woodard & Curran-Walnut Creek
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Walnut Creek, CA 94596

Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B195172						
Bicarbonate Alkalinity as CaCO3	B195172-BLK1	ND	mg/L	4.1	4.1	
QC Batch ID: B196486						
Chloride	**B196486-BLK1**	**0.18640**	**mg/L**	**0.50**	**0.13**	**J**
Nitrate as N	**B196486-BLK1**	**0.025400**	**mg/L**	**0.10**	**0.024**	**J**
Sulfate	**B196486-BLK1**	**0.19880**	**mg/L**	**1.0**	**0.14**	**J**
QC Batch ID: B196601						
Total Dissolved Solids @ 180 C	B196601-BLK1	ND	mg/L	6.7	3.3	
QC Batch ID: B196748						
Dissolved Calcium	B196748-BLK1	ND	ug/L	100	16	
Dissolved Magnesium	B196748-BLK1	ND	ug/L	50	22	
Dissolved Sodium	B196748-BLK1	ND	ug/L	1000	51	
Dissolved Potassium	B196748-BLK1	ND	ug/L	1000	100	

Woodard & Curran-Walnut Creek
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Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B196486										
Chloride	B196486-BS1	LCS	49.698	50.000	mg/L	99.4		90 - 110		
Nitrate as N	B196486-BS1	LCS	4.7949	5.0000	mg/L	95.9		90 - 110		
Sulfate	B196486-BS1	LCS	98.542	100.00	mg/L	98.5		90 - 110		
QC Batch ID: B196601										
Total Dissolved Solids @ 180 C	B196601-BS1	LCS	605.00	586.00	mg/L	103		90 - 110		
QC Batch ID: B196748										
Dissolved Calcium	B196748-BS1	LCS	10249	10000	ug/L	102		80 - 120		
Dissolved Magnesium	B196748-BS1	LCS	10270	10000	ug/L	103		80 - 120		
Dissolved Sodium	B196748-BS1	LCS	9995.9	10000	ug/L	100		80 - 120		
Dissolved Potassium	B196748-BS1	LCS	10125	10000	ug/L	101		80 - 120		

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Project Manager: Jim Strandberg

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: B195172	Used client sample: Y - Description: Well 921, 09/05/2024 12:06										
Bicarbonate Alkalinity as CaCO3	DUP	2414379-01	172.52	175.56		mg/L	1.7		10		
QC Batch ID: B196486	Used client sample: N										
Chloride	DUP	2414367-03	1.2716	1.3349		mg/L	4.9		10		
	MS	2414367-03	1.2716	55.589	50.505	mg/L		108		80 - 120	
	MSD	2414367-03	1.2716	53.151	50.505	mg/L	4.5	103	10	80 - 120	
Nitrate as N	DUP	2414367-03	ND	0.030600		mg/L			10		J
	MS	2414367-03	ND	5.1710	5.0505	mg/L		102		80 - 120	
	MSD	2414367-03	ND	4.9841	5.0505	mg/L	3.7	98.7	10	80 - 120	
Sulfate	DUP	2414367-03	3.1131	3.1434		mg/L	1.0		10		
	MS	2414367-03	3.1131	107.68	101.01	mg/L		104		80 - 120	
	MSD	2414367-03	3.1131	106.61	101.01	mg/L	1.0	102	10	80 - 120	
QC Batch ID: B196601	Used client sample: N										
Total Dissolved Solids @ 180 C	DUP	2414312-12	649.99	643.33		mg/L	1.0		10		
QC Batch ID: B196748	Used client sample: N										
Dissolved Calcium	DUP	2414511-01	31940	30684		ug/L	4.0		20		
	MS	2414511-01	31940	41607	10204	ug/L		94.7		75 - 125	
	MSD	2414511-01	31940	43893	10204	ug/L	5.3	117	20	75 - 125	
Dissolved Magnesium	DUP	2414511-01	3039.1	3056.0		ug/L	0.6		20		
	MS	2414511-01	3039.1	13827	10204	ug/L		106		75 - 125	
	MSD	2414511-01	3039.1	13750	10204	ug/L	0.6	105	20	75 - 125	
Dissolved Sodium	DUP	2414511-01	265300	265010		ug/L	0.1		20		
	MS	2414511-01	265300	275220	10204	ug/L		97.3		75 - 125	
	MSD	2414511-01	265300	274760	10204	ug/L	0.2	92.7	20	75 - 125	
Dissolved Potassium	DUP	2414511-01	3347.5	3444.6		ug/L	2.9		20		
	MS	2414511-01	3347.5	14145	10204	ug/L		106		75 - 125	
	MSD	2414511-01	3347.5	13880	10204	ug/L	1.9	103	20	75 - 125	

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Woodard & Curran-Walnut Creek
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Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B196748						
Dissolved Aluminum	B196748-BLK1	ND	ug/L	50	23	
Dissolved Arsenic	B196748-BLK1	ND	ug/L	50	9.2	

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Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B196748										
Dissolved Aluminum	B196748-BS1	LCS	1010.1	1000.0	ug/L	101		80 - 120		
Dissolved Arsenic	B196748-BS1	LCS	201.00	200.00	ug/L	100		80 - 120		

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Woodard & Curran-Walnut Creek
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Reported: 09/17/2024 18:31
Project: Cuyama Basin GSP 0011078.01
Project Number: 0011078.01.056
Project Manager: Jim Strandberg

Metals Analysis

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: B196748	Used client sample: N										
Dissolved Aluminum	DUP	2414511-01	ND	ND		ug/L			20		
	MS	2414511-01	ND	1074.9	1020.4	ug/L		105		75 - 125	
	MSD	2414511-01	ND	1072.2	1020.4	ug/L	0.2	105	20	75 - 125	
Dissolved Arsenic	DUP	2414511-01	ND	ND		ug/L			20		
	MS	2414511-01	ND	223.16	204.08	ug/L		109		75 - 125	
	MSD	2414511-01	ND	219.49	204.08	ug/L	1.7	108	20	75 - 125	

Woodard & Curran-Walnut Creek
2175 N. California Boulevard Suite 315
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Reported:	09/17/2024 18:31
Project:	Cuyama Basin GSP 0011078.01
Project Number:	0011078.01.056
Project Manager:	Jim Strandberg

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected
PQL	Practical Quantitation Limit
A10	Detection and quantitation limits were raised due to matrix interference.

ISOTECH
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Lab #: 922300 **Job #:** 58636

Sample Name: WELL 904

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/13/2024 15:19 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-69.6‰ relative to VSMOW
$\delta^{18}O$ of water	-9.68‰ relative to VSMOW
Tritium content of water	<1.16 TU
$\delta^{13}C$ of DIC	-9.7‰ relative to VPDB
^{14}C content of DIC	66.8 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

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Lab #: 922301 **Job #:** 58636

Sample Name: CH2

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/13/2024 13:42 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-65.5‰ relative to VSMOW
$\delta^{18}O$ of water	-9.27‰ relative to VSMOW
Tritium content of water	1.18 ± 0.27 TU
$\delta^{13}C$ of DIC	-9.9‰ relative to VPDB
^{14}C content of DIC	76.2 ± 0.3 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Not Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

ISOTECH
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Lab #: 922302 **Job #:** 58636

Sample Name: Well 902

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/14/2024 11:49 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-64.0‰ relative to VSMOW
$\delta^{18}O$ of water	-8.05‰ relative to VSMOW
Tritium content of water	<1.17 TU
$\delta^{13}C$ of DIC	-18.8‰ relative to VPDB
^{14}C content of DIC	43.1 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

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Lab #: 922303 **Job #:** 58636

Sample Name: Well 916

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/15/2024 09:17 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-69.2‰ relative to VSMOW
$\delta^{18}O$ of water	-9.68‰ relative to VSMOW
Tritium content of water	1.26 ± 0.24 TU
$\delta^{13}C$ of DIC	-12.3‰ relative to VPDB
^{14}C content of DIC	81.6 ± 0.3 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

ISOTECH
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Lab #: 922304 **Job #:** 58636

Sample Name: Well 901

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/14/2024 12:46 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-66.4‰ relative to VSMOW
$\delta^{18}O$ of water	-8.74‰ relative to VSMOW
Tritium content of water	<1.18 TU
$\delta^{13}C$ of DIC	-16.4‰ relative to VPDB
^{14}C content of DIC	61.2 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

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Lab #: 922305 **Job #:** 58636

Sample Name: Well 915

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/15/2024 12:19 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-71.0‰ relative to VSMOW
$\delta^{18}O$ of water	-9.85‰ relative to VSMOW
Tritium content of water	1.13 ± 0.28 TU
$\delta^{13}C$ of DIC	na
^{14}C content of DIC	28.5 ± 0.1 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Sample can't be filtered, unable to run DIC.
Not Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

ISOTECH
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Lab #: 922306 **Job #:** 58636

Sample Name: NF-20

Company: Woodard & Curran

Container: Plastic Bottle

Field/Site Name: Cuyama Basin GSP Implementation

Location: Cuyama, CA

Date Sampled: 05/14/2024 09:23 **Date Received:** 05/16/2024 **Date Reported:** 07/26/2024

δD of water	-56.7‰ relative to VSMOW
$\delta^{18}O$ of water	-7.93‰ relative to VSMOW
Tritium content of water	0.80 ± 0.22 TU
$\delta^{13}C$ of DIC	-11.6‰ relative to VPDB
^{14}C content of DIC	68.9 ± 0.3 percent modern carbon
$\delta^{15}N$ of nitrate	na
$\delta^{18}O$ of nitrate	na
δ^{34} of sulfate	na
$\delta^{18}O$ of sulfate	na
Vacuum Distilled? *	Yes

Remarks:
Field-Filtered

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water
Counting TU values are calculated for date of sample collection, as provided by the submitter. If no such date is provided, the sample arrival date at our laboratory is used.

AR Bennett
WE HELP GROWERS FEED THE WORLD

Submitted By: Shaen Charest
Grower: Kern Ridge Growers
Sample Desc: Well Water (CH2)

Water Source: Well
Date Sampled: 4/25/24
Date Submitted: 4/26/24
Sample ID#: 042603

Products Recommended

- ☐ HYE-CLEAN Line Scale-Away
- ☐ HYE-CLEAN Out
- ☐ HYE-CLEAN Iron Out
- ☐ Aqua Flow
- ☐ HYE-CLEAN Slime-Away

Bacteria & Fungi	CFU/mL	Target Limits
Bacteria, cfu/mL	100	<100
Fungus, cfu/mL	<10	<10

Coliform	Presence/Absence
Coliform	
E. Coli	

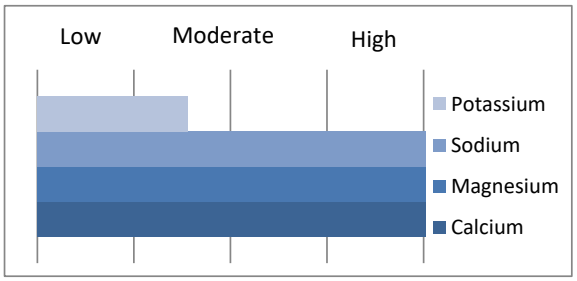
Cations	mg/L	meq/L	Lbs/Ac/Ft	Target Limits
Calcium	234.0	11.68	636.5	41 - 80
Magnesium	94.4	7.77	256.7	9 - 16
Sodium	78.7	3.42	214.1	30 - 35
Potassium	4.1	0.11	11.3	4.6 - 6
Iron	<0.1			<0.20
Manganese	<0.1			<0.10

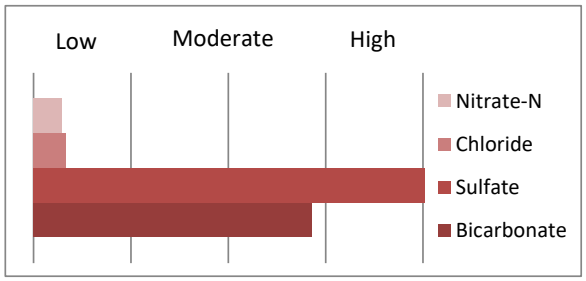
Anions	mg/L	meq/L	Lbs/Ac/Ft	Target Limits
Hydroxide	<0.1			Varies on pH
Carbonate	<0.1			3.0 - 4.0
Bicarbonate	214.5	3.52	583.4	120 - 180
Sulfate	1072.3	22.33	2916.8	25 - 50
Chloride	17.6	0.50	47.8	70 - 140
Nitrate-N	0.7	0.05	2.0	3 - 7
Boron	0.2		0.6	0.3 - 0.6

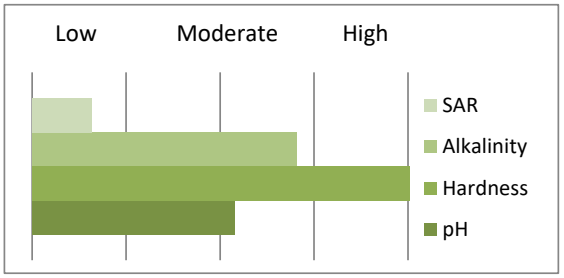
Other		Lbs/Ac/Ft	Target Limits
Total Dissolved Solids, mg/L	1610	4379.2	<450
Electrical Conductivity, dS/m	1.985		<0.450
pH	7.72		6.8 - 7.5
Hardness, mg/L as CaCO3	973	2646.6	60 - 120
Alkalinity, mg/L as CaCO3	176	478.6	100 - 150
Langelier Saturation Index	0.8		-0.2
Sodium Adsorption Ratio, adj.	1.0		2 - 4

Bacteria

Fungi







Note: Brandt is not a certified lab.These results are generated using modern and standard methods for informational purposes and product recommendations

August 28, 2020

Cleath-Harris Geologists
Attn: Spencer Harris
75 Zaca Lane
Suite 110
San Luis Obispo, CA 93401

Lab ID : CC 2082747
Customer : 8-514

Laboratory Report

Introduction: This report package contains total of 9 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(3 pages)	: Results for each sample submitted.
Quality Control	(4 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
NF-20	08/19/2020	08/19/2020	CC 2082747-001	GW

Sampling and Receipt Information: All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples arrived on ice. All samples were prepared and analyzed within the method specified hold time. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Inorganic - Metals QC

200.7	08/20/2020:213279 All analysis quality controls are within established criteria
	08/20/2020:209731 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)

Inorganic - Wet Chemistry QC

2120B	08/20/2020:213459 All analysis quality controls are within established criteria
	08/20/2020:209884 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
2130B	08/20/2020:213557 All analysis quality controls are within established criteria
	08/20/2020:209960 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)

Corporate Offices & Laboratory
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August 28, 2020
Cleath-Harris Geologists

Lab ID : CC 2082747
Customer : 8-514

Inorganic - Wet Chemistry QC

2150B	08/20/2020:209879 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
2320B	08/25/2020:213571 All analysis quality controls are within established criteria
	08/25/2020:209939 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
2510B	08/26/2020:213552 All analysis quality controls are within established criteria
	08/26/2020:209956 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
2540CE	08/24/2020:209860 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
300.0	08/20/2020:213276 All analysis quality controls are within established criteria
	08/21/2020:213276 All analysis quality controls are within established criteria
	08/20/2020:209739 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)
5540C	08/20/2020:213560 All analysis quality controls are within established criteria
	08/20/2020:209964 All preparation quality controls are within established criteria (performed at FGL-SP ELAP# 1573)

Certification:: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:SVH

Approved By **Kelly A. Dunnahoo, B.S.**

Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2020-08-28

August 28, 2020

Cleath-Harris Geologists
Attn: Spencer Harris
75 Zaca Lane
Suite 110
San Luis Obispo, CA 93401
Description : NF-20
Project : North Fork Ranch

Lab ID : CC 2082747-001
Customer ID : 8-514

Sampled On : August 19, 2020-12:10
Sampled By : Neil D. Currie
Received On : August 19, 2020-14:06
Matrix : Ground Water

Sample Result - Inorganic

Constituent	Result	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
General Mineral								
Total Hardness as CaCO3	404	2.5	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Calcium	101	1	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Magnesium	37	1	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Potassium	2	1	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Sodium	95	1	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Total Cations	12.3	---	meq/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Boron	0.2	0.1	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Copper	ND	10	ug/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Iron	40	30	ug/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Manganese	ND	10	ug/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Zinc	ND	20	ug/L		200.7	08/20/20:209731	200.7	08/20/20:213279
Gypsum Requirement	0.08	0.01	Tons/AF		200.7	08/20/20:209731	200.7	08/20/20:213279
SAR	2.1	0.1	--		200.7	08/20/20:209731	200.7	08/20/20:213279
Total Alkalinity (as CaCO3)	230	10	mg/L		2320B	08/25/20:209939	2320B	08/25/20:213571
Hydroxide as OH	ND	10	mg/L		2320B	08/25/20:209939	2320B	08/25/20:213571
Carbonate as CO3	ND	10	mg/L		2320B	08/25/20:209939	2320B	08/25/20:213571
Bicarbonate as HCO3	280	10	mg/L		2320B	08/25/20:209939	2320B	08/25/20:213571
Sulfate	279	1.5*	mg/L		300.0	08/20/20:209739	300.0	08/21/20:213276
Chloride	90	1	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Nitrate as NO3	12.6	0.4	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Nitrite as N	ND	0.2	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Nitrate + Nitrite as N	2.8	0.1	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Fluoride	0.3	0.1	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Total Anions	13.2	---	meq/L		2320B	08/25/20:209939	2320B	08/25/20:213571
pH (Field)	8.4	--	units		4500-H B	08/19/20:209832	4500HB	08/19/20:213394
Specific Conductance	1300	1	umhos/cm		2510B	08/26/20:209956	2510B	08/26/20:213552
Total Dissolved Solids	910	20	mg/L		2540CE	08/24/20:209860	2540C	08/25/20:213500
Total Dissolved Solids (sum)	897	0	mg/L		200.7	08/20/20:209731	200.7	08/20/20:213279
MBAS Screen	Negative	0.1	mg/L		5540C	08/20/20:209964	5540C	08/20/20:213560
Aggressiveness Index	13.2	1	--		4500-H B	08/19/20:209832	4500HB	08/19/20:213394
Langelier Index (20°C)	1.3	1	--		4500-H B	08/19/20:209832	4500HB	08/19/20:213394
Nitrate Nitrogen	2.8	0.1	mg/L		300.0	08/20/20:209739	300.0	08/20/20:213276
Wet Chemistry								
Color, Apparent	ND	5	units		2120B	08/20/20:209884	2120B	08/20/20:213459
Odor	ND	1	TON		2150B	08/20/20:209879	2150B	08/20/20:213453

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August 28, 2020
Description : NF-20

Lab ID : CC 2082747-001
Customer ID : 8-514

Sample Result - Inorganic

Constituent	Result	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Wet Chemistry								
Turbidity	1.4	0.1	NTU		2130B	08/20/20:209960	2130B	08/20/20:213557

ND=Non-Detected. PQL=Practical Quantitation Limit. * PQL adjusted for dilution.

August 28, 2020

Cleath-Harris Geologists
Attn: Spencer Harris
75 Zaca Lane
Suite 110
San Luis Obispo, CA 93401
Description : NF-20
Project : North Fork Ranch

Lab ID : CC 2082747-001
Customer ID : 8-514

Sampled On : August 19, 2020-12:10
Sampled By : Neil D. Currie
Received On : August 19, 2020-14:06
Matrix : Ground Water

Sample Result - Support

Constituent	Result	PQL	Units	Note	Sample Preparation Method	Sample Preparation Date/ID	Sample Analysis Method	Sample Analysis Date/ID
Field Test								
pH (Field)	8.38		units			08/19/20 12:10	4500HB	08/19/20 12:10

ND=Non-Detected. PQL=Practical Quantitation Limit. * PQL adjusted for dilution.

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August 28, 2020
Cleath-Harris Geologists

Lab ID : CC 2082747
Customer : 8-514

Quality Control - Inorganic

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Metals								
Boron	200.7	(SP 2011213-001)	MS	mg/L	4.000	102 %	75-125	
			MSD	mg/L	4.000	88.0 %	75-125	
			MSRPD	mg/L	4000	14.4%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	5.000	101 %	90-110	
			CCB	ppm		-0.0002	0.1	
			CCV	ppm	5.000	94.2 %	90-110	
			CCB	ppm		-0.0008	0.1	
Calcium	200.7	(SP 2011213-001)	MS	mg/L	12.00	116 %	75-125	
			MSD	mg/L	12.00	124 %	75-125	
			MSRPD	mg/L	4000	0.6%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	25.00	103 %	90-110	
			CCB	ppm		-0.003	1	
			CCV	ppm	25.00	95.1 %	90-110	
			CCB	ppm		0.005	1	
Copper	200.7	(SP 2011213-001)	MS	ug/L	800.0	100 %	75-125	
			MSD	ug/L	800.0	86.3 %	75-125	
			MSRPD	ug/L	4000	14.6%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	1.000	91.5 %	90-110	
			CCB	ppm		-0.001	0.01	
			CCV	ppm	1.000	93.9 %	90-110	
			CCB	ppm		-0.0006	0.01	
Iron	200.7	(SP 2011213-001)	MS	ug/L	4000	100 %	75-125	
			MSD	ug/L	4000	85.8 %	75-125	
			MSRPD	ug/L	4000	15.0%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	5.000	100 %	90-110	
			CCB	ppm		0.0022	0.03	
			CCV	ppm	5.000	93.6 %	90-110	
			CCB	ppm		0.0007	0.03	
Magnesium	200.7	(SP 2011213-001)	MS	mg/L	12.00	104 %	75-125	
			MSD	mg/L	12.00	90.0 %	75-125	
			MSRPD	mg/L	4000	10.5%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	25.00	105 %	90-110	
			CCB	ppm		0.0007	1	
			CCV	ppm	25.00	96.5 %	90-110	
			CCB	ppm		0.0005	1	
Manganese	200.7	(SP 2011213-001)	MS	ug/L	800.0	103 %	75-125	
			MSD	ug/L	800.0	88.6 %	75-125	
			MSRPD	ug/L	4000	13.9%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	1.000	104 %	90-110	
			CCB	ppm		0.0002	0.01	
			CCV	ppm	1.000	95.0 %	90-110	
			CCB	ppm		-0.00006	0.01	
Potassium	200.7	(SP 2011213-001)	MS	mg/L	12.00	104 %	75-125	
			MSD	mg/L	12.00	89.1 %	75-125	
			MSRPD	mg/L	4000	14.0%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	25.00	102 %	90-110	
			CCB	ppm		-0.08	1	
			CCV	ppm	25.00	94.4 %	90-110	
			CCB	ppm		-0.06	1	
Sodium	200.7	(SP 2011213-001)	MS	mg/L	12.00	88.6 %	75-125	
			MSD	mg/L	12.00	83.7 %	75-125	
			MSRPD	mg/L	4000	1.2%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	25.00	104 %	90-110	
			CCB	ppm		0.005	1	
			CCV	ppm	25.00	96.9 %	90-110	

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August 28, 2020
Cleath-Harris Geologists

Lab ID : CC 2082747
Customer : 8-514

Quality Control - Inorganic

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Metals								
Sodium	200.7	08/20/20:213279AC	CCB	ppm		-0.0004	1	
Zinc	200.7		MS	ug/L	800.0	95.8 %	75-125	
		(SP 2011213-001)	MSD	ug/L	800.0	86.7 %	75-125	
			MSRPD	ug/L	4000	9.8%	≤20.0	
	200.7	08/20/20:213279AC	CCV	ppm	1.000	102 %	90-110	
			CCB	ppm		0.0004	0.02	
			CCV	ppm	1.000	105 %	90-110	
			CCB	ppm		0.0003	0.02	
Wet Chem								
Apparent Color	2120B	(SP 2011280-001)	Dup	units		0.0	5	
Color	2120B	08/20/20:213459AMM	CCB	units		0.00	5.0	
			CCV	units	10.00	100 %	90-110	
Turbidity	2130B	(CC 2082747-001)	Dup	NTU		0.7%	20	
	2130B	08/20/20:213557jba	CCV	NTU	10.00	99.0 %	90-110	
			CCB	NTU		0.085	0.1	
			CCV	NTU	10.00	104 %	90-110	
			CCB	NTU		0.084	0.1	
Odor	2150B	(CC 2082747-001)	Dup	TON		0.0	1	
Alkalinity (as CaCO3)	2320B	(VI 2046378-012)	Dup	mg/L		0.2%	10	
	2320B	08/25/20:213571AMM	CCV	mg/L	235.8	97.3 %	90-110	
			CCV	mg/L	235.8	96.3 %	90-110	
Bicarbonate	2320B	(VI 2046378-012)	Dup	mg/L		0.2%	10	
Carbonate	2320B	(VI 2046378-012)	Dup	mg/L		0.0	10	
Hydroxide	2320B	(VI 2046378-012)	Dup	mg/L		0.0	10	
Conductivity	2510B	08/26/20:213552STA	ICB	umhos/cm		0.12	1	
			ICV	umhos/cm	999.0	101 %	95-105	
			CCV	umhos/cm	999.0	101 %	95-105	
E. C.	2510B	08/26/20:209956sta	Blank	umhos/cm		ND	<1	
		(CH 2076763-001)	Dup	umhos/cm		0.5%	5	
Total Dissolved Solids (TFR)	2540CE	08/24/20:209860CTL	Blank	mg/L		ND	<20	
			LCS	mg/L	993.0	99.9 %	90-110	
		(STK2051855-001)	Dup	mg/L		2.8%	5	
		(STK2051855-001)	Dup	mg/L		1.7%	5	
Chloride	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<1	
			LCS	mg/L	25.00	102 %	90-110	
			MS	mg/L	50.00	95.7 %	85-121	
		(STK2051998-001)	MSD	mg/L	50.00	95.7 %	85-121	
			MSRPD	mg/L	10.00	0.06%	≤19	
			MS	mg/L	50.00	89.1 %	85-121	
		(STK2052000-001)	MSD	mg/L	50.00	89.2 %	85-121	
			MSRPD	mg/L	10.00	0.02%	≤19	
	300.0	08/20/20:213276JMR	CCB	mg/L		0.14	1	
			CCV	mg/L	25.00	101 %	90-110	
			CCB	mg/L		0.28	1	
			CCV	mg/L	25.00	103 %	90-110	
Fluoride	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<0.1	
			LCS	mg/L	2.500	102 %	90-110	
			MS	mg/L	5.000	102 %	87-120	
		(STK2051998-001)	MSD	mg/L	5.000	102 %	87-120	
			MSRPD	mg/L	10.00	0.2%	≤16	
			MS	mg/L	5.000	101 %	87-120	
		(STK2052000-001)	MSD	mg/L	5.000	101 %	87-120	
			MSRPD	mg/L	10.00	0.06%	≤16	
	300.0	08/20/20:213276JMR	CCB	mg/L		0.01	0.1	

August 28, 2020
Cleath-Harris Geologists

Lab ID : CC 2082747
Customer : 8-514

Quality Control - Inorganic

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
Fluoride	300.0	08/20/20:213276JMR	CCV	mg/L	2.500	101 %	90-110	
			CCB	mg/L		0.000	0.1	
			CCV	mg/L	2.500	102 %	90-110	
Nitrate	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	100 %	90-110	
			MS	mg/L	40.00	99.8 %	85-119	
		(STK2051998-001)	MSD	mg/L	40.00	98.8 %	85-119	
			MSRPD	mg/L	10.00	1.0%	≤19	
			MS	mg/L	40.00	98.1 %	85-119	
		(STK2052000-001)	MSD	mg/L	40.00	98.8 %	85-119	
			MSRPD	mg/L	10.00	0.6%	≤19	
	300.0	08/20/20:213276JMR	CCB	mg/L		0.201	0.5	
			CCV	mg/L	20.00	103 %	90-110	
			CCB	mg/L		0.189	0.5	
			CCV	mg/L	20.00	107 %	90-110	
Nitrate + Nitrite as N	300.0	08/20/20:209739JMR	Blank	mg/L		0.029	0.1	
Nitrate Nitrogen	300.0	08/20/20:209739JMR	Blank	mg/L		0.029	0.1	
Nitrite	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<0.5	
			LCS	mg/L	15.00	96.4 %	90-110	
			MS	mg/L	30.00	96.8 %	74-126	
		(STK2051998-001)	MSD	mg/L	30.00	97.1 %	74-126	
			MSRPD	mg/L	10.00	0.3%	≤20	
			MS	mg/L	30.00	96.4 %	74-126	
		(STK2052000-001)	MSD	mg/L	30.00	97.9 %	74-126	
			MSRPD	mg/L	10.00	1.5%	≤20	
	300.0	08/20/20:213276JMR	CCB	mg/L		0.085	0.5	
			CCV	mg/L	15.00	98.6 %	90-110	
			CCB	mg/L		0.000	0.5	
			CCV	mg/L	15.00	101 %	90-110	
Nitrite Nitrogen	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<0.2	
Sulfate	300.0	08/20/20:209739JMR	Blank	mg/L		ND	<0.5	
			LCS	mg/L	50.00	103 %	90-110	
			MS	mg/L	100.0	99.6 %	82-124	
		(STK2051998-001)	MSD	mg/L	100.0	99.5 %	82-124	
			MSRPD	mg/L	10.00	0.09%	≤23	
			MS	mg/L	100.0	96.9 %	82-124	
		(STK2052000-001)	MSD	mg/L	100.0	96.9 %	82-124	
			MSRPD	mg/L	10.00	0.009%	≤23	
	300.0	08/21/20:213276JMR	CCB	mg/L		0.000	0.5	
			CCV	mg/L	50.00	101 %	90-110	
			CCB	mg/L		0.170	0.5	
			CCV	mg/L	50.00	101 %	90-110	
MBAS	5540C	08/20/20:213560jba	CCB	mg/L		0.000	0.1	
			CCV	mg/L	0.1000	100 %	99-101	
MBAS Screen	5540C		MS	mg/L	0.1000	100 %	90-110	
		(CC 2082747-001)	MSD	mg/L	0.1000	100 %	90-110	
			MSRPD	mg/L	0.1000	0.0	≤0.1	

Definition

ICV	: Initial Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
ICB	: Initial Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
CCV	: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
CCB	: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
Blank	: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
LCS	: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.

August 28, 2020
Cleath-Harris Geologists

Lab ID : CC 2082747
Customer : 8-514

Quality Control - Inorganic

Definition	
MS	: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
Dup	: Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
MSRPD	: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
ND	: Non-detect - Result was below the DQO listed for the analyte.
DQO	: Data Quality Objective - This is the criteria against which the quality control data is compared.

August 28, 2020

Cleath-Harris Geologists
Attn: Spencer Harris
75 Zaca Lane
Suite 110
San Luis Obispo, CA 93401
Description : NF-20
Project : North Fork Ranch

Lab ID : CC 2082747-001
Customer ID : 8-514

Sampled On : August 19, 2020
Sampled By : Neil D. Currie
Received On : August 19, 2020
Matrix : Ground Water

Grape Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	101	5	41	270	**				
Magnesium	37	3	25	100	**				
Potassium	2	0.051	0	5	**				
Sodium	95	4.1	34	260					
Anions									
Carbonate	< 10	0	0	0					
Bicarbonate	280	4.6	35	760	**				
Sulfate	279	5.8	44	760	**				
Chloride	90	2.5	19	240					
Nitrate	12.6	0.2	2	34					
Nitrate Nitrogen	2.8			8					
Fluoride	0.3	0.016	0	0.8					
Minor Elements									
Boron	0.20			0.54					
Copper	< 0.01			0.00					
Iron	0.040			0.11					
Manganese	< 0.01			0.00					
Zinc	< 0.02			0.00					
TDS by Summation	897			2400					
Other									
pH	8.4			units					
E. C.	1.30			dS/m					
SAR	2.1								
Crop Suitability									
No Amendments	Fairly		Poor						
With Amendments	Good								
Amendments									
Gypsum Requirement	0.08			Tons/AF					
Sulfuric Acid (98%)	16			oz/1000Gal	Or 39 oz/1000Gal of urea Sulfuric Acid (15/49).				
Leaching Requirement	8.8			%					

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter

August 28, 2020

Cleath-Harris Geologists

Lab ID : CC 2082747-001
Customer ID : 8-514
Description : NF-20

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
			Slight / Moderate / Severe
Chemical			
Manganese	< 0.01	mg/L	
Iron	0.04	mg/L	
TDS by Summation	897	mg/L	
No Amendments			
pH	8.4	units	
Alkalinity (As CaCO3)	230	mg/L	
Langlier Index	1.3	---	
Total Hardness	404	mg/L	
With Amendments			
Alkalinity (As CaCO3)	46	mg/L	
Langlier Index	-0.4	---	
Total Hardness	46	mg/L	
pH	5.4 - 6.7	units	

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:

The Amendments recommended on the previous pages include:

Gypsum:

This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water. Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:

These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.

Guidelines for the above interpretations are sourced from USDA & U.C. Cooperative Extension Service publications. Please contact us if you have any questions.

FRUIT GROWERS LABORATORY, INC.

B. Waddell

Ben Waddell, Director of Ag. Services

BRW1:SVH

Inter-Laboratory Condition Upon Receipt (Attach to COC) CC2082747

Sample Receipt at: STK (CC) CH VI

1. Number of ice chests/packages received: 1 Shipping tracking # OTC

2. Were samples received in a chilled condition? Temps: ROT / ____ / ____ / ____ / ____
   Surface water SWTR bact samples: A sample that has a temperature upon receipt of >10° C, whether iced or not, should be flagged unless the time since sample collection has been less than two hours.

3.	Do the number of bottles received agree with the COC?	(Yes)	No	N/A
4.	Were samples received intact? (i.e. no broken bottles, leaks etc.)	(Yes)	No	
5.	VOAs checked for Headspace?	Yes	No	(N/A)
6.	Were sample custody seals intact?	Yes	No	(N/A)
7.	If required, was sample split for pH analysis?	Yes	No	(N/A)
8.	Were all analyses within holding times at time of receipt?	(Yes)	No	
9.	Verify sample date, time and sampler name	(Yes)	No	

Sign and date the COC, place in a ziplock and put in the same ice chest as the samples.
Sample Receipt Review completed by (initials): JK

Sample Receipt at SP:

1. Were samples received in a chilled condition? Temps: 3 / ____ / ____ / ____ / ____
   Acceptable is above freezing to 6° C. If many packages are received at one time check for tests/H.T.'s/rushes/
2. Shipping tracking numbers:
   551012343 8

3.	Do the number of bottles received agree with the COC?	(Yes)	No	N/A
4.	Were samples received intact? (i.e. no broken bottles, leaks etc.)	(Yes)	No	
5.	Were sample custody seals intact?	Yes	No	(N/A)

Sign and date the COC, obtain LIMS sample numbers, select methods/tests and print labels.

Sample Verification, Labeling and Distribution:

1.	Were all requested analyses understood and acceptable?	(Yes)	No		
2.	Did bottle labels correspond with the client's ID's?	(Yes)	No		
3.	Were all bottles requiring sample preservation properly preserved? [Exception: Oil & Grease, VOA and CrVI verified in lab]	(Yes)	No	N/A	FGL
4.	VOAs checked for Headspace?	Yes	No	(N/A)	
5.	Have rush or project due dates been checked and accepted?	(Yes)	No	N/A	
6.	Were all analyses within holding times at time of receipt?	(Yes)	No		

Attach labels to the containers and include a copy of the COC for lab delivery.
Sample Receipt, Login and Verification completed by (initials): JK

Discrepancy Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:
   Resolution:

2. Person Contacted: _____
   Initiated By: _____
   Problem:
   Resolution:

(Please use the back of this sheet for additional contacts)

(8-514)
Cleath-Harris Geologists
CC 2082747
IV-08/19/2020-15:29:49

_____
oer here
_____

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Analytical Chemists

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CHAIN OF CUSTODY
AND ANALYSIS REQUEST DOCUMENT

ORIGINAL

CLIENT DETAILS — SECTION I

Client: Cleath Harris Geologists
☐ New Customer Customer Number: 8-514
Address:
Phone: 805-543-1413 Fax:
E-Mail: neilc@cleath-harris.com
Project name: North Fork Ranch
Contact person: Neil Currie
Billing Information (if different from above)
Name:
Address:
Phone: Fax:
E-Mail:
Contact person:
Purchase order/contract/FGL quote number:
Pre Log Required: yes ____ Frequency: Monthly☐ Weekly☐ Quarterly☐ Other☐

RUSH

SAMPLING — SECTION II

Sampler (s): Neil D Currie
Comp Sampler Set up Date: ____ Time: ____
Time: ____ Mileage: ____
Shipping Charge: ____ Pickup Charge: ____

REPORT INFORMATION — SECTION III

Rush Analysis (surcharge will apply):
☒ 5 Day ☐ 4 Day ☐ 3 Day ☐ 2 Day ☐ 24 hour
Rush pre-approved by lab: Kelly D.
Electronic Data Transfer: ☐ yes ☐ no
If yes, To: State ____ Client ____ Other ____
Lab number: C020827-47

SAMPLE INFORMATION — SECTION IV

Sample Number	Location/Description	Date Sampled	Time Sampled	Type of Sampling: Composite (C) or Grab (G)	Number of Containers	Type of Containers: (G) Glass (P) Plastic (V) VOA (MT) Metal Tube	(P) Potable (NP) Non-Potable	(SW) Surface Water (MW) Monitoring Well (GW) Ground Water (TB) Travel Blank (AgW) Ag Water (WW) Wastewater (DW) Drinking Water	(S) Soil (SLG) Sludge (SLD) Solid (O) Oil	BacT: (Sys) System (SRC) Source (W) Waste	BacT: Routine (ROUT) Repeat (RPT) Other (OTH) Replace (RPL)	(LT) Leaf Tissue (PET) Petiole Tissue (PRD) Produce	Preservative: (1) NaOH + ZnAc, (2) NaOH, (3) HCL (4) H_2SO_4, (5) HNO_3, (6) $Na_2S_2O_3$, (7) Other	ANALYSES REQUESTED	General Mineral/Ferrigation Suite	Cargo Grade	General Physical	Field pH 8.38
1	NF-20	8/19/20	12:10	G	3	P/G		GW							X		X	X
~~2~~	"	~~8/19/20~~	~~12:11~~															
~~3~~	"	~~8/19/20~~	~~12:12~~															

RUSH

RUSH

REMARKS — SECTION V

Field pH 8.38
Field Temp 22.6°C
ROI

CUSTODY — SECTION VI

Relinquished by and subject to the terms and conditions on the reverse of this document:
Neil D Currie Date: 8/19/20 Time: 14:06 Relinquished by: Date: Time:
Received by: Date: Time: Received by: Date: Time:
Relinquished by: Date: Time: 1700 Relinquished by: Date: Time:
Received by: GLS Date: Time: Received by: Date: Time:

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: (805) 392-2000
FAX: (805) 525-4172

Office & Laboratory
2500 Stagecoach Road
Stockton, CA 95215
TEL: (209) 942-0182
FAX: (209) 942-0423

Office & Laboratory
563 East Lindo Avenue
Chico, CA 95926
TEL: (530) 343-5818
FAX: (530) 343-3807

Office & Laboratory
3442 Empresa Drive, Suite D
San Luis Obispo, CA 93401
TEL: (805) 783-2940
FAX: (805) 783-2912

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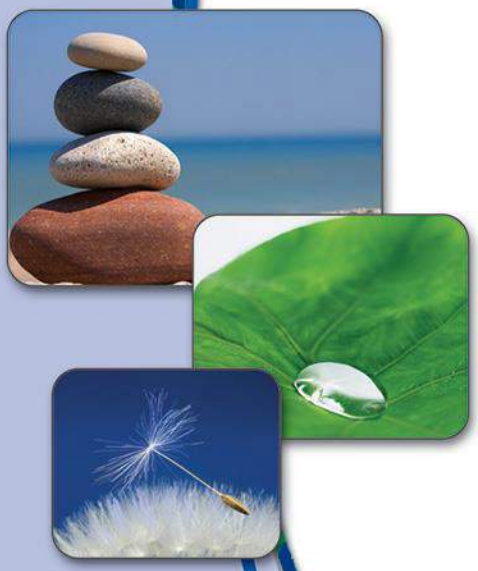
9415 W. Goshen Avenue
Visalia, CA 93291
TEL: (559) 734-9473
FAX: (559) 734-8435

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-76318-1
Client Project/Site: Cuyama Valley

For:
California Department of Water Resources
Division of Operations & Maintenance
1416 Ninth St. Room 620
Sacramento, California 95814

Attn: Jack Tung

Authorized for release by:
8/3/2021 11:49:34 AM

Justinn Gonzales, Project Manager I
(925)484-1919
Justinn.Gonzales@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: California Department of Water Resources
Job ID: 320-76318-1
Project/Site: Cuyama Valley

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-76318-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-76318-1

Comments
No additional comments.

Receipt
The samples were received on 7/16/2021 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.8º C.

Receipt Exceptions
The container label for the following sample(s) did not match the information listed on the Chain-of-Custody (COC): The listed samples have time discrepancies:
Sample 1, All three unpreserved container have times 1013, 1009, 1011. One of the HNO3 containers has time 1015; 900 (320-76318-1).
Sample 2, All three unpreserved container have times 1222, 1223, 1220. One of the HNO3 containers has time 1225; 901 (320-76318-2).
Sample 3, All three unpreserved container have times 1503, 1504, 1502. One of the HNO3 containers has time 1506; 902 (320-76318-3).

Metals
Method 200.8: The following samples were diluted due to the nature of the sample matrix: 900 (320-76318-1), 901 (320-76318-2) and 902 (320-76318-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method 300.0: The following samples in analytical batch 320-507407 were diluted due to the nature of the sample matrix: 900 (320-76318-1), 901 (320-76318-2), 902 (320-76318-3), (320-76318-A-1 MS) and (320-76318-A-1 MSD). Elevated reporting limits (RLs) are provided.

Method 300.0: The following samples in analytical batch 320-507406 were diluted due to the nature of the sample matrix: 900 (320-76318-1), 901 (320-76318-2), 902 (320-76318-3), (320-76318-A-1 MS) and (320-76318-A-1 MSD). Elevated reporting limits (RLs) are provided.

Method SM 5540C: The following samples were received outside of holding time: 900 (320-76318-1), 901 (320-76318-2) and 902 (320-76318-3).

Method SM 5540C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 440-652494. The laboratory control sample (LCS) was performed in duplicate to provide precision data for this batch.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Client Sample ID: 900 — Lab Sample ID: 320-76318-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1800		200	74	mg/L	200		300.0	Total/NA
Sulfate	2900		200	72	mg/L	200		300.0	Total/NA
Boron	1.5		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	610		1.0	0.25	mg/L	5		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	3000		4.6	0.85	mg/L	5		200.7 Rev 4.4	Total Recoverable
Iron	4.8		0.10	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	350		0.50	0.050	mg/L	5		200.7 Rev 4.4	Total Recoverable
Manganese	0.54		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	7.9		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	1200		5.0	1.3	mg/L	5		200.7 Rev 4.4	Total Recoverable
Aluminum	11	J	20	10	ug/L	2		200.8	Total Recoverable
Arsenic	4.7		2.0	1.0	ug/L	2		200.8	Total Recoverable
Barium	23		2.0	1.0	ug/L	2		200.8	Total Recoverable
Nickel	1.3	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Mercury	0.13	J	0.20	0.10	ug/L	1		245.1	Total/NA
Alkalinity as CaCO3	370		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	370		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	9600		2.0	2.0	umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	7900		100	50	mg/L	1		SM 2540C	Total/NA
Methylene Blue Active Substances	0.11	H	0.10	0.050	mg/L	1		SM 5540C	Total/NA

Client Sample ID: 901 — Lab Sample ID: 320-76318-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2200		250	93	mg/L	250		300.0	Total/NA
Sulfate	2400		250	90	mg/L	250		300.0	Total/NA
Boron	2.2		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	800		1.0	0.25	mg/L	5		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	3500		4.6	0.85	mg/L	5		200.7 Rev 4.4	Total Recoverable
Iron	14		0.10	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	360		0.50	0.050	mg/L	5		200.7 Rev 4.4	Total Recoverable
Manganese	2.4		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	18		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	1200		5.0	1.3	mg/L	5		200.7 Rev 4.4	Total Recoverable
Aluminum	830		20	10	ug/L	2		200.8	Total Recoverable

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Client Sample ID: 901 (Continued)

Lab Sample ID: 320-76318-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.0		2.0	1.0	ug/L	2		200.8	Total Recoverable
Barium	87		2.0	1.0	ug/L	2		200.8	Total Recoverable
Chromium	2.0	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Nickel	2.4	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Selenium	1.7	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Vanadium	2.8	J	4.0	2.0	ug/L	2		200.8	Total Recoverable
Mercury	0.20		0.20	0.10	ug/L	1		245.1	Total/NA
Alkalinity as CaCO3	380		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	380		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	11000		2.0	2.0	umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	8400		100	50	mg/L	1		SM 2540C	Total/NA
Methylene Blue Active Substances	0.13	H	0.10	0.050	mg/L	1		SM 5540C	Total/NA

Client Sample ID: 902

Lab Sample ID: 320-76318-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3500		500	190	mg/L	500		300.0	Total/NA
Sulfate	2000		500	180	mg/L	500		300.0	Total/NA
Boron	3.4		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	860		1.0	0.25	mg/L	5		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	3100		4.6	0.85	mg/L	5		200.7 Rev 4.4	Total Recoverable
Iron	5.0		0.10	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	240		0.50	0.050	mg/L	5		200.7 Rev 4.4	Total Recoverable
Manganese	2.4		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	32		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	1800		5.0	1.3	mg/L	5		200.7 Rev 4.4	Total Recoverable
Aluminum	61		20	10	ug/L	2		200.8	Total Recoverable
Arsenic	7.4		2.0	1.0	ug/L	2		200.8	Total Recoverable
Barium	110		2.0	1.0	ug/L	2		200.8	Total Recoverable
Nickel	2.0	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Selenium	1.2	J	4.0	1.0	ug/L	2		200.8	Total Recoverable
Alkalinity as CaCO3	260		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	260		5.0	5.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	13000		2.0	2.0	umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	9500		100	50	mg/L	1		SM 2540C	Total/NA
Methylene Blue Active Substances	0.14	H	0.10	0.050	mg/L	1		SM 5540C	Total/NA

This Detection Summary does not include radiochemical test results.

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Client Sample ID: 900

Date Collected: 07/15/21 10:17
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-1

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1800**		200	74	mg/L			07/16/21 18:47	200
Nitrate as N	ND		50	20	mg/L			07/16/21 18:47	200
Fluoride	ND		100	11	mg/L			07/16/21 18:47	200
Nitrite as N	ND		50	10	mg/L			07/16/21 18:47	200
Nitrate Nitrite as N	ND		50	20	mg/L			07/16/21 18:47	200
Sulfate	**2900**		200	72	mg/L			07/16/21 18:47	200

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**1.5**		0.050	0.025	mg/L		07/21/21 10:56	07/21/21 16:59	1
Calcium	**610**		1.0	0.25	mg/L		07/21/21 10:56	07/22/21 09:41	5
Copper	ND		0.010	0.0050	mg/L		07/21/21 10:56	07/21/21 16:59	1
Hardness, as CaCO3	**3000**		4.6	0.85	mg/L		07/21/21 10:56	07/22/21 09:41	5
Iron	**4.8**		0.10	0.050	mg/L		07/21/21 10:56	07/21/21 16:59	1
Magnesium	**350**		0.50	0.050	mg/L		07/21/21 10:56	07/22/21 09:41	5
Manganese	**0.54**		0.020	0.0068	mg/L		07/21/21 10:56	07/21/21 16:59	1
Potassium	**7.9**		1.0	0.25	mg/L		07/21/21 10:56	07/21/21 16:59	1
Sodium	**1200**		5.0	1.3	mg/L		07/21/21 10:56	07/22/21 09:41	5
Zinc	ND		0.020	0.012	mg/L		07/21/21 10:56	07/21/21 16:59	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Aluminum	**11**	**J**	20	10	ug/L		07/21/21 11:30	07/21/21 17:42	2
Arsenic	**4.7**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Barium	**23**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Beryllium	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:42	2
Cadmium	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:42	2
Chromium	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Nickel	**1.3**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Lead	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Antimony	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Selenium	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:42	2
Thallium	ND		2.0	0.40	ug/L		07/21/21 11:30	07/21/21 17:42	2
Vanadium	ND		4.0	2.0	ug/L		07/21/21 11:30	07/21/21 17:42	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.13**	**J**	0.20	0.10	ug/L		08/02/21 09:45	08/02/21 16:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	**370**		5.0	5.0	mg/L			07/20/21 15:25	1
Bicarbonate Alkalinity	**370**		5.0	5.0	mg/L			07/20/21 15:25	1
Carbonate Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:25	1
Hydroxide Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:25	1
Specific Conductance	**9600**		2.0	2.0	umhos/cm			07/22/21 11:27	1
Total Dissolved Solids	**7900**		100	50	mg/L			07/19/21 11:03	1
Methylene Blue Active Substances	**0.11**	**H**	0.10	0.050	mg/L			07/20/21 12:41	1

Client Sample ID: 901
Date Collected: 07/15/21 12:27
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-2
Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**2200**		250	93	mg/L			07/16/21 19:40	250
Nitrate as N	ND		63	25	mg/L			07/16/21 19:40	250
Fluoride	ND		130	13	mg/L			07/16/21 19:40	250
Nitrite as N	ND		63	13	mg/L			07/16/21 19:40	250
Nitrate Nitrite as N	ND		63	25	mg/L			07/16/21 19:40	250
Sulfate	**2400**		250	90	mg/L			07/16/21 19:40	250

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**2.2**		0.050	0.025	mg/L		07/21/21 10:56	07/21/21 17:06	1
Calcium	**800**		1.0	0.25	mg/L		07/21/21 10:56	07/22/21 09:49	5
Copper	ND		0.010	0.0050	mg/L		07/21/21 10:56	07/21/21 17:06	1
Hardness, as CaCO3	**3500**		4.6	0.85	mg/L		07/21/21 10:56	07/22/21 09:49	5
Iron	**14**		0.10	0.050	mg/L		07/21/21 10:56	07/21/21 17:06	1
Magnesium	**360**		0.50	0.050	mg/L		07/21/21 10:56	07/22/21 09:49	5
Manganese	**2.4**		0.020	0.0068	mg/L		07/21/21 10:56	07/21/21 17:06	1
Potassium	**18**		1.0	0.25	mg/L		07/21/21 10:56	07/21/21 17:06	1
Sodium	**1200**		5.0	1.3	mg/L		07/21/21 10:56	07/22/21 09:49	5
Zinc	ND		0.020	0.012	mg/L		07/21/21 10:56	07/21/21 17:06	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Aluminum	**830**		20	10	ug/L		07/21/21 11:30	07/21/21 17:44	2
Arsenic	**4.0**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Barium	**87**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Beryllium	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:44	2
Cadmium	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:44	2
Chromium	**2.0**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Nickel	**2.4**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Lead	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Antimony	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Selenium	**1.7**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:44	2
Thallium	ND		2.0	0.40	ug/L		07/21/21 11:30	07/21/21 17:44	2
Vanadium	**2.8**	**J**	4.0	2.0	ug/L		07/21/21 11:30	07/21/21 17:44	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.20**		0.20	0.10	ug/L		08/02/21 09:45	08/02/21 16:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	**380**		5.0	5.0	mg/L			07/20/21 15:45	1
Bicarbonate Alkalinity	**380**		5.0	5.0	mg/L			07/20/21 15:45	1
Carbonate Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:45	1
Hydroxide Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:45	1
Specific Conductance	**11000**		2.0	2.0	umhos/cm			07/22/21 11:29	1
Total Dissolved Solids	**8400**		100	50	mg/L			07/19/21 11:03	1
Methylene Blue Active Substances	**0.13**	**H**	0.10	0.050	mg/L			07/20/21 12:41	1

Client Sample ID: 902
Date Collected: 07/15/21 15:05
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-3
Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**3500**		500	190	mg/L			07/16/21 19:57	500
Nitrate as N	ND		130	50	mg/L			07/16/21 19:57	500
Fluoride	ND		250	27	mg/L			07/16/21 19:57	500
Nitrite as N	ND		130	25	mg/L			07/16/21 19:57	500
Nitrate Nitrite as N	ND		130	50	mg/L			07/16/21 19:57	500
Sulfate	**2000**		500	180	mg/L			07/16/21 19:57	500

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**3.4**		0.050	0.025	mg/L		07/21/21 10:56	07/21/21 17:09	1
Calcium	**860**		1.0	0.25	mg/L		07/21/21 10:56	07/22/21 09:51	5
Copper	ND		0.010	0.0050	mg/L		07/21/21 10:56	07/21/21 17:09	1
Hardness, as CaCO3	**3100**		4.6	0.85	mg/L		07/21/21 10:56	07/22/21 09:51	5
Iron	**5.0**		0.10	0.050	mg/L		07/21/21 10:56	07/21/21 17:09	1
Magnesium	**240**		0.50	0.050	mg/L		07/21/21 10:56	07/22/21 09:51	5
Manganese	**2.4**		0.020	0.0068	mg/L		07/21/21 10:56	07/21/21 17:09	1
Potassium	**32**		1.0	0.25	mg/L		07/21/21 10:56	07/21/21 17:09	1
Sodium	**1800**		5.0	1.3	mg/L		07/21/21 10:56	07/22/21 09:51	5
Zinc	ND		0.020	0.012	mg/L		07/21/21 10:56	07/21/21 17:09	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Aluminum	**61**		20	10	ug/L		07/21/21 11:30	07/21/21 18:02	2
Arsenic	**7.4**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Barium	**110**		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Beryllium	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 18:02	2
Cadmium	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 18:02	2
Chromium	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Nickel	**2.0**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Lead	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Antimony	ND		4.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Selenium	**1.2**	**J**	4.0	1.0	ug/L		07/21/21 11:30	07/21/21 18:02	2
Thallium	ND		2.0	0.40	ug/L		07/21/21 11:30	07/21/21 18:02	2
Vanadium	ND		4.0	2.0	ug/L		07/21/21 11:30	07/21/21 18:02	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/02/21 09:46	08/02/21 16:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	**260**		5.0	5.0	mg/L			07/20/21 15:53	1
Bicarbonate Alkalinity	**260**		5.0	5.0	mg/L			07/20/21 15:53	1
Carbonate Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:53	1
Hydroxide Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:53	1
Specific Conductance	**13000**		2.0	2.0	umhos/cm			07/22/21 11:30	1
Total Dissolved Solids	**9500**		100	50	mg/L			07/19/21 11:03	1
Methylene Blue Active Substances	**0.14**	**H**	0.10	0.050	mg/L			07/20/21 12:41	1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-507406/3
Matrix: Water
Analysis Batch: 507406

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.37	mg/L			07/16/21 18:12	1
Fluoride	ND		0.50	0.053	mg/L			07/16/21 18:12	1
Sulfate	ND		1.0	0.36	mg/L			07/16/21 18:12	1

Lab Sample ID: LCS 320-507406/4
Matrix: Water
Analysis Batch: 507406

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	7.50	7.66		mg/L		102	90 - 110
Fluoride	7.50	7.75		mg/L		103	90 - 110
Sulfate	7.50	7.45		mg/L		99	90 - 110

Lab Sample ID: 320-76318-1 MS
Matrix: Water
Analysis Batch: 507406

Client Sample ID: 900
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1800		1000	2800		mg/L		98	90 - 110
Fluoride	ND		1000	1060		mg/L		106	90 - 110
Sulfate	2900		1000	3880		mg/L		98	90 - 110

Lab Sample ID: 320-76318-1 MSD
Matrix: Water
Analysis Batch: 507406

Client Sample ID: 900
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1800		1000	2800		mg/L		98	90 - 110	0	10
Fluoride	ND		1000	1050		mg/L		105	90 - 110	1	10
Sulfate	2900		1000	3890		mg/L		98	90 - 110	0	10

Lab Sample ID: MB 320-507407/3
Matrix: Water
Analysis Batch: 507407

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.25	0.10	mg/L			07/16/21 18:12	1
Nitrite as N	ND		0.25	0.050	mg/L			07/16/21 18:12	1
Nitrate Nitrite as N	ND		0.25	0.10	mg/L			07/16/21 18:12	1

Lab Sample ID: LCS 320-507407/4
Matrix: Water
Analysis Batch: 507407

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	1.50	1.50		mg/L		100	90 - 110
Nitrite as N	5.00	5.15		mg/L		103	90 - 110
Nitrate Nitrite as N	6.50	6.65		mg/L		102	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 320-76318-1 MS
Matrix: Water
Analysis Batch: 507407

Client Sample ID: 900
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	ND		200	196		mg/L		98	90 - 110
Nitrite as N	ND		1000	1020		mg/L		102	90 - 110
Nitrate Nitrite as N	ND		1200	1210		mg/L		101	90 - 110

Lab Sample ID: 320-76318-1 MSD
Matrix: Water
Analysis Batch: 507407

Client Sample ID: 900
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND		200	195		mg/L		98	90 - 110	0	10
Nitrite as N	ND		1000	1020		mg/L		102	90 - 110	0	10
Nitrate Nitrite as N	ND		1200	1210		mg/L		101	90 - 110	0	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 440-652608/1-A
Matrix: Water
Analysis Batch: 652665

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	0.025	mg/L		07/21/21 10:56	07/21/21 16:54	1
Copper	ND		0.010	0.0050	mg/L		07/21/21 10:56	07/21/21 16:54	1
Iron	ND		0.10	0.050	mg/L		07/21/21 10:56	07/21/21 16:54	1
Manganese	ND		0.020	0.0068	mg/L		07/21/21 10:56	07/21/21 16:54	1
Potassium	ND		1.0	0.25	mg/L		07/21/21 10:56	07/21/21 16:54	1
Zinc	ND		0.020	0.012	mg/L		07/21/21 10:56	07/21/21 16:54	1

Lab Sample ID: MB 440-652608/1-A
Matrix: Water
Analysis Batch: 652716

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.20	0.050	mg/L		07/21/21 10:56	07/22/21 09:37	1
Hardness, as CaCO3	ND		0.91	0.17	mg/L		07/21/21 10:56	07/22/21 09:37	1
Magnesium	ND		0.10	0.010	mg/L		07/21/21 10:56	07/22/21 09:37	1
Sodium	ND		1.0	0.26	mg/L		07/21/21 10:56	07/22/21 09:37	1

Lab Sample ID: LCS 440-652608/2-A
Matrix: Water
Analysis Batch: 652665

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.500	0.486		mg/L		97	85 - 115
Copper	0.500	0.494		mg/L		99	85 - 115
Iron	0.500	0.459		mg/L		92	85 - 115
Manganese	0.500	0.490		mg/L		98	85 - 115
Potassium	5.00	4.95		mg/L		99	85 - 115
Zinc	0.500	0.500		mg/L		100	85 - 115

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 440-652608/2-A
Matrix: Water
Analysis Batch: 652716

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	2.50	2.47		mg/L		99	85 - 115
Magnesium	2.50	2.46		mg/L		98	85 - 115
Sodium	5.00	5.00		mg/L		100	85 - 115

Lab Sample ID: 320-76318-1 MS
Matrix: Water
Analysis Batch: 652665

Client Sample ID: 900
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.5		0.500	2.02		mg/L		109	70 - 130
Copper	ND		0.500	0.545		mg/L		109	70 - 130
Iron	4.8		0.500	5.40	4	mg/L		119	70 - 130
Manganese	0.54		0.500	1.01		mg/L		95	70 - 130
Potassium	7.9		5.00	13.5		mg/L		112	70 - 130
Zinc	ND		0.500	0.411		mg/L		82	70 - 130

Lab Sample ID: 320-76318-1 MS
Matrix: Water
Analysis Batch: 652716

Client Sample ID: 900
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	610		2.50	616	4	mg/L		340	70 - 130
Magnesium	350		2.50	360	4	mg/L		234	70 - 130
Sodium	1200		5.00	1240	4	mg/L		360	70 - 130

Lab Sample ID: 320-76318-1 MSD
Matrix: Water
Analysis Batch: 652665

Client Sample ID: 900
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.5		0.500	2.07		mg/L		119	70 - 130	2	20
Copper	ND		0.500	0.554		mg/L		111	70 - 130	2	20
Iron	4.8		0.500	5.54	4	mg/L		147	70 - 130	3	20
Manganese	0.54		0.500	1.03		mg/L		99	70 - 130	2	20
Potassium	7.9		5.00	14.1		mg/L		124	70 - 130	5	20
Zinc	ND		0.500	0.418		mg/L		84	70 - 130	2	20

Lab Sample ID: 320-76318-1 MSD
Matrix: Water
Analysis Batch: 652716

Client Sample ID: 900
Prep Type: Total Recoverable
Prep Batch: 652608

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	610		2.50	634	4	mg/L		1060	70 - 130	3	20
Magnesium	350		2.50	363	4	mg/L		340	70 - 130	1	20
Sodium	1200		5.00	1280	4	mg/L		1160	70 - 130	3	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-652611/1-A
Matrix: Water
Analysis Batch: 652662

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 652611

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Aluminum	ND		10	5.0	ug/L		07/21/21 11:30	07/21/21 17:27	1
Arsenic	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Barium	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Beryllium	ND		0.50	0.25	ug/L		07/21/21 11:30	07/21/21 17:27	1
Cadmium	ND		1.0	0.25	ug/L		07/21/21 11:30	07/21/21 17:27	1
Chromium	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Nickel	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Lead	ND		1.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Antimony	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Selenium	ND		2.0	0.50	ug/L		07/21/21 11:30	07/21/21 17:27	1
Thallium	ND		1.0	0.20	ug/L		07/21/21 11:30	07/21/21 17:27	1
Vanadium	ND		2.0	1.0	ug/L		07/21/21 11:30	07/21/21 17:27	1

Lab Sample ID: LCS 440-652611/2-A
Matrix: Water
Analysis Batch: 652662

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 652611

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	80.0	84.9		ug/L		106	85 - 115
Aluminum	80.0	85.7		ug/L		107	85 - 115
Arsenic	80.0	80.9		ug/L		101	85 - 115
Barium	80.0	81.9		ug/L		102	85 - 115
Beryllium	80.0	87.4		ug/L		109	85 - 115
Cadmium	80.0	81.3		ug/L		102	85 - 115
Chromium	80.0	80.5		ug/L		101	85 - 115
Nickel	80.0	79.4		ug/L		99	85 - 115
Lead	80.0	83.4		ug/L		104	85 - 115
Antimony	80.0	86.3		ug/L		108	85 - 115
Selenium	80.0	81.9		ug/L		102	85 - 115
Thallium	80.0	82.7		ug/L		103	85 - 115
Vanadium	80.0	80.7		ug/L		101	85 - 115

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-653551/1-A
Matrix: Water
Analysis Batch: 653591

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 653551

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/02/21 09:45	08/02/21 15:28	1

Lab Sample ID: LCS 440-653551/2-A
Matrix: Water
Analysis Batch: 653591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 653551

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	5.58		ug/L		93	85 - 115

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 320-508724/7
Matrix: Water
Analysis Batch: 508724

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		5.0	5.0	mg/L			07/20/21 15:02	1
Bicarbonate Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:02	1
Carbonate Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:02	1
Hydroxide Alkalinity	ND		5.0	5.0	mg/L			07/20/21 15:02	1

Lab Sample ID: LCS 320-508724/8
Matrix: Water
Analysis Batch: 508724

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity as CaCO3			1000	975		mg/L		97	90 - 110		

Lab Sample ID: 320-76318-1 DU
Matrix: Water
Analysis Batch: 508724

Client Sample ID: 900
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity as CaCO3	370			377		mg/L				1	20
Bicarbonate Alkalinity	370			377		mg/L				1	20
Carbonate Alkalinity	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 320-509273/6
Matrix: Water
Analysis Batch: 509273

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		2.0	2.0	umhos/cm			07/22/21 11:22	1

Lab Sample ID: LCS 320-509273/7
Matrix: Water
Analysis Batch: 509273

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			391	391		umhos/cm		100	90 - 110		

Lab Sample ID: 320-76318-3 DU
Matrix: Water
Analysis Batch: 509273

Client Sample ID: 902
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	13000			13200		umhos/cm				0.2	10

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-652360/1
Matrix: Water
Analysis Batch: 652360

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/19/21 09:17	1

Lab Sample ID: LCS 440-652360/2
Matrix: Water
Analysis Batch: 652360

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			1000	976		mg/L		98	90 - 110		

Method: SM 5540C - Methylene Blue Active Substances (MBAS)

Lab Sample ID: MB 440-652494/4
Matrix: Water
Analysis Batch: 652494

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Blue Active Substances	ND		0.10	0.050	mg/L			07/20/21 12:41	1

Lab Sample ID: LCS 440-652494/5
Matrix: Water
Analysis Batch: 652494

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methylene Blue Active Substances			0.250	0.258		mg/L		103	90 - 110		

Lab Sample ID: LCSD 440-652494/6
Matrix: Water
Analysis Batch: 652494

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances			0.250	0.256		mg/L		102	90 - 110	1	20

Lab Sample ID: MRL 440-652494/3
Matrix: Water
Analysis Batch: 652494

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Methylene Blue Active Substances			0.100	0.128		mg/L		128	50 - 150		

HPLC/IC

Analysis Batch: 507406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	300.0	
320-76318-2	901	Total/NA	Water	300.0	
320-76318-3	902	Total/NA	Water	300.0	
MB 320-507406/3	Method Blank	Total/NA	Water	300.0	
LCS 320-507406/4	Lab Control Sample	Total/NA	Water	300.0	
320-76318-1 MS	900	Total/NA	Water	300.0	
320-76318-1 MSD	900	Total/NA	Water	300.0	

Analysis Batch: 507407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	300.0	
320-76318-2	901	Total/NA	Water	300.0	
320-76318-3	902	Total/NA	Water	300.0	
MB 320-507407/3	Method Blank	Total/NA	Water	300.0	
LCS 320-507407/4	Lab Control Sample	Total/NA	Water	300.0	
320-76318-1 MS	900	Total/NA	Water	300.0	
320-76318-1 MSD	900	Total/NA	Water	300.0	

Metals

Prep Batch: 652608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total Recoverable	Water	200.2	
320-76318-2	901	Total Recoverable	Water	200.2	
320-76318-3	902	Total Recoverable	Water	200.2	
MB 440-652608/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-652608/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
320-76318-1 MS	900	Total Recoverable	Water	200.2	
320-76318-1 MSD	900	Total Recoverable	Water	200.2	

Prep Batch: 652611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total Recoverable	Water	200.2	
320-76318-2	901	Total Recoverable	Water	200.2	
320-76318-3	902	Total Recoverable	Water	200.2	
MB 440-652611/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-652611/2-A	Lab Control Sample	Total Recoverable	Water	200.2	

Analysis Batch: 652662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total Recoverable	Water	200.8	652611
320-76318-2	901	Total Recoverable	Water	200.8	652611
320-76318-3	902	Total Recoverable	Water	200.8	652611
MB 440-652611/1-A	Method Blank	Total Recoverable	Water	200.8	652611
LCS 440-652611/2-A	Lab Control Sample	Total Recoverable	Water	200.8	652611

Analysis Batch: 652665

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-2	901	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-3	902	Total Recoverable	Water	200.7 Rev 4.4	652608

Metals (Continued)

Analysis Batch: 652665 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 440-652608/1-A	Method Blank	Total Recoverable	Water	200.7 Rev 4.4	652608
LCS 440-652608/2-A	Lab Control Sample	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-1 MS	900	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-1 MSD	900	Total Recoverable	Water	200.7 Rev 4.4	652608

Analysis Batch: 652716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-2	901	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-3	902	Total Recoverable	Water	200.7 Rev 4.4	652608
MB 440-652608/1-A	Method Blank	Total Recoverable	Water	200.7 Rev 4.4	652608
LCS 440-652608/2-A	Lab Control Sample	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-1 MS	900	Total Recoverable	Water	200.7 Rev 4.4	652608
320-76318-1 MSD	900	Total Recoverable	Water	200.7 Rev 4.4	652608

Prep Batch: 653551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	245.1	
320-76318-2	901	Total/NA	Water	245.1	
320-76318-3	902	Total/NA	Water	245.1	
MB 440-653551/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-653551/2-A	Lab Control Sample	Total/NA	Water	245.1	

Analysis Batch: 653591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	245.1	653551
320-76318-2	901	Total/NA	Water	245.1	653551
320-76318-3	902	Total/NA	Water	245.1	653551
MB 440-653551/1-A	Method Blank	Total/NA	Water	245.1	653551
LCS 440-653551/2-A	Lab Control Sample	Total/NA	Water	245.1	653551

General Chemistry

Analysis Batch: 508724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	SM 2320B	
320-76318-2	901	Total/NA	Water	SM 2320B	
320-76318-3	902	Total/NA	Water	SM 2320B	
MB 320-508724/7	Method Blank	Total/NA	Water	SM 2320B	
LCS 320-508724/8	Lab Control Sample	Total/NA	Water	SM 2320B	
320-76318-1 DU	900	Total/NA	Water	SM 2320B	

Analysis Batch: 509273

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	SM 2510B	
320-76318-2	901	Total/NA	Water	SM 2510B	
320-76318-3	902	Total/NA	Water	SM 2510B	
MB 320-509273/6	Method Blank	Total/NA	Water	SM 2510B	
LCS 320-509273/7	Lab Control Sample	Total/NA	Water	SM 2510B	
320-76318-3 DU	902	Total/NA	Water	SM 2510B	

QC Association Summary

Client: California Department of Water Resources
Job ID: 320-76318-1
Project/Site: Cuyama Valley

General Chemistry

Analysis Batch: 652360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	SM 2540C	
320-76318-2	901	Total/NA	Water	SM 2540C	
320-76318-3	902	Total/NA	Water	SM 2540C	
MB 440-652360/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-652360/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 652494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76318-1	900	Total/NA	Water	SM 5540C	
320-76318-2	901	Total/NA	Water	SM 5540C	
320-76318-3	902	Total/NA	Water	SM 5540C	
MB 440-652494/4	Method Blank	Total/NA	Water	SM 5540C	
LCS 440-652494/5	Lab Control Sample	Total/NA	Water	SM 5540C	
LCSD 440-652494/6	Lab Control Sample Dup	Total/NA	Water	SM 5540C	
MRL 440-652494/3	Lab Control Sample	Total/NA	Water	SM 5540C	

Lab Chronicle

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Client Sample ID: 900

Date Collected: 07/15/21 10:17
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	10 mL	10 mL	507406	07/16/21 18:47	Y1S	TAL SAC
Total/NA	Analysis	300.0		200	10 mL	10 mL	507407	07/16/21 18:47	Y1S	TAL SAC
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			652665	07/21/21 16:59	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		5			652716	07/22/21 09:41	K1UV	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652611	07/21/21 11:30	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		2			652662	07/21/21 17:42	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653551	08/02/21 09:45	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653591	08/02/21 16:04	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			508724	07/20/21 15:25	KDB	TAL SAC
Total/NA	Analysis	SM 2510B		1			509273	07/22/21 11:27	KDB	TAL SAC
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	652360	07/19/21 11:03	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	652494	07/20/21 12:41	GG0B	TAL IRV

Client Sample ID: 901

Date Collected: 07/15/21 12:27
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		250	10 mL	10 mL	507406	07/16/21 19:40	Y1S	TAL SAC
Total/NA	Analysis	300.0		250	10 mL	10 mL	507407	07/16/21 19:40	Y1S	TAL SAC
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			652665	07/21/21 17:06	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		5			652716	07/22/21 09:49	K1UV	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652611	07/21/21 11:30	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		2			652662	07/21/21 17:44	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653551	08/02/21 09:45	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653591	08/02/21 16:06	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			508724	07/20/21 15:45	KDB	TAL SAC
Total/NA	Analysis	SM 2510B		1			509273	07/22/21 11:29	KDB	TAL SAC
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	652360	07/19/21 11:03	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	652494	07/20/21 12:41	GG0B	TAL IRV

Client Sample ID: 902

Date Collected: 07/15/21 15:05
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		500	10 mL	10 mL	507406	07/16/21 19:57	Y1S	TAL SAC
Total/NA	Analysis	300.0		500	10 mL	10 mL	507407	07/16/21 19:57	Y1S	TAL SAC

Lab Chronicle

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Client Sample ID: 902

Date Collected: 07/15/21 15:05
Date Received: 07/16/21 09:30

Lab Sample ID: 320-76318-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			652665	07/21/21 17:09	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652608	07/21/21 10:56	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		5			652716	07/22/21 09:51	K1UV	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	652611	07/21/21 11:30	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		2			652662	07/21/21 18:02	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653551	08/02/21 09:46	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653591	08/02/21 16:08	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			508724	07/20/21 15:53	KDB	TAL SAC
Total/NA	Analysis	SM 2510B		1			509273	07/22/21 11:30	KDB	TAL SAC
Total/NA	Analysis	SM 2540C		1	10 mL	100 mL	652360	07/19/21 11:03	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	652494	07/20/21 12:41	GG0B	TAL IRV

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: California Department of Water Resources
Job ID: 320-76318-1
Project/Site: Cuyama Valley

Laboratory: Eurofins TestAmerica, Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2897	01-31-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Nitrate Nitrite as N

Laboratory: Eurofins Calscience Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.7 Rev 4.4	200.2	Water	Hardness, as CaCO3

Method Summary

Client: California Department of Water Resources
Job ID: 320-76318-1
Project/Site: Cuyama Valley

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAC
200.7 Rev 4.4	Metals (ICP)	EPA	TAL IRV
200.8	Metals (ICP/MS)	EPA	TAL IRV
245.1	Mercury (CVAA)	EPA	TAL IRV
SM 2320B	Alkalinity	SM	TAL SAC
SM 2510B	Conductivity, Specific Conductance	SM	TAL SAC
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV
SM 5540C	Methylene Blue Active Substances (MBAS)	SM	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76318-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-76318-1	900	Water	07/15/21 10:17	07/16/21 09:30
320-76318-2	901	Water	07/15/21 12:27	07/16/21 09:30
320-76318-3	902	Water	07/15/21 15:05	07/16/21 09:30

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

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Client Information	Sampler: Armin Ghavim	Lab PM: Gonzales, Justinn	Carrier Tracking No(s):	COC No: 320-40289-8508.1
Client Contact: Jack Tung	Phone: (818) 549-2341	E-Mail: Justinn.Gonzales@Eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: California Department of Water Resources	PWSID:			Job #:

Analysis Requested

Address: Division of Operations & Maintenance 1416 Ninth St. Room 620	Due Date Requested:
City: Sacramento	TAT Requested (days):
State, Zip: CA, 95814	Compliance Project: Δ Yes Δ No
Phone: 818-549-2341(Tel)	PO #: 4600012570
Email: Jack.Tung@water.ca.gov	WO #:
Project Name: Camarillo GW Analyses	Project #: 32016345
Site: CRC	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B, 2510B; 2540C_Calcd, 300_ORGFM_28D, 300_ORGFMS, 5540C	200.7 - (MOD) Custom - Pick list	200.8, 245.1	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	D	D		
900	7-15-21	1017	6	Water	N		3	1	1		
901	7-15-21	1227	6	Water	N		3	1	1		
902	7-15-21	1505	6	Water	N		3	1	1		
				Water							
				Water							

320-76318 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Armin Ghavim	1515 / 7-15-21	DWR	Chris Baker	1515 7/15/21	DWR
Chris Baker	1610 / 7/15/21			7-16-21 / 09:30	ETAS AL

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 1504883
Cooler Temperature(s) °C and Other Remarks: 4.8

Ver: 11/01/2020

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gonzales, Justinn	Carrier Tracking No(s): 4895 5416 6304	COC No: 320-232789.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Justinn.Gonzales@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: Eurofins Calscience LLC		Accreditations Required (See note)		Job #: 320-76318-1
Address: 17461 Derian Ave, Suite 100,	Due Date Requested: 8/5/2021			
City: Irvine	TAT Requested (days):			
State, Zip: CA, 92614-5817				
Phone: 949-261-1022(Tel) 949-260-3297(Fax)	PO #:			
Email:	WO #:			
Project Name: Camarillo GW Analyses	Project #: 32016345			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2540C_Calcd/ Total Dissolved Solids (TDS)	5540C/ (MBAS)	200.7/200.2 Metals 200.7 - 10 Metals	200.8/FIELD_FLTRD Metals 200.8 - 13 Metals	245.1/FIELD_FLTRD Mercury (CVAA)	Total Number of containers	Special Instructions/Note:
			Preservation Code:										
900 (320-76318-1)	7/15/21	10:17 Pacific		Water			X	X	X	X	X	4	
901 (320-76318-2)	7/15/21	12:27 Pacific		Water			X	X	X	X	X	4	
902 (320-76318-3)	7/15/21	15:05 Pacific		Water			X	X	X	X	X	4	

Note. Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 7/16/21 1630	Company: ETA	Received by:	Date/Time: 7/17/21 1000	Company: ETA
Relinquished by	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by	Date/Time	Company	Received by	Date/Time.	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: N/CS	Cooler Temperature(s) °C and Other Remarks: 4/4

Login Sample Receipt Checklist

Client: California Department of Water Resources

Job Number: 320-76318-1

Login Number: 76318
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1504883
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: California Department of Water Resources

Job Number: 320-76318-1

Login Number: 76318
List Number: 2
Creator: Lagunas, Jorge L

List Source: Eurofins Calscience Irvine
List Creation: 07/17/21 11:37 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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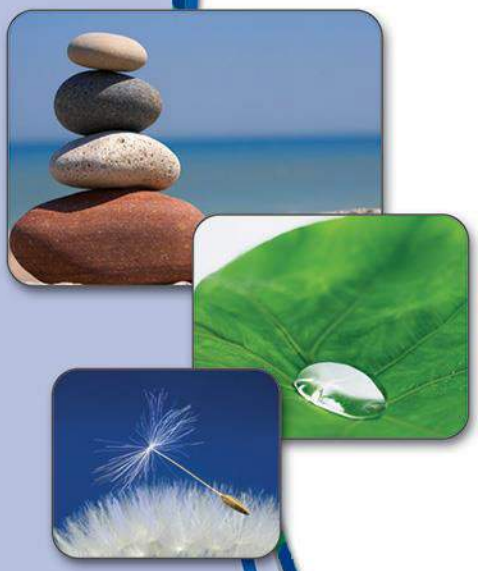

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-76717-1
Client Project/Site: Cuyama Valley

For:
California Department of Water Resources
Division of Operations & Maintenance
1416 Ninth St. Room 620
Sacramento, California 95814

Attn: Jack Tung

Authorized for release by:
8/5/2021 1:32:21 PM

Justinn Gonzales, Project Manager I
(925)484-1919
Justinn.Gonzales@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: California Department of Water Resources
Job ID: 320-76717-1
Project/Site: Cuyama Valley

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Job ID: 320-76717-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-76717-1

Comments
No additional comments.

Receipt
The samples were received on 7/26/2021 10:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 21.6º C.

Receipt Exceptions
The following samples were received at the laboratory outside the required temperature criteria: 903 (320-76717-1), 904 (320-76717-2) and 905 (320-76717-3). Samples were received at 21.6/21.6 deg C on melted ice. The lab was instructed to proceed with analysis per client request.

The following samples were received outside of holding time for NO3, NO2 and MBAS (5540): 903 (320-76717-1), 904 (320-76717-2) and 905 (320-76717-3). The lab was instruced to proceed with analysis per client request.

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. Sample date and time missing on the COC. Sample date taken from sample jars.

HPLC/IC
Method 300.0: The following samples were received outside of holding time: 903 (320-76717-1), 904 (320-76717-2) and 905 (320-76717-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method SM 5540C: The following samples were received outside of holding time: 903 (320-76717-1), 904 (320-76717-2) and 905 (320-76717-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Client Sample ID: 903 — Lab Sample ID: 320-76717-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18		0.50	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	1.2	H H3	0.11	0.055	mg/L	1		300.0	Total/NA
Fluoride	0.60		0.50	0.20	mg/L	1		300.0	Total/NA
Nitrate Nitrite as N	1.2	H H3	0.15	0.055	mg/L	1		300.0	Total/NA
Sulfate	910		25	13	mg/L	50		300.0	Total/NA
Boron	0.20		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	210		0.20	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	890		0.91	0.17	mg/L	1		200.7 Rev 4.4	Total Recoverable
Iron	0.12		0.10	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	87		0.10	0.010	mg/L	1		200.7 Rev 4.4	Total Recoverable
Manganese	0.023		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	6.1		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	99		1.0	0.26	mg/L	1		200.7 Rev 4.4	Total Recoverable
Aluminum	140		10	5.0	ug/L	1		200.8	Total Recoverable
Arsenic	1.2		1.0	0.50	ug/L	1		200.8	Total Recoverable
Barium	17		1.0	0.50	ug/L	1		200.8	Total Recoverable
Chromium	1.9	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Nickel	1.8	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Selenium	1.3	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Vanadium	1.7	J	2.0	1.0	ug/L	1		200.8	Total Recoverable
Alkalinity as CaCO3	150		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	150		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	1800		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA
Resistivity	570		1.0	1.0	ohm cm	1		SM 2510B	Total/NA
Total Dissolved Solids	1600		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: 904 — Lab Sample ID: 320-76717-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	33		5.0	2.5	mg/L	10		300.0	Total/NA
Nitrate as N	0.81	H H3	0.11	0.055	mg/L	1		300.0	Total/NA
Fluoride	0.67		0.50	0.20	mg/L	1		300.0	Total/NA
Nitrate Nitrite as N	0.81	H H3	0.15	0.055	mg/L	1		300.0	Total/NA
Sulfate	990		25	13	mg/L	50		300.0	Total/NA
Boron	0.22		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	200		0.20	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	820		0.91	0.17	mg/L	1		200.7 Rev 4.4	Total Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample ID: 904 (Continued) — Lab Sample ID: 320-76717-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	0.11		0.10	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	80		0.10	0.010	mg/L	1		200.7 Rev 4.4	Total Recoverable
Manganese	0.12		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	7.5		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	150		1.0	0.26	mg/L	1		200.7 Rev 4.4	Total Recoverable
Aluminum	98		10	5.0	ug/L	1		200.8	Total Recoverable
Arsenic	1.6		1.0	0.50	ug/L	1		200.8	Total Recoverable
Barium	19		1.0	0.50	ug/L	1		200.8	Total Recoverable
Chromium	1.8	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Nickel	2.4		2.0	0.50	ug/L	1		200.8	Total Recoverable
Selenium	1.5	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Vanadium	1.8	J	2.0	1.0	ug/L	1		200.8	Total Recoverable
Alkalinity as CaCO3	150		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	150		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	1900		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA
Resistivity	530		1.0	1.0	ohm cm	1		SM 2510B	Total/NA
Total Dissolved Solids	1700		20	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: 905 — Lab Sample ID: 320-76717-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	42	E	0.50	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	1.2	H H3	0.11	0.055	mg/L	1		300.0	Total/NA
Fluoride	0.56	F1	0.50	0.20	mg/L	1		300.0	Total/NA
Nitrate Nitrite as N	1.2	H H3	0.15	0.055	mg/L	1		300.0	Total/NA
Sulfate	1200	E	0.50	0.25	mg/L	1		300.0	Total/NA
Chloride - DL	35		5.0	2.5	mg/L	10		300.0	Total/NA
Sulfate - DL2	860		25	13	mg/L	50		300.0	Total/NA
Boron	0.22		0.050	0.025	mg/L	1		200.7 Rev 4.4	Total Recoverable
Calcium	200		0.20	0.050	mg/L	1		200.7 Rev 4.4	Total Recoverable
Hardness, as CaCO3	820		0.91	0.17	mg/L	1		200.7 Rev 4.4	Total Recoverable
Magnesium	78		0.10	0.010	mg/L	1		200.7 Rev 4.4	Total Recoverable
Manganese	0.099		0.020	0.0068	mg/L	1		200.7 Rev 4.4	Total Recoverable
Potassium	5.0		1.0	0.25	mg/L	1		200.7 Rev 4.4	Total Recoverable
Sodium	120		1.0	0.26	mg/L	1		200.7 Rev 4.4	Total Recoverable
Aluminum	17		10	5.0	ug/L	1		200.8	Total Recoverable

This Detection Summary does not include radiochemical test results.

Client Sample ID: 905 (Continued)
Lab Sample ID: 320-76717-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.86	J	1.0	0.50	ug/L	1		200.8	Total Recoverable
Barium	17		1.0	0.50	ug/L	1		200.8	Total Recoverable
Chromium	1.8	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Nickel	1.9	J	2.0	0.50	ug/L	1		200.8	Total Recoverable
Selenium	2.6		2.0	0.50	ug/L	1		200.8	Total Recoverable
Vanadium	1.9	J	2.0	1.0	ug/L	1		200.8	Total Recoverable
Alkalinity as CaCO3	160		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity	160		4.0	4.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	1800		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA
Resistivity	570		1.0	1.0	ohm cm	1		SM 2510B	Total/NA
Total Dissolved Solids	1600		20	10	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 903
Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-1
Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18		0.50	0.25	mg/L			07/27/21 21:18	1
Nitrate as N	1.2	H H3	0.11	0.055	mg/L			07/27/21 21:18	1
Fluoride	0.60		0.50	0.20	mg/L			07/27/21 21:18	1
Nitrite as N	ND	H H3	0.15	0.024	mg/L			07/27/21 21:18	1
Nitrate Nitrite as N	1.2	H H3	0.15	0.055	mg/L			07/27/21 21:18	1
Sulfate	910		25	13	mg/L			07/27/21 21:37	50

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.20		0.050	0.025	mg/L		07/27/21 08:10	07/28/21 12:00	1
Calcium	210		0.20	0.050	mg/L		07/27/21 08:10	07/28/21 12:00	1
Copper	ND		0.010	0.0050	mg/L		07/27/21 08:10	07/28/21 12:00	1
Hardness, as CaCO3	890		0.91	0.17	mg/L		07/27/21 08:10	07/28/21 12:00	1
Iron	0.12		0.10	0.050	mg/L		07/27/21 08:10	07/28/21 12:00	1
Magnesium	87		0.10	0.010	mg/L		07/27/21 08:10	07/28/21 12:00	1
Manganese	0.023		0.020	0.0068	mg/L		07/27/21 08:10	07/28/21 12:00	1
Potassium	6.1		1.0	0.25	mg/L		07/27/21 08:10	07/28/21 12:00	1
Sodium	99		1.0	0.26	mg/L		07/27/21 08:10	07/28/21 12:00	1
Zinc	ND		0.020	0.012	mg/L		07/27/21 08:10	07/28/21 12:00	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Aluminum	140		10	5.0	ug/L		07/27/21 08:20	07/27/21 13:38	1
Arsenic	1.2		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Barium	17		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Beryllium	ND		0.50	0.25	ug/L		07/27/21 08:20	07/27/21 13:38	1
Cadmium	ND		1.0	0.25	ug/L		07/27/21 08:20	07/27/21 13:38	1
Chromium	1.9	J	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Nickel	1.8	J	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Lead	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Antimony	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Selenium	1.3	J	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:38	1
Thallium	ND		1.0	0.20	ug/L		07/27/21 08:20	07/27/21 13:38	1
Vanadium	1.7	J	2.0	1.0	ug/L		07/27/21 08:20	07/27/21 13:38	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/03/21 10:04	08/03/21 15:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	150		4.0	4.0	mg/L			07/27/21 07:36	1
Bicarbonate Alkalinity	150		4.0	4.0	mg/L			07/27/21 07:36	1
Carbonate Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:36	1
Hydroxide Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:36	1
Specific Conductance	1800		1.0	1.0	umhos/cm			08/03/21 15:40	1
Resistivity	570		1.0	1.0	ohm cm			08/03/21 15:40	1
Total Dissolved Solids	1600		20	10	mg/L			07/29/21 09:00	1
Methylene Blue Active Substances	ND	H H3	0.10	0.050	mg/L			07/28/21 16:28	1

Client Sample ID: 904
Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-2
Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**33**		5.0	2.5	mg/L			07/28/21 00:14	10
Nitrate as N	**0.81**	**H H3**	0.11	0.055	mg/L			07/27/21 21:57	1
Fluoride	**0.67**		0.50	0.20	mg/L			07/27/21 21:57	1
Nitrite as N	ND	H H3	0.15	0.024	mg/L			07/27/21 21:57	1
Nitrate Nitrite as N	**0.81**	**H H3**	0.15	0.055	mg/L			07/27/21 21:57	1
Sulfate	**990**		25	13	mg/L			07/27/21 22:16	50

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**0.22**		0.050	0.025	mg/L		07/27/21 08:10	07/28/21 12:07	1
Calcium	**200**		0.20	0.050	mg/L		07/27/21 08:10	07/28/21 12:07	1
Copper	ND		0.010	0.0050	mg/L		07/27/21 08:10	07/28/21 12:07	1
Hardness, as CaCO3	**820**		0.91	0.17	mg/L		07/27/21 08:10	07/28/21 12:07	1
Iron	**0.11**		0.10	0.050	mg/L		07/27/21 08:10	07/28/21 12:07	1
Magnesium	**80**		0.10	0.010	mg/L		07/27/21 08:10	07/28/21 12:07	1
Manganese	**0.12**		0.020	0.0068	mg/L		07/27/21 08:10	07/28/21 12:07	1
Potassium	**7.5**		1.0	0.25	mg/L		07/27/21 08:10	07/28/21 12:07	1
Sodium	**150**		1.0	0.26	mg/L		07/27/21 08:10	07/28/21 12:07	1
Zinc	ND		0.020	0.012	mg/L		07/27/21 08:10	07/28/21 12:07	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Aluminum	**98**		10	5.0	ug/L		07/27/21 08:20	07/27/21 13:40	1
Arsenic	**1.6**		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Barium	**19**		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Beryllium	ND		0.50	0.25	ug/L		07/27/21 08:20	07/27/21 13:40	1
Cadmium	ND		1.0	0.25	ug/L		07/27/21 08:20	07/27/21 13:40	1
Chromium	**1.8**	**J**	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Nickel	**2.4**		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Lead	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Antimony	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Selenium	**1.5**	**J**	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:40	1
Thallium	ND		1.0	0.20	ug/L		07/27/21 08:20	07/27/21 13:40	1
Vanadium	**1.8**	**J**	2.0	1.0	ug/L		07/27/21 08:20	07/27/21 13:40	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/03/21 10:04	08/03/21 15:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	**150**		4.0	4.0	mg/L			07/27/21 07:51	1
Bicarbonate Alkalinity	**150**		4.0	4.0	mg/L			07/27/21 07:51	1
Carbonate Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:51	1
Hydroxide Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:51	1
Specific Conductance	**1900**		1.0	1.0	umhos/cm			08/03/21 15:40	1
Resistivity	**530**		1.0	1.0	ohm cm			08/03/21 15:40	1
Total Dissolved Solids	**1700**		20	10	mg/L			07/29/21 09:00	1
Methylene Blue Active Substances	ND	H H3	0.10	0.050	mg/L			07/28/21 16:28	1

Client Sample ID: 905
Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-3
Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**42**	**E**	0.50	0.25	mg/L			07/27/21 22:36	1
Nitrate as N	**1.2**	**H H3**	0.11	0.055	mg/L			07/27/21 22:36	1
Fluoride	**0.56**	**F1**	0.50	0.20	mg/L			07/27/21 22:36	1
Nitrite as N	ND	H H3	0.15	0.024	mg/L			07/27/21 22:36	1
Nitrate Nitrite as N	**1.2**	**H H3**	0.15	0.055	mg/L			07/27/21 22:36	1
Sulfate	**1200**	**E**	0.50	0.25	mg/L			07/27/21 22:36	1

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**35**		5.0	2.5	mg/L			07/27/21 23:35	10

Method: 300.0 - Anions, Ion Chromatography - DL2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**860**		25	13	mg/L			07/27/21 23:55	50

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**0.22**		0.050	0.025	mg/L		07/27/21 08:10	07/28/21 12:10	1
Calcium	**200**		0.20	0.050	mg/L		07/27/21 08:10	07/28/21 12:10	1
Copper	ND		0.010	0.0050	mg/L		07/27/21 08:10	07/28/21 12:10	1
Hardness, as CaCO3	**820**		0.91	0.17	mg/L		07/27/21 08:10	07/28/21 12:10	1
Iron	ND		0.10	0.050	mg/L		07/27/21 08:10	07/28/21 12:10	1
Magnesium	**78**		0.10	0.010	mg/L		07/27/21 08:10	07/28/21 12:10	1
Manganese	**0.099**		0.020	0.0068	mg/L		07/27/21 08:10	07/28/21 12:10	1
Potassium	**5.0**		1.0	0.25	mg/L		07/27/21 08:10	07/28/21 12:10	1
Sodium	**120**		1.0	0.26	mg/L		07/27/21 08:10	07/28/21 12:10	1
Zinc	ND		0.020	0.012	mg/L		07/27/21 08:10	07/28/21 12:10	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Aluminum	**17**		10	5.0	ug/L		07/27/21 08:20	07/27/21 13:43	1
Arsenic	**0.86**	**J**	1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Barium	**17**		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Beryllium	ND		0.50	0.25	ug/L		07/27/21 08:20	07/27/21 13:43	1
Cadmium	ND		1.0	0.25	ug/L		07/27/21 08:20	07/27/21 13:43	1
Chromium	**1.8**	**J**	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Nickel	**1.9**	**J**	2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Lead	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Antimony	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Selenium	**2.6**		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:43	1
Thallium	ND		1.0	0.20	ug/L		07/27/21 08:20	07/27/21 13:43	1
Vanadium	**1.9**	**J**	2.0	1.0	ug/L		07/27/21 08:20	07/27/21 13:43	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/03/21 10:04	08/03/21 15:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	**160**		4.0	4.0	mg/L			07/27/21 07:58	1

Client: California Department of Water Resources
Job ID: 320-76717-1
Project/Site: Cuyama Valley

Client Sample ID: 905
Lab Sample ID: 320-76717-3
Date Collected: 07/22/21 00:00
Matrix: Water
Date Received: 07/26/21 10:15

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity	**160**		4.0	4.0	mg/L			07/27/21 07:58	1
Carbonate Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:58	1
Hydroxide Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:58	1
Specific Conductance	**1800**		1.0	1.0	umhos/cm			08/03/21 15:40	1
Resistivity	**570**		1.0	1.0	ohm cm			08/03/21 15:40	1
Total Dissolved Solids	**1600**		20	10	mg/L			07/29/21 09:00	1
Methylene Blue Active Substances	ND	H H3	0.10	0.050	mg/L			07/28/21 16:28	1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 440-653049/6
Matrix: Water
Analysis Batch: 653049

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.11	0.055	mg/L			07/27/21 12:14	1
Nitrite as N	ND		0.15	0.024	mg/L			07/27/21 12:14	1
Nitrate Nitrite as N	ND		0.15	0.055	mg/L			07/27/21 12:14	1

Lab Sample ID: LCS 440-653049/5
Matrix: Water
Analysis Batch: 653049

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	1.13	1.15		mg/L		102	90 - 110
Nitrite as N	1.52	1.54		mg/L		101	90 - 110
Nitrate Nitrite as N	2.65	2.69		mg/L		101	90 - 110

Lab Sample ID: 320-76717-3 MS
Matrix: Water
Analysis Batch: 653049

Client Sample ID: 905
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	1.2	H H3	1.13	2.20		mg/L		92	80 - 120
Nitrite as N	ND	H H3	1.52	1.37		mg/L		90	80 - 120
Nitrate Nitrite as N	1.2	H H3	2.65	3.57		mg/L		89	80 - 120

Lab Sample ID: 320-76717-3 MSD
Matrix: Water
Analysis Batch: 653049

Client Sample ID: 905
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	1.2	H H3	1.13	2.18		mg/L		90	80 - 120	1	20
Nitrite as N	ND	H H3	1.52	1.36		mg/L		89	80 - 120	1	20
Nitrate Nitrite as N	1.2	H H3	2.65	3.54		mg/L		88	80 - 120	1	20

Lab Sample ID: MB 440-653050/6
Matrix: Water
Analysis Batch: 653050

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50	0.25	mg/L			07/27/21 12:14	1
Fluoride	ND		0.50	0.20	mg/L			07/27/21 12:14	1
Sulfate	ND		0.50	0.25	mg/L			07/27/21 12:14	1

Lab Sample ID: LCS 440-653050/5
Matrix: Water
Analysis Batch: 653050

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	5.00	5.03		mg/L		101	90 - 110
Fluoride	5.00	4.87		mg/L		97	90 - 110
Sulfate	5.00	5.25		mg/L		105	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 320-76717-3 MS
Matrix: Water
Analysis Batch: 653050

Client Sample ID: 905
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	42	E	5.00	48.0	E 4	mg/L		122	80 - 120
Fluoride	0.56	F1	5.00	4.50	F1	mg/L		79	80 - 120
Sulfate	1200	E	5.00	1230	E 4	mg/L		-19	80 - 120

Lab Sample ID: 320-76717-3 MSD
Matrix: Water
Analysis Batch: 653050

Client Sample ID: 905
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	42	E	5.00	48.0	E 4	mg/L		122	80 - 120	0	20
Fluoride	0.56	F1	5.00	4.56		mg/L		80	80 - 120	1	20
Sulfate	1200	E	5.00	1230	E 4	mg/L		36	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 440-653035/1-A
Matrix: Water
Analysis Batch: 653225

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 653035

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	0.025	mg/L		07/27/21 08:10	07/28/21 11:51	1
Calcium	ND		0.20	0.050	mg/L		07/27/21 08:10	07/28/21 11:51	1
Copper	ND		0.010	0.0050	mg/L		07/27/21 08:10	07/28/21 11:51	1
Hardness, as CaCO3	ND		0.91	0.17	mg/L		07/27/21 08:10	07/28/21 11:51	1
Iron	ND		0.10	0.050	mg/L		07/27/21 08:10	07/28/21 11:51	1
Magnesium	ND		0.10	0.010	mg/L		07/27/21 08:10	07/28/21 11:51	1
Manganese	ND		0.020	0.0068	mg/L		07/27/21 08:10	07/28/21 11:51	1
Potassium	ND		1.0	0.25	mg/L		07/27/21 08:10	07/28/21 11:51	1
Sodium	ND		1.0	0.26	mg/L		07/27/21 08:10	07/28/21 11:51	1
Zinc	ND		0.020	0.012	mg/L		07/27/21 08:10	07/28/21 11:51	1

Lab Sample ID: LCS 440-653035/2-A
Matrix: Water
Analysis Batch: 653225

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 653035

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.500	0.489		mg/L		98	85 - 115
Calcium	2.50	2.52		mg/L		101	85 - 115
Copper	0.500	0.500		mg/L		100	85 - 115
Iron	0.500	0.489		mg/L		98	85 - 115
Magnesium	2.50	2.48		mg/L		99	85 - 115
Manganese	0.500	0.496		mg/L		99	85 - 115
Potassium	5.00	4.90		mg/L		98	85 - 115
Sodium	5.00	4.78		mg/L		96	85 - 115
Zinc	0.500	0.506		mg/L		101	85 - 115

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 320-76717-1 MS
Matrix: Water
Analysis Batch: 653225

Client Sample ID: 903
Prep Type: Total Recoverable
Prep Batch: 653035

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.20		0.500	0.728		mg/L		105	70 - 130
Calcium	210		2.50	220	4	mg/L		276	70 - 130
Copper	ND		0.500	0.533		mg/L		107	70 - 130
Iron	0.12		0.500	0.626		mg/L		101	70 - 130
Magnesium	87		2.50	91.3	4	mg/L		175	70 - 130
Manganese	0.023		0.500	0.524		mg/L		100	70 - 130
Potassium	6.1		5.00	11.3		mg/L		104	70 - 130
Sodium	99		5.00	106	4	mg/L		126	70 - 130
Zinc	ND		0.500	0.483		mg/L		97	70 - 130

Lab Sample ID: 320-76717-1 MSD
Matrix: Water
Analysis Batch: 653225

Client Sample ID: 903
Prep Type: Total Recoverable
Prep Batch: 653035

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.20		0.500	0.723		mg/L		104	70 - 130	1	20
Calcium	210		2.50	218	4	mg/L		204	70 - 130	1	20
Copper	ND		0.500	0.532		mg/L		106	70 - 130	0	20
Iron	0.12		0.500	0.674		mg/L		110	70 - 130	7	20
Magnesium	87		2.50	90.4	4	mg/L		138	70 - 130	1	20
Manganese	0.023		0.500	0.523		mg/L		100	70 - 130	0	20
Potassium	6.1		5.00	11.3		mg/L		103	70 - 130	0	20
Sodium	99		5.00	105	4	mg/L		118	70 - 130	0	20
Zinc	ND		0.500	0.481		mg/L		96	70 - 130	0	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-653036/1-A
Matrix: Water
Analysis Batch: 653078

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 653036

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Aluminum	ND		10	5.0	ug/L		07/27/21 08:20	07/27/21 13:02	1
Arsenic	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Barium	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Beryllium	ND		0.50	0.25	ug/L		07/27/21 08:20	07/27/21 13:02	1
Cadmium	ND		1.0	0.25	ug/L		07/27/21 08:20	07/27/21 13:02	1
Chromium	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Nickel	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Lead	ND		1.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Antimony	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Selenium	ND		2.0	0.50	ug/L		07/27/21 08:20	07/27/21 13:02	1
Thallium	ND		1.0	0.20	ug/L		07/27/21 08:20	07/27/21 13:02	1
Vanadium	ND		2.0	1.0	ug/L		07/27/21 08:20	07/27/21 13:02	1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 440-653036/2-A
Matrix: Water
Analysis Batch: 653078

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 653036

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	80.0	80.9		ug/L		101	85 - 115
Aluminum	80.0	78.3		ug/L		98	85 - 115
Arsenic	80.0	77.4		ug/L		97	85 - 115
Barium	80.0	75.9		ug/L		95	85 - 115
Beryllium	80.0	78.9		ug/L		99	85 - 115
Cadmium	80.0	75.4		ug/L		94	85 - 115
Chromium	80.0	77.3		ug/L		97	85 - 115
Nickel	80.0	76.9		ug/L		96	85 - 115
Lead	80.0	75.1		ug/L		94	85 - 115
Antimony	80.0	78.4		ug/L		98	85 - 115
Selenium	80.0	77.7		ug/L		97	85 - 115
Thallium	80.0	77.7		ug/L		97	85 - 115
Vanadium	80.0	76.5		ug/L		96	85 - 115

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-653634/1-A
Matrix: Water
Analysis Batch: 653682

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 653634

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		08/03/21 10:04	08/03/21 14:50	1

Lab Sample ID: LCS 440-653634/2-A
Matrix: Water
Analysis Batch: 653682

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 653634

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	5.66		ug/L		94	85 - 115

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 440-653034/3
Matrix: Water
Analysis Batch: 653034

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		4.0	4.0	mg/L			07/27/21 07:29	1
Bicarbonate Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:29	1
Carbonate Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:29	1
Hydroxide Alkalinity	ND		4.0	4.0	mg/L			07/27/21 07:29	1

Lab Sample ID: LCS 440-653034/2
Matrix: Water
Analysis Batch: 653034

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	75.8	77.8		mg/L		103	80 - 120

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 320-76717-1 DU
Matrix: Water
Analysis Batch: 653034

Client Sample ID: 903
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity as CaCO3	150			148		mg/L				2	20
Bicarbonate Alkalinity	150			148		mg/L				2	20
Carbonate Alkalinity	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 440-653681/3
Matrix: Water
Analysis Batch: 653681

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			08/03/21 15:40	1

Lab Sample ID: LCS 440-653681/4
Matrix: Water
Analysis Batch: 653681

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			687	679		umhos/cm		99	90 - 110		

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 440-653166/1
Matrix: Water
Analysis Batch: 653166

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	5.0	mg/L			07/29/21 09:00	1

Lab Sample ID: LCS 440-653166/2
Matrix: Water
Analysis Batch: 653166

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			1000	978		mg/L		98	90 - 110		

Lab Sample ID: 320-76717-3 DU
Matrix: Water
Analysis Batch: 653166

Client Sample ID: 905
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	1600			1590		mg/L				1	5

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Method: SM 5540C - Methylene Blue Active Substances (MBAS)

Lab Sample ID: MB 440-653231/4
Matrix: Water
Analysis Batch: 653231

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Blue Active Substances	ND		0.10	0.050	mg/L			07/28/21 16:27	1

Lab Sample ID: LCS 440-653231/5
Matrix: Water
Analysis Batch: 653231

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.250	0.268		mg/L		107	90 - 110

Lab Sample ID: MRL 440-653231/3
Matrix: Water
Analysis Batch: 653231

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.100	0.129		mg/L		129	50 - 150

HPLC/IC

Analysis Batch: 653049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	300.0	
320-76717-2	904	Total/NA	Water	300.0	
320-76717-3	905	Total/NA	Water	300.0	
MB 440-653049/6	Method Blank	Total/NA	Water	300.0	
LCS 440-653049/5	Lab Control Sample	Total/NA	Water	300.0	
320-76717-3 MS	905	Total/NA	Water	300.0	
320-76717-3 MSD	905	Total/NA	Water	300.0	

Analysis Batch: 653050

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	300.0	
320-76717-1	903	Total/NA	Water	300.0	
320-76717-2	904	Total/NA	Water	300.0	
320-76717-2	904	Total/NA	Water	300.0	
320-76717-2	904	Total/NA	Water	300.0	
320-76717-3	905	Total/NA	Water	300.0	
320-76717-3 - DL	905	Total/NA	Water	300.0	
320-76717-3 - DL2	905	Total/NA	Water	300.0	
MB 440-653050/6	Method Blank	Total/NA	Water	300.0	
LCS 440-653050/5	Lab Control Sample	Total/NA	Water	300.0	
320-76717-3 MS	905	Total/NA	Water	300.0	
320-76717-3 MSD	905	Total/NA	Water	300.0	

Metals

Prep Batch: 653035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total Recoverable	Water	200.2	
320-76717-2	904	Total Recoverable	Water	200.2	
320-76717-3	905	Total Recoverable	Water	200.2	
MB 440-653035/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-653035/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
320-76717-1 MS	903	Total Recoverable	Water	200.2	
320-76717-1 MSD	903	Total Recoverable	Water	200.2	

Prep Batch: 653036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total Recoverable	Water	200.2	
320-76717-2	904	Total Recoverable	Water	200.2	
320-76717-3	905	Total Recoverable	Water	200.2	
MB 440-653036/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-653036/2-A	Lab Control Sample	Total Recoverable	Water	200.2	

Analysis Batch: 653078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total Recoverable	Water	200.8	653036
320-76717-2	904	Total Recoverable	Water	200.8	653036
320-76717-3	905	Total Recoverable	Water	200.8	653036
MB 440-653036/1-A	Method Blank	Total Recoverable	Water	200.8	653036
LCS 440-653036/2-A	Lab Control Sample	Total Recoverable	Water	200.8	653036

Metals

Analysis Batch: 653225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total Recoverable	Water	200.7 Rev 4.4	653035
320-76717-2	904	Total Recoverable	Water	200.7 Rev 4.4	653035
320-76717-3	905	Total Recoverable	Water	200.7 Rev 4.4	653035
MB 440-653035/1-A	Method Blank	Total Recoverable	Water	200.7 Rev 4.4	653035
LCS 440-653035/2-A	Lab Control Sample	Total Recoverable	Water	200.7 Rev 4.4	653035
320-76717-1 MS	903	Total Recoverable	Water	200.7 Rev 4.4	653035
320-76717-1 MSD	903	Total Recoverable	Water	200.7 Rev 4.4	653035

Prep Batch: 653634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	245.1	
320-76717-2	904	Total/NA	Water	245.1	
320-76717-3	905	Total/NA	Water	245.1	
MB 440-653634/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-653634/2-A	Lab Control Sample	Total/NA	Water	245.1	

Analysis Batch: 653682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	245.1	653634
320-76717-2	904	Total/NA	Water	245.1	653634
320-76717-3	905	Total/NA	Water	245.1	653634
MB 440-653634/1-A	Method Blank	Total/NA	Water	245.1	653634
LCS 440-653634/2-A	Lab Control Sample	Total/NA	Water	245.1	653634

General Chemistry

Analysis Batch: 653034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	SM 2320B	
320-76717-2	904	Total/NA	Water	SM 2320B	
320-76717-3	905	Total/NA	Water	SM 2320B	
MB 440-653034/3	Method Blank	Total/NA	Water	SM 2320B	
LCS 440-653034/2	Lab Control Sample	Total/NA	Water	SM 2320B	
320-76717-1 DU	903	Total/NA	Water	SM 2320B	

Analysis Batch: 653166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	SM 2540C	
320-76717-2	904	Total/NA	Water	SM 2540C	
320-76717-3	905	Total/NA	Water	SM 2540C	
MB 440-653166/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 440-653166/2	Lab Control Sample	Total/NA	Water	SM 2540C	
320-76717-3 DU	905	Total/NA	Water	SM 2540C	

Analysis Batch: 653231

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	SM 5540C	
320-76717-2	904	Total/NA	Water	SM 5540C	
320-76717-3	905	Total/NA	Water	SM 5540C	
MB 440-653231/4	Method Blank	Total/NA	Water	SM 5540C	
LCS 440-653231/5	Lab Control Sample	Total/NA	Water	SM 5540C	

General Chemistry (Continued)

Analysis Batch: 653231 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MRL 440-653231/3	Lab Control Sample	Total/NA	Water	SM 5540C	

Analysis Batch: 653681

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-76717-1	903	Total/NA	Water	SM 2510B	
320-76717-2	904	Total/NA	Water	SM 2510B	
320-76717-3	905	Total/NA	Water	SM 2510B	
MB 440-653681/3	Method Blank	Total/NA	Water	SM 2510B	
LCS 440-653681/4	Lab Control Sample	Total/NA	Water	SM 2510B	

Lab Chronicle

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Client Sample ID: 903

Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			653049	07/27/21 21:18	NIH3	TAL IRV
Total/NA	Analysis	300.0		1			653050	07/27/21 21:18	NIH3	TAL IRV
Total/NA	Analysis	300.0		50			653050	07/27/21 21:37	NIH3	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	653035	07/27/21 08:10	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			653225	07/28/21 12:00	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	653036	07/27/21 08:20	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			653078	07/27/21 13:38	Y2WS	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653634	08/03/21 10:04	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653682	08/03/21 15:05	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			653034	07/27/21 07:36	YO8L	TAL IRV
Total/NA	Analysis	SM 2510B		1			653681	08/03/21 15:40	VY3D	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	653166	07/29/21 09:00	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	653231	07/28/21 16:28	GG0B	TAL IRV

Client Sample ID: 904

Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			653049	07/27/21 21:57	NIH3	TAL IRV
Total/NA	Analysis	300.0		1			653050	07/27/21 21:57	NIH3	TAL IRV
Total/NA	Analysis	300.0		50			653050	07/27/21 22:16	NIH3	TAL IRV
Total/NA	Analysis	300.0		10			653050	07/28/21 00:14	NIH3	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	653035	07/27/21 08:10	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			653225	07/28/21 12:07	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	653036	07/27/21 08:20	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			653078	07/27/21 13:40	Y2WS	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653634	08/03/21 10:04	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653682	08/03/21 15:08	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			653034	07/27/21 07:51	YO8L	TAL IRV
Total/NA	Analysis	SM 2510B		1			653681	08/03/21 15:40	VY3D	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	653166	07/29/21 09:00	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	653231	07/28/21 16:28	GG0B	TAL IRV

Client Sample ID: 905

Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			653049	07/27/21 22:36	NIH3	TAL IRV
Total/NA	Analysis	300.0		1			653050	07/27/21 22:36	NIH3	TAL IRV
Total/NA	Analysis	300.0	DL	10			653050	07/27/21 23:35	NIH3	TAL IRV
Total/NA	Analysis	300.0	DL2	50			653050	07/27/21 23:55	NIH3	TAL IRV

Lab Chronicle

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Client Sample ID: 905

Date Collected: 07/22/21 00:00
Date Received: 07/26/21 10:15

Lab Sample ID: 320-76717-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	200.2			25 mL	25 mL	653035	07/27/21 08:10	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			653225	07/28/21 12:10	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	653036	07/27/21 08:20	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			653078	07/27/21 13:43	Y2WS	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	653634	08/03/21 10:04	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			653682	08/03/21 15:10	MA6V	TAL IRV
Total/NA	Analysis	SM 2320B		1			653034	07/27/21 07:58	YO8L	TAL IRV
Total/NA	Analysis	SM 2510B		1			653681	08/03/21 15:40	VY3D	TAL IRV
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	653166	07/29/21 09:00	VY3D	TAL IRV
Total/NA	Analysis	SM 5540C		1	100 mL	100 mL	653231	07/28/21 16:28	GG0B	TAL IRV

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Accreditation/Certification Summary

Client: California Department of Water Resources
Job ID: 320-76717-1
Project/Site: Cuyama Valley

Laboratory: Eurofins Calscience Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2510B		Water	Resistivity

Method Summary

Client: California Department of Water Resources
Job ID: 320-76717-1
Project/Site: Cuyama Valley

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL IRV
200.7 Rev 4.4	Metals (ICP)	EPA	TAL IRV
200.8	Metals (ICP/MS)	EPA	TAL IRV
245.1	Mercury (CVAA)	EPA	TAL IRV
SM 2320B	Alkalinity	SM	TAL IRV
SM 2510B	Conductivity, Specific Conductance	SM	TAL IRV
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL IRV
SM 5540C	Methylene Blue Active Substances (MBAS)	SM	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Sample Summary

Client: California Department of Water Resources
Project/Site: Cuyama Valley

Job ID: 320-76717-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-76717-1	903	Water	07/22/21 00:00	07/26/21 10:15
320-76717-2	904	Water	07/22/21 00:00	07/26/21 10:15
320-76717-3	905	Water	07/22/21 00:00	07/26/21 10:15

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261 1022 Fax: 949-260-3297

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Eddie Reza TJ NGUYEN	Lab PM: Gonzales, Justinn	Carrier Tracking No(s):	COC No: 320-34328-8508.1
Client Contact: Jack Tung	Phone: 626 228 5829 ~~818 549 2341~~	E-Mail: Justinn.Gonzales@Eurofinset.com		Page: Page 1 of 1
Company: California Department of Water Resources				Job #:
Address: Division of Operations & Maintenance 1416 Ninth St. Room 620	Due Date Requested:			
City: Sacramento	TAT Requested (days): Standard			
State, Zip: CA, 95814				
Phone: 818-549-2341(Tel)	PO #: 4600012570			
Email: Jack.Tung@water.ca.gov	WO #:			
Project Name: Camarillo GW Analyses	Project #: 32016345			
Site: Wegis	SSOW#:			

Analysis Requested

Preservation Codes:

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
G	Amchlor	S	H2SO4
H	Ascorbic Acid	T	TSP Dodecahydrate
I	Ice	U	Acetone
J	DI Water	V	MCAA
K	EDTA	W	pH 4-5
L	EDA	Z	other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B, 2510B, 2540C_Calcd, 300_ORGFM_28D, 300_ORGFMS, 6640C	200.7 (MOD) Custom Pick list	200.8, 245.1	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	D	D		
903			G	Water	NO FILTER		3	1	1		
904			G	Water			3	1	1		
905			G	Water			3	1	1		
				Water							
				Water							

320-76717 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I II, III, IV Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	7/22/21 16 00	DWR			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by: fedex 5120650854 60	Date/Time:	Company	Received by:	Date/Time: 7/26/21 1015	Company ECIRV

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks: 1289 21.6/21.6 melted ice

Ver: 01 16/2019

Login Sample Receipt Checklist

Client: California Department of Water Resources

Job Number: 320-76717-1

Login Number: 76717
List Number: 2
Creator: Skinner, Alma D

List Source: Eurofins Calscience Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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