Water Supply Assessment For the California Renewable Carbon Williams Production Facility

Colusa County, California

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1.0 INTRODUCTION

This Water Supply Assessment has been prepared for California Renewable Carbon, LLC (CRC) for the proposed Williams Production Facility (the "Project") in Colusa County, California (Figure 1-1). The overall Project entails the installation and operation of a biocarbon production facility using renewable biomass on an existing approximately 49-acre industrial site at 6229 Myers Road in Williams, California.

Water Code Sections 10910 through 10915 were amended by Senate Bill 610 (SB 610) in 2002. SB 610 requires that under specific circumstances, as detailed below, an assessment of available water supplies must be conducted. The purpose of the assessment is to determine if available water supplies are sufficient to serve the demand generated by the Project, as well as the reasonably foreseeable demand in the region over the next 20 years under average normal year, single dry year, and multiple dry year conditions. Water Code Section 10910 was further amended by SB 1262 on September 24, 2016 to require a Water Supply Assessment to include additional information regarding the groundwater basin designation and adjacent water systems. This report provides the information required for a Water Supply Assessment (WSA), as described in the October 2003 *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning*, published by the California Department of Water Resources (DWR Guidebook) along with the additional information required by SB 1262.

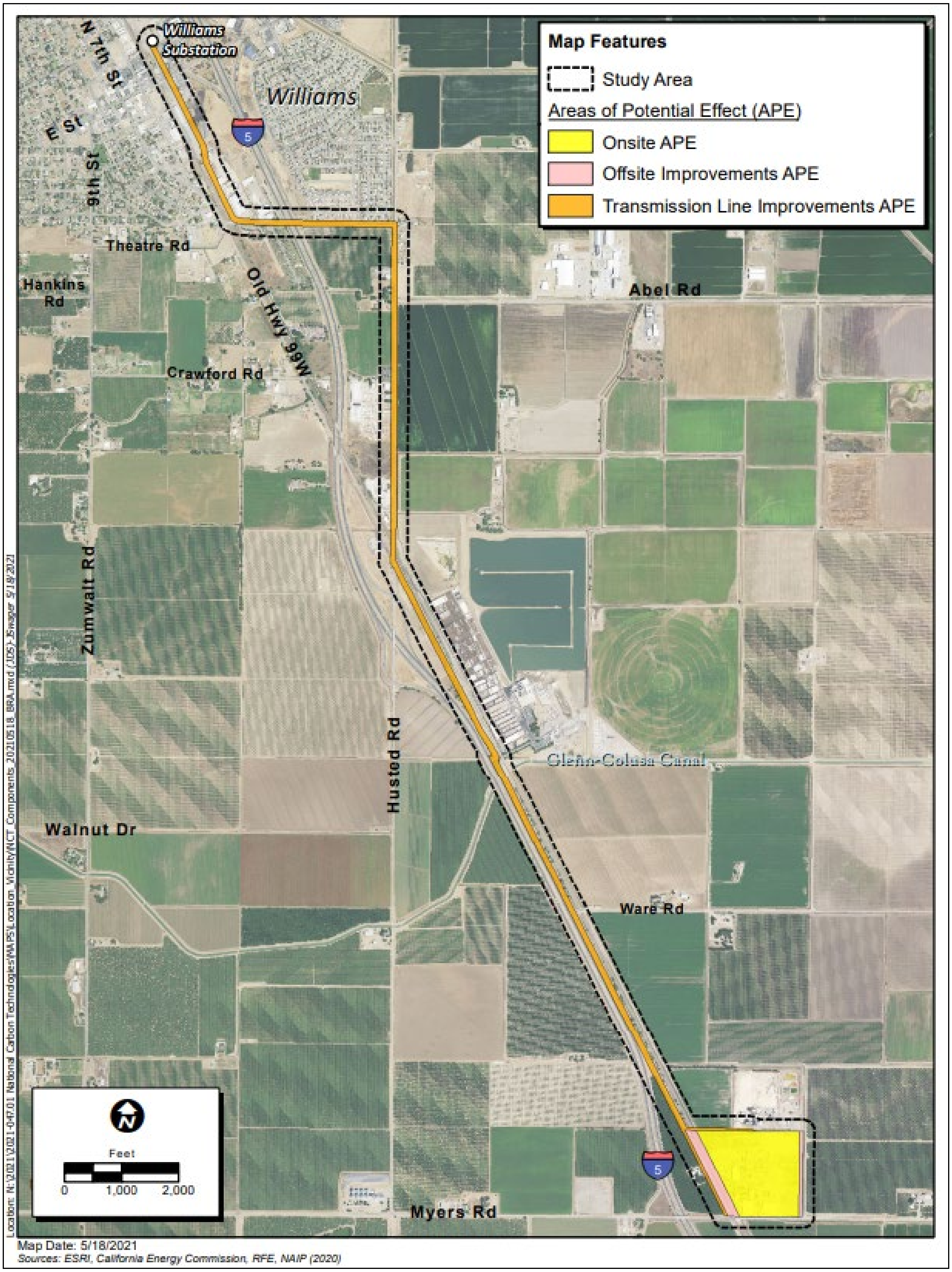

Figure 1-1. Project Location and Vicinity

2.0 PROJECT DESCRIPTION

CRC is a leader in environmental technology with more than 185 issued and pending patents around processes and products engineered to improve the environment. CRC proposes to repurpose an existing facility in Colusa County to construct a new renewable biocarbon production facility. The new facility will use CRC's patented non combustion technology to convert sustainably sourced biomass into renewable biocarbon products. The new facility will use self-generated renewable biogas for process energy as well as generate and export renewable electricity to the grid. The new biocarbon process will be net water positive and carbon negative on a lifecycle basis. The facility also will significantly reduce regional air emissions by thousands of tons per year by converting locally sourced biomass such as orchard rotations and trimmings, that otherwise undergo open burning or land disposal, into renewable biocarbon products. CRC's products will be used to displace fossil-based products and reduce environmental impacts from metals production, energy generation, and crop production, and to purify the air and water. CRC will create more than 65 direct clean-tech jobs working toward environmental improvement.

The Project Site is located at 6229 Myers Road in unincorporated Colusa County, approximately 1.4 miles south of Williams, California (see Figure 1-1). The approximately 49-acre site at the northeast corner of the intersection of Myers Road and Frontage Road would be the location of the CRC Williams facility. The site currently accommodates the existing Olam Tomato Processing facility, comprising approximately 161,000 square feet of existing buildings, an existing rail spur, and two existing water wells, as shown on the Site Plan for the Project dated June 30, 2021. The site is bound by the Wadham Energy Company facility just north of the Project Site with agricultural lands north of the Wadham facility, and agricultural land and residences to the east and south. The Union Pacific Railroad (UPRR) tracks and Frontage Road run west of the site then Interstate-5 (I-5) further west. Orchard land with a single-family residence on a parcel zoned for Heavy Industrial (M-2) is located between Frontage Road and I-5 approximately 150 feet from the western boundary of the site. The site is located approximately 1,000 feet (0.3 mile) from I-5. The ground surface elevation varies from approximately 98 feet in the northwest corner of the property to approximately 91 feet in the southeast corner of the property.

The Project will use renewable biomass, primarily in the form of orchard rotations and trimmings, to produce a biocarbon product using a net water positive, non-combustion process involving thermal conversion of biomass. The process will use self-generated biogas for process energy and will provide net electric power for export sale to Pacific Gas and Electric (PG&E) through interconnection to either a PG&E 12 kilovolt (kV) distribution line or PG&E’s Wadham 60 kV power line to PG&E’s Williams Generating Station. The project will also include improvements to, and extension of, an existing rail spur system on the property which interconnects with the Union Pacific Railroad tracks adjacent to the property.

The process at the CRC Williams facility would involve the following components discussed in more detail:

- Biomass receiving and sizing;
- Biomass drying;

- Non-combustion thermal conversion;
- Pelletizing;
- Pellet finishing and shipping; and
- Cogeneration.

CRC would utilize all existing buildings onsite and would construct several smaller support structures for the process. A new paved access road into the northeast corner of the facility would be constructed as well as a new drainage basin and other drainage improvements. New process equipment, tanks, pipe bridges, and conveyor belts would be installed outdoors in the central portion of the site in and around existing buildings.

The Project would involve improvements to, and extension of, an existing rail spur system on the property that interconnects to the UPRR tracks that run adjacent to the Project Site and along I-5. Improvements to the existing rail spur may involve improvements to the rail spur track (i.e., new ballast, ties, rail), signal improvements, and/or improvements to utility lines along the rail spur (electrical lines, fiber optic lines, etc.). Improvements to the UPRR tracks may be requested by UPRR, including potentially new ballast, ties, rail, and/or signal or utility line improvements on or near the UPRR tracks. Extension of the rail spur is also proposed along the eastern boundary of the CRC Williams facility property. New track, signal facilities, and utility lines will be installed in this area in support of the rail spur. Finally, a new rail spur loadout area would be constructed adjacent to the new rail spur.

Biogas from the process would be used in a new cogeneration system for generation of electricity. The process would provide net electric power for export sale to PG&E through interconnection to either PG&E's Williams 1101 12 kV distribution line or PG&E's Wadham 60 kV power line to PG&E's Williams Generating Station. Both existing lines are located on the same power poles along Frontage Road running north to the PG&E Williams Generating Station in Williams. It is assumed that PG&E will require reconductoring along this route and may require replacement of some or all of the power poles along this route. For interconnection to the 12 kV distribution line, a new transformer or circuit breaker may be required at the PG&E Williams Generating Station (within the station facility). Alternatively, for interconnection to the Wadham 60 kV power line, a new 60 kV gentie line would be required on the CRC Williams facility that would interconnect with the Wadham 60 kV line with a new three-breaker ring bus that would be located on the northwest corner of the CRC Williams facility. Improvements at the Williams Generation Station are not anticipated for interconnection to the 60 kV power line.

Grading would be required for new foundations, for paving of the new internal access roads, and drainage improvements on the CRC Williams facility. Construction at the CRC Williams facility, including offsite improvements required for the interconnection to PG&E's electrical system and any improvements to the interconnection to the UPRR tracks, is expected to take 14 months to complete using approximately 42 construction workers.

The CRC Williams facility can process up to 750,000 gross wet tons of renewable feedstock per year. The source locations for renewable feedstock would primarily comprise orchards in the region, and primarily within Colusa County. Approximately 125 heavy truck trips per day would be utilized to deliver renewable feedstock to the CRC Williams facility. Source locations for the renewable feedstock are expected to be primarily within 75 miles of the CRC Williams facility. Heavy trucks would utilize local area roadways to access I-5, to travel either north or south along I-5 to the CRC Williams facility. Heavy trucks would either utilize the I-5/Husted Road interchange to then travel southbound on the two-lane Frontage Road to the facility or utilize the I-5/Hahn Road interchange to travel northbound on the two-lane Frontage Road to the facility.

Rail cars would be loaded with biocarbon product at the proposed rail car loadout area. A new electric switching locomotive would be utilized on the property to move cars along the rail spur system. Approximately 50 rail cars per week would be utilized to transport biocarbon product on UPRR tracks to one or more major ports in California and/or Oregon for ultimate transport of the biocarbon product via Handymax class vessels.

3.0 WATER SUPPLY PLANNING UNDER SB 610 AND SB 1262

SB 610, effective January 1, 2002, amends Sections 10910 through 10915 of the Water Code by requiring preparation of a WSA for development projects subject to CEQA and other criteria, as discussed below. SB 610 also amends Section 10631 of the Water Code, which relates to Urban Water Management Plans (UWMPs). The WSA process under SB 610 is designed to rely on the information typically contained in UWMPs, where available.

On September 24, 2016, SB 1262 further amended Section 10910 of the Water Code to require additional information related to adjacent public water systems and the status of the groundwater basin. These amendments provide additional consistency with the Sustainable Groundwater Management Act of 2014, as discussed further in Section 4.4.

The first steps in the WSA process are to determine whether SB 610 applies to the proposed Project. If so, then documentation of available water supplies, anticipated Project demand, and the sufficiency of supplies must be conducted. These issues are summarized by the following questions, as outlined in the DWR Guidebook:

1. Is the proposed Project subject to CEQA?

2. Is the proposed Project a “Project” under SB 610?

3. Is there a public water system that will service the proposed Project?

4. Is there a current UWMP that accounts for the project demand?

5. Is groundwater a component of the supplies for the Project?

6. Are there sufficient supplies to serve the Project over the next twenty years?

Each of these issues are discussed in the following sections as they relate to the proposed Project.

3.1 Is the Proposed Project Subject to CEQA?

The first step in the SB 610 process is to determine whether the proposed project is subject to CEQA. Water Code Section 10910(a) states that any city or county that determines that an application meets the definition of "project", per Water Code Section 10912 (see Section 3.2, below), and is subject to CEQA, shall prepare a water supply assessment for the project. CEQA applies to projects requiring issuance of a discretionary permit by a public agency, projects undertaken by a public agency, or projects funded by a public agency. The proposed CRC Williams Facility, as described in Section 2.0, requires discretionary approval by Colusa County, a public agency. Therefore, the Project is subject to CEQA. This WSA has been prepared to support the environmental review that will be conducted by Colusa County under CEQA.

3.2 Is the Proposed Project a "Project" Under SB 610?

The second step in the SB 610 process is to determine if the proposed Project meets the definition of "project" under Water Code Section 10912(a). Under Section 10912(a) a "project" is defined as meeting any of the following criteria:

1. a proposed residential development of more than 500 dwelling units;

2. a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;

3. a proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;

4. a proposed hotel or motel, or both, having more than 500 rooms;

5. a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;

6. a mixed-use project that includes one or more of the projects defined above; or

7. a project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The Project site consists of approximately 49 acres. As a result, the Project would include an industrial site that is larger than 40 acres and thus this WSA is being prepared in accordance with category 5, above.

3.3 Is There a Public Water System That Will Service the Proposed Project?

Section 10912(c) of the Water Code identifies a public water system as a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. There are no public water systems that serve the Project site, or that are located within more than one mile of the Project site. As described below, the Project would provide its own water needs through existing onsite groundwater wells. In addition, the Project will not be connected to a water system, such that the Project would not result in an existing water system becoming a public water system as a result of the project (per SB 1262 modifications to Water Code Section 10910(b)).

3.4 Is There a Current Urban Water Management Plan That Accounts for the Project Demand?

The Water Code requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet per year, must prepare an UWMP. The DWR Guidebook (page iii) states that SB 610 repeatedly refers to the UWMP as a planning document that can be used to meet the standards set forth in the statute, and that UWMPs act as a foundation to fulfill the requirements of the statute. There are no public water systems within the vicinity of the Proposed project, and thus there is not an UWMP that accounts for the Project demand.

Since there is no UWMP for the Project area, this WSA is based upon available and relevant information, including public records, the technical studies and assessments submitted with the application for the proposed Project, and other relevant documents, as cited in Section 8.0. Since this WSA has been prepared for use by the CEQA lead agency, this document includes an evaluation of whether the total projected water supplies, determined to be available during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses, in accordance with Water Code § 10910(c)(4).

3.5 Is Groundwater a Component of the Supplies for the Project?

Water Code Section 10910(f), paragraphs 1 through 5, must be addressed if groundwater is a source of supply for the proposed Project. The Olam Tomato Processing facility obtains water from onsite groundwater supply wells. The same wells are also planned to serve the water needs for the Project. Therefore, an assessment of groundwater conditions is included in this document.

Water Code Section 10910(f) paragraphs 1 through 5, as modified by SB 1262, state:

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) (A) A description of any groundwater basin or basins from which the proposed project will be supplied. (B) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. (C) For a basin that has not been adjudicated that is a basin designated as high- or medium priority pursuant to Section 10722.4, information regarding the following: (i) Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924; and (ii) If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan. (D) For a basin that has not been adjudicated that is a basin designated as low- or very-low priority pursuant to Section 10722.4, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the

information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

Pursuant to paragraph 1, there is not an urban water management plan that addresses the Project demand, or the adjacent and surrounding properties, as discussed in Section 3.4. Therefore, the information and evaluations presented in this WSA are based primarily on other publicly-available reports and documents from the California Department of Water Resources, along with groundwater studies conducted for other sites and projects in the region.

Paragraph 2 is addressed in Section 4.1, below, including a description of the groundwater basin and groundwater conditions.

As previously discussed, there is not an urban water management plan that covers the project area. To address the items described in Paragraph 3, Section 5.0 presents available information regarding current and future water consumption at the Project site.

To address paragraph 4, Sections 4.1 and 4.2 include a discussion of the amount and location of groundwater pumping and recharge that may occur in the groundwater basin. Section 5.0 presents available information regarding current and future water consumption at the Project site.

The Paragraph 5 requirement to provide an analysis of the sufficiency of the groundwater basin to meet the projected water demand associated with the proposed project is addressed in Section 6.0, below.

3.6 Are There Sufficient Supplies to Serve the Project Over the Next Twenty Years?

Water Code Section 10910(c)(4) requires the WSA to "include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and future planned uses, including agricultural and manufacturing uses."

The sufficiency of water supply for the proposed Project is addressed in Section 6.0, below.

4.0 PROJECT WATER SUPPLY

Water for existing operations at the Olam Tomato Processing facility is provided by two onsite supply wells, designated Well #2 and Well #3[1]. For the proposed Project, water would be supplied by the same

[1] A previously existing groundwater well, designated Well #1 has been abandoned and plugged.

wells. Overall conditions within the groundwater basin are described in Section 4.1. Details regarding the existing supply wells and volumes of water that were historically pumped are provided in Section 4.2. Section 4.3 identifies the available groundwater supply within the basin.

A series of three bills passed by the California legislature were signed by Governor Brown on September 16, 2014. These three bills, Assembly Bill (AB) 1739, SB 1168, and SB 1319, together comprise the Sustainable Groundwater Management Act of 2014 (SGMA). SGMA provides a structure under which local agencies are to develop a sustainable groundwater management program. SGMA focuses on basins or subbasins designated by DWR as high- or medium priority basins, and those with critical conditions of overdraft.

The Project is within the Colusa Subbasin, which is classified as a high priority basin but does not exhibit critical conditions of overdraft, according to the SGMA Basin Prioritization Dashboard (DWR, 2021a). The Colusa Groundwater Sustainability Agency (GSA) and Glenn GSA have submitted a draft Groundwater Sustainability Plan (GSP) to DWR, in accordance with the requirements of SGMA (Colusa GSA and Glenn GSA, 2021). Most of the information presented below related to the groundwater basin and available groundwater supplies is based on the draft GSP.

4.1 Groundwater Basin

The proposed CRC Williams Facility is located within the Colusa Subbasin within the larger Sacramento Valley Groundwater Basin. The Colusa Subbasin is designated as basin number 5-021.52 by the California Department of Water Resources (DWR, 2006). The subbasin area is shown on Figure 4-1. The basin encompasses most of Colusa and Glenn Counties east of the Coast Ranges and west of the Sacramento River, with an area of approximately 1,131 square miles, or 723,823 acres (Colusa GSA and Glenn GSA, 2021). The bottom of the subbasin is defined either by crystalline bedrock or the base of freshwater, below which saline water is present in the porous sediments that make up the groundwater aquifers.

The primary aquifer in the Project area is the Tehama Formation. Groundwater in the Colusa Subbasin occurs under semiconfined to confined conditions within interconnected channels and lenses of high-permeability sand and gravel interbedded with thick low-permeability sediments such as silts and clays (Colusa GSA and Glenn GSA, 2021). While there are no defined continuous aquitard units within the subbasin, the fine-grained sediments tend to impede vertical movement of groundwater and may limit deep recharge of the channels and lenses of coarser sediments that comprise the water-bearing aquifer deposits.

Based on groundwater contour maps provided in the draft GSP (Appendix 3B, Colusa GSA and Glenn GSA, 2021), groundwater in the Subbasin generally flows eastward from the edge of the Coast Ranges on the west toward the Sacramento River on the east, and from north to south parallel to the Sacramento River. In the Project vicinity, groundwater flows toward the northeast toward the river. At the Project location, the hydraulic gradient, or slope of the groundwater surface, averages approximately 10 feet per mile, which is equivalent to a gradient of about 0.002 ft/ft.

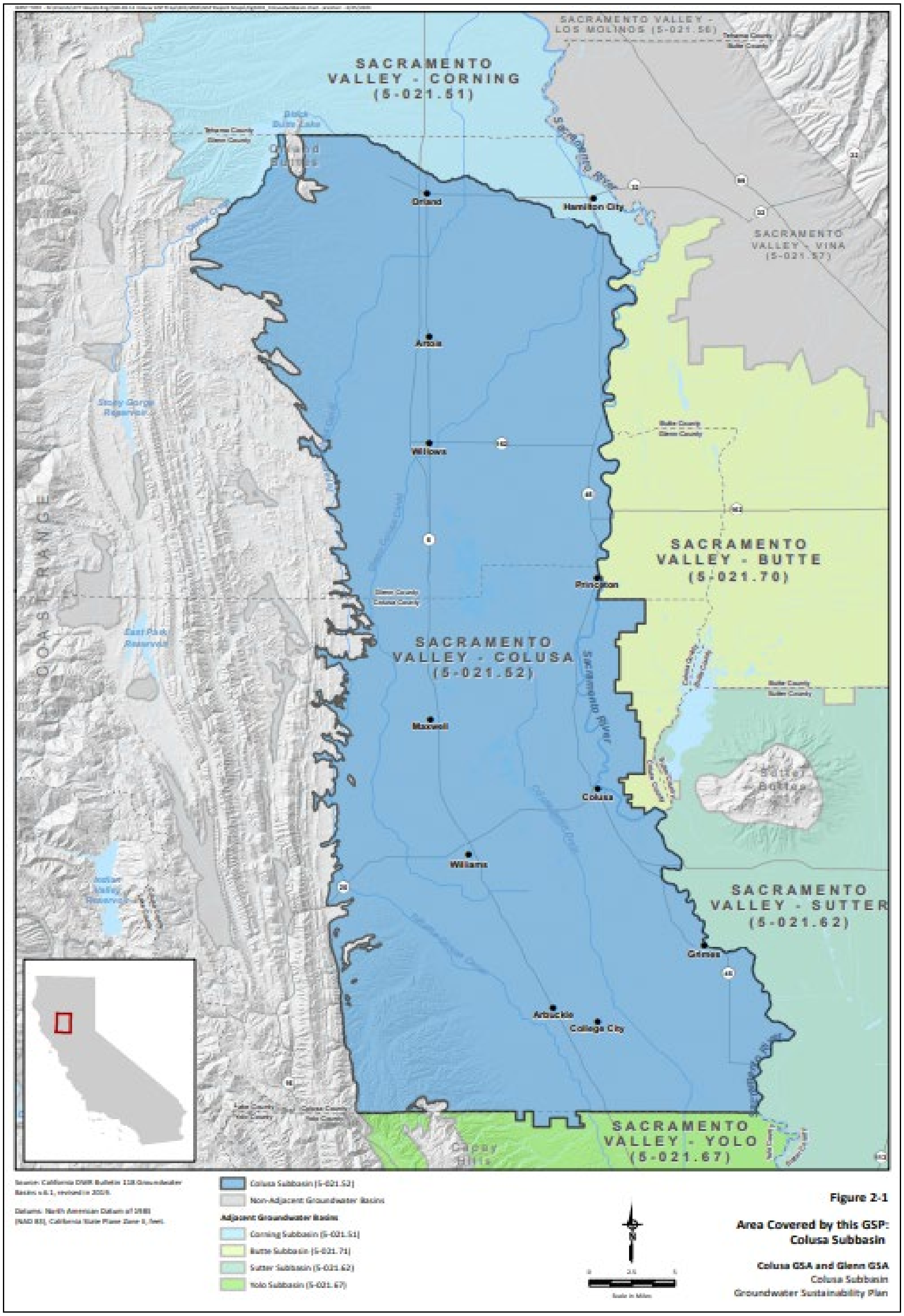

Figure 4-1. Colusa Subbasin

In general, groundwater levels within the Colusa Subbasin fluctuate seasonally due to increased pumping demand in the summer and increased recharge during the winter and spring. In addition, groundwater levels fluctuate due to longer climatic cycles consisting of wet periods and drought periods, as indicated by the hydrograph shown on Figure 4-2. The well location for this hydrograph is just southwest of College City, approximately nine miles southeast of the Project site.

As indicated by the water levels shown on Figure 4-2, prior to the 2012-2016 drought, past dry periods primarily affected the summer season low groundwater elevations but did not substantially affect the winter season high groundwater elevations. For example, during the 1987-1991 drought, the seasonal peak groundwater elevations were between 40 and 45 feet below the surface, which is comparable to the high groundwater elevations in the five years prior to and after the drought period. However, as the drought progressed, the summer low elevation became progressively lower, eventually dropping to approximately -20 feet (20 feet below sea level) in 1991, whereas the groundwater lows prior to and after this drought period were at least 35 feet higher. However, this pattern appears to have changed with recent drought periods, with both the seasonal high and low groundwater elevations dropping appreciably beginning in 2012, as shown on Figure 4-2, due to reduced rainfall available for recharge and potentially increased groundwater pumping due to curtailment of surface water deliveries for irrigation.

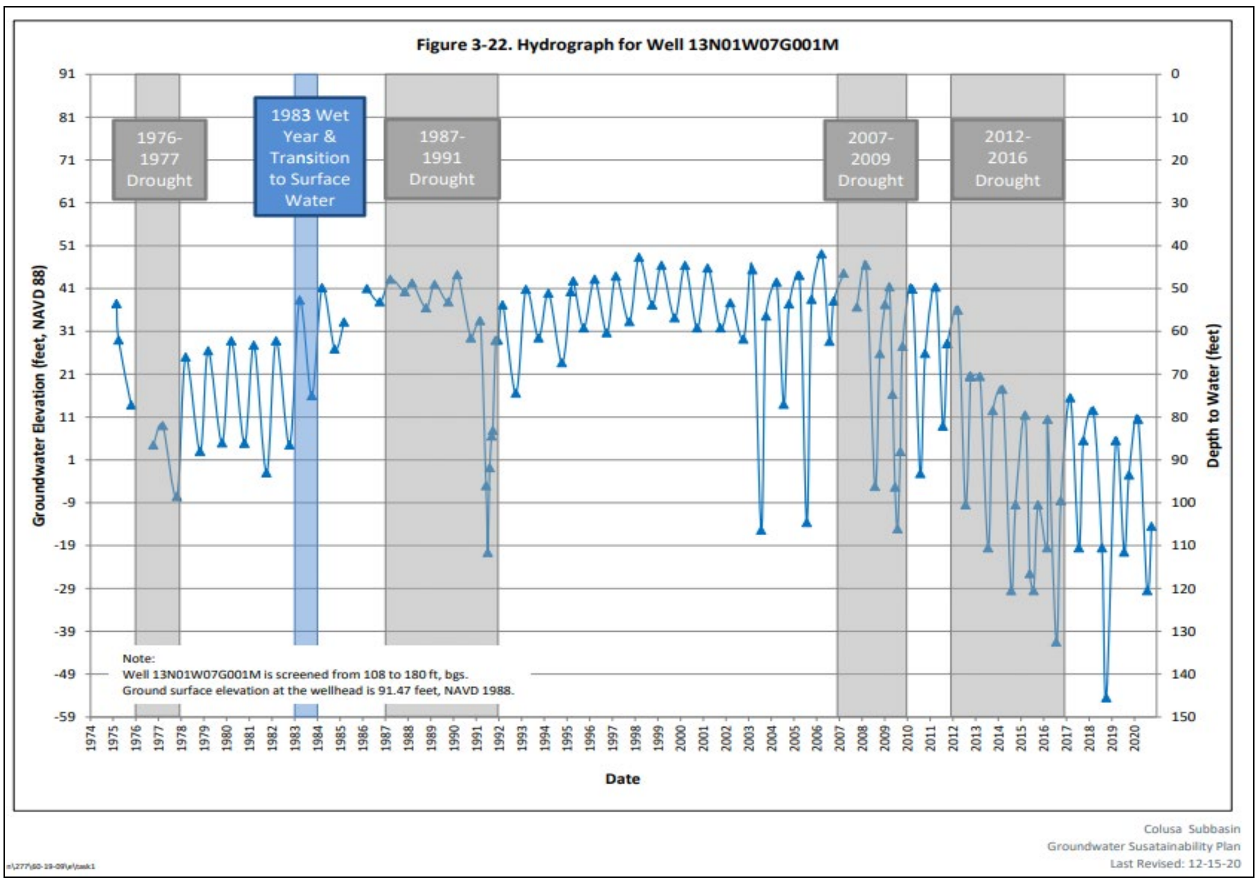

Figure 4-2. Hydrograph showing effects of drought and non-drought conditions on groundwater levels in the Colusa Subbasin

Appendix 3A of the draft GSP for the Colusa Subbasin (Colusa GSA and Glenn GSA, 2021) provides hydrographs showing the change in the groundwater elevations and depth to groundwater in the Project vicinity. The two nearest wells to the Project site presented in Appendix 3A of the draft GSP are designated by State Well Numbers 14N02W13N001M (referred to herein as Well 13N) and 15N02W19E001M (referred to herein as Well 19E). Well 13N is located approximately four miles southeast of the Project site and Well 19E is located approximately three miles northwest of the Project site. The water level data from these two wells are shown on Figures 4-3 and 4-4.

At Well 13N, located to the southeast, the depth to groundwater has varied from approximately 20 feet below ground surface (ft bgs) to approximately 50 ft bgs since the 1950s, as shown on Figure 4-3. Seasonal fluctuations average approximately 15 feet. The depth to groundwater generally varies in response to wet and dry climatic cycles, similar to those depicted on Figure 4-2. (Colusa GSA and Glenn GSA, 2021).

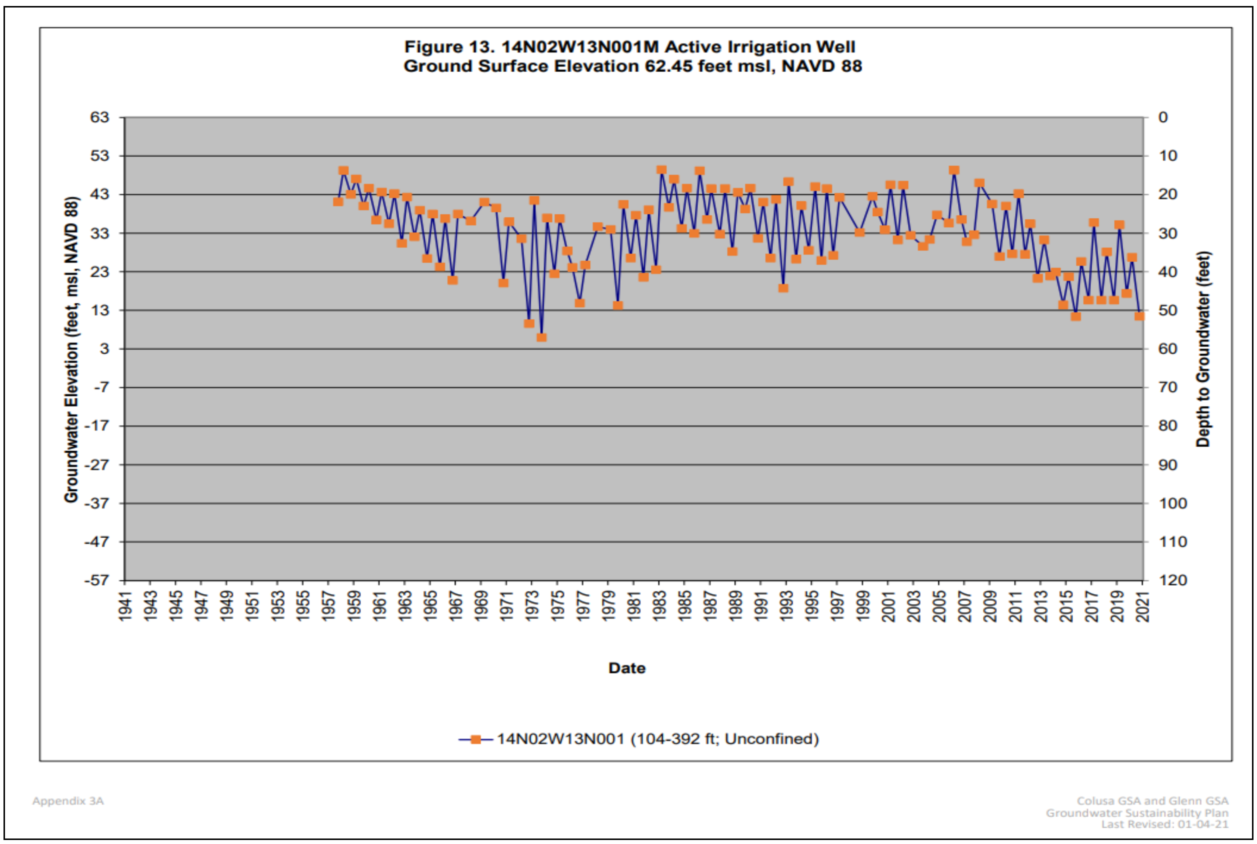

Figure 4-3. Hydrograph for Well 13N

At Well 19E, located to the northwest, groundwater levels were generally 20 to 30 feet bgs prior to the 1980s. However, in approximately 1983, irrigation in some parts of the Colusa Subbasin transitioned from groundwater to imported surface water (Colusa GSA and Glenn GSA, 2021). As a result of this transition, the depth to groundwater at Well 19E remained relatively stable between approximately 10 to 15 ft bgs until 2020, and seasonal fluctuations averaged less than 10 feet. The current dry conditions and reduced availability of surface water have caused the water level at Well 19E to drop recently to approximately 35 ft bgs, as indicated on Figure 4-4.

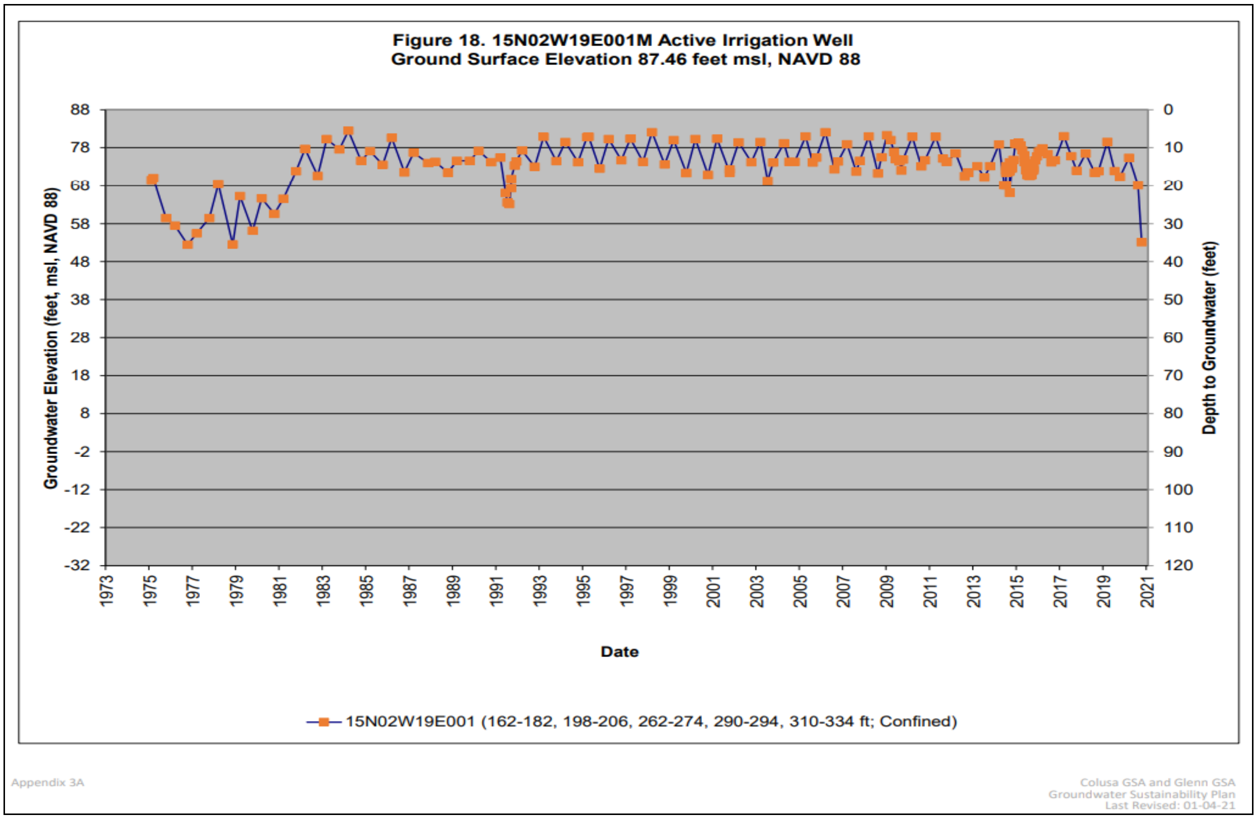

Figure 4-4. Hydrograph for Well 19E

4.2 Existing Supply Well and Historic Water Volumes Pumped

Three groundwater supply wells have previously been drilled at the site, at the locations designated as Wells #1 through #3 on the Site Plan for the Project dated June 30, 2021. Well #1 has been abandoned and plugged. Well #2 and Well #3 were used to supply the former Olam Tomato Processing facility and will be used to supply water for the Project.

Well #2 was drilled in 1981 to a total depth of 500 feet. The predominant materials encountered throughout the borehole were sand and sandy clay. Coarse-grained aquifer deposits were identified from 308 feet below ground surface (ft bgs) to 316 ft bgs, from 370 ft bgs to 390 ft bgs, and from 420 ft bgs to 440 ft bgs. The well was completed with a 16-inch steel casing to 440 ft bgs, with the perforated interval (i.e. the interval that allows groundwater to flow into the well) from 360 ft bgs to 440 ft bgs. Gravel was placed in the annulus between the casing and the wall of the borehole from 50 ft bgs to 440 ft bgs. A sanitary seal was installed to a depth of 50 ft bgs. The depth to water and the production capacity of Well

#2 were not reported at the time the well was drilled. The Well Completion Report for Well #2 is provided in Appendix A.

Well #3 was drilled in 2016 to a total depth of 800 feet. The predominant material encountered throughout the borehole was a brown clay. Coarse-grained aquifer deposits were identified from 310 ft bgs to 350 ft bgs and from 370 ft bgs to 440 ft bgs. The well was backfilled to 470 feet and completed with a 16-inch steel casing to that depth, with perforated intervals from 300 ft bgs to 350 ft bgs and from 370 ft bgs to 420 ft bgs. The gravel pack was placed in the annulus between the casing and the wall of the borehole from 240 ft bgs to 470 ft bgs, with a 10-foot bentonite seal above the gravel pack. A sanitary seal was installed to a depth of 230 ft bgs. The depth to water at the time the well was installed was reported to be 57 ft bgs. During a six-hour production test, Well #3 was reported to yield 2,050 gallons per minute (gpm) with a drawdown of 43 feet, yielding a specific capacity of 47.7 gpm/ft. Based on the specific capacity and the screened interval, the aquifer at the Well #3 location may have a transmissivity of 11,000 ft^2/day and a hydraulic conductivity of 110 ft/day (equivalent to 4×10^{-2} cm/sec) (Thomasson et al., 1960). The Well Completion Report for Well #3 is provided in Appendix A.

According to information provided to CRC from Olam, the two existing onsite wells are set up to pump 900 gpm each. For 2019, approximately 29 million gallons of groundwater were produced each month during the summer tomato processing season while during the off-season, approximately 5 million gallons of groundwater were produced each month. The total groundwater production in 2019 is reported to have been 179 million gallons, or approximately 550 acre-feet.

Table 4-1 summarizes the average water quality of the groundwater produced from the supply wells along with typical water quality standards. These standards consist of primary and secondary drinking water maximum contaminant levels and Regional Water Quality Control Board Basin Plan limits for discharge to surface waters.

Table 4-1. Average Supply Well Water Quality

Constituent	Concentration (mg/L)	Typical Water Quality Standard (mg/L)
Total dissolved solids (TDS)	425	500
Fixed dissolved solids (FDS)	382	
Nitrate as N	5.3	10
Total Kjeldahl nitrogen (TKN)	0.27	
Total nitrogen	5.7	
Boron	0.3	1
Chloride	47	250
Sodium	57	

Iron	0.05	0.3
Manganese	0.055	0.05
Sulfate	62	250

4.3 Available Groundwater Supply

The current volume of groundwater within the Colusa Subbasin, above crystalline bedrock and the base of freshwater, is estimated to be between 26 million acre-feet to 140 million acre-feet (Colusa GSA and Glenn GSA, 2021). Overall, the volume of groundwater stored in the Colusa Subbasin is affected more substantially by dry years than it is by wet years. This is potentially a result of a greater reliance on groundwater supply during dry years, when surface water deliveries are curtailed, and the relatively slow nature of deep percolation to recharge the groundwater system during wet years (Colusa GSA and Glenn GSA, 2021).

The draft GSP for the Colusa Subbasin (Colusa GSA and Glenn GSA, 2021) presents several water budget estimates for surface water and groundwater, including for historical conditions, current baseline conditions, and several future scenarios with and without climate change impacts. Table 4-2 shows the available water supplies and change in groundwater storage for the historical conditions water budget, based on data for the period from 1990 to 2015. Over that period, the amount of groundwater in storage has decreased by an average of 28,000 acre-feet per year, or a total of 728,000 acre-feet (Colusa GSA and Glenn GSA, 2021). Almost all of this net reduction of groundwater in storage has occurred since onset of drought conditions in 2012. The largest annual change in groundwater storage of 116,000 acre-feet per year shown in Table 4-2 represents 0.08 percent to 0.5 percent of the total groundwater in storage in the subbasin. The total reduction of groundwater in storage over the historical period is 0.5 percent to 2.8 percent of the total groundwater in storage in the subbasin.

Table 4-2. Historical Water Supplies and Change in Groundwater Storage by Hydrological Water Year Type (in thousand acre-feet per year)

Water Year Type	Surface Water Deliveries for Irrigation	Groundwater Pumping	Total Supply	Change in Groundwater Storage
Wet	1381	435	1814	99
Above Normal	1474	435	1909	101
Below Normal	1592	546	2138	-24
Dry	1598	570	2168	-116
Critically Dry	1228	540	1768	-66
Average	**1420**	**502**	**1922**	**-28**

Values rounded to the nearest whole acre-foot (values may not add up due to rounding)

Table 4-3 provides estimates of the current and future groundwater pumping, change in storage within the Colusa Subbasin, and the sustainable yield for scenarios considered in the water budget presented in the draft GSP (Colusa GSA and Glenn GSA, 2021). Sustainable yield refers to the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin, that can be withdrawn annually from the groundwater subbasin without causing an undesirable result (see Section 4.4 for discussion of undesirable results). The draft GSP provides estimates of sustainable yield, calculated by subtracting the annual decrease in groundwater storage from the long-term annual average groundwater pumping, as presented in Table 4-3. Under current conditions, groundwater pumping is approximately equal to the estimated sustainable yield.

Table 4-3. Groundwater Pumping and Sustainable Yield for Current and Future Scenarios (in thousand acre-feet per year)

Scenario	Groundwater Pumping	Change in Groundwater Storage	Sustainable Yield
Current	499	1	500
Future, No Climate Change Impacts	499	1	499
2030 with Climate Change Impacts	525	-3	523
2070 with Climate Change Impacts	559	-7	551

Values rounded to the nearest whole acre-foot (values may not add up due to rounding)

4.4 Groundwater Sustainability

As described above, the Colusa Subbasin is classified as a high priority basin but does not exhibit critical conditions of overdraft, based on DWR SGMA criteria (DWR, 2021a). The Colusa GSA and the Glenn GSA have jointly submitted a draft GSP for the subbasin. GSPs are intended to identify conditions in the groundwater basin and determine how the groundwater resource can be managed sustainably. SGMA regulations (Section 10721(v)) defined sustainable groundwater management as “management and use of groundwater in a manner than can be maintained during the planning and implementation horizon without causing undesirable results.” SGMA defines undesirable results as:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply;
2. Significant and unreasonable reduction of groundwater storage;
3. Significant and unreasonable seawater intrusion;
4. Significant and unreasonable degraded groundwater quality;
5. Significant and unreasonable land subsidence; and

6. Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The draft GSP (Colusa GSA and Glenn GSA, 2021) indicates that undesirable results #3 through #6 are not of concern at this time in the Project vicinity.

As described above and depicted on Figures 4-2, 4-3, and 4-4, groundwater levels have historically fluctuated in response to changes in climatic conditions but have not experienced chronic, long-term declines. Past and current sustained drought periods have resulted in groundwater levels decreasing by 10 feet to 40 feet in the part of the subbasin where the Project is located. In the past, the groundwater levels have recovered to pre-drought levels when normal or wet climatic conditions return. Furthermore, these temporary changes in groundwater levels are not substantial given that the local supply wells have a water column in the range of 400 feet. The small and cyclical nature of the water level fluctuations indicates that there is not a chronic lowering of groundwater levels, such that the subbasin is not experiencing a persistent depletion of groundwater supply or a reduction of groundwater storage based on current water demands.

According to the draft GSP (Colusa GSA and Glenn GSA, 2021), sustainable basin operation is expected to be achievable in current and future conditions scenarios, but modest overdraft is expected in future conditions with 2030 climate change and future conditions with 2070 climate change. The GSAs anticipate that the sustainable yield estimates described in Section 4.3, above, will be refined as part of development of sustainable management criteria for the basin, and as monitoring is improved and operational experience is gained during GSP implementation.

While the current draft GSP has not identified any specific management areas or criteria to be implemented in the near future, the Colusa Subbasin is already subject to numerous other surface water and groundwater monitoring and management programs that are intended to maintain local control over water resources while ensuring a reliable water supply and long-term groundwater sustainability. These programs are described in Section 2.2 of the current draft GSP (Colusa GSA and Glenn GSA, 2021).

5.0 PROJECT WATER DEMAND

Project water demand includes water used in the process for cooling, pellet mixing, and boiler feedwater for the cogeneration system. Based on process information from CRC, the estimated net annual industrial process water demand will be approximately 1,004 acre-feet for the cogeneration unit. Additional process water demand will be met by water recovered and recycled from the biomass drying process.

According to the American Water Works Association (http://www.drinktap.org/consumerdnn/Home/WaterInformation/Conservation/WaterUseStatistics/tabid/85/Default.aspx), water use in a commercial setting (i.e. toilets and faucets using water-efficient fixtures) is approximately 20 gallons per worker per day. Approximately 50 persons will be employed at the project site on weekdays and 40 persons per day on weekends. Therefore, the anticipated potable water demand is anticipated to be approximately 1,000 gallons per day, which is about one acre-foot per year.

Water for dust control will be required for the raw material and partially-processed material storage areas on the north part of the Project site. These facilities have a total area of approximately four acres. Dust control water demand was estimated assuming that from October to April each water year, dust control water use would average one 4,000-gallon water truck per day. From May to September, the potential dust control water needs are based on the rate of evaporative loss using pan evaporation data and surface evaporation factors from DWR (1979). The total dust control water demand is estimated to be as much as 17 acre-feet per year.

In addition, approximately one million gallons of fire suppression water will be present at the site and that may need to be replaced once per year as part of routine maintenance. The water needed for that activity would be approximately three acre-feet per year.

Based on the above information, the total water demand for the Project will be 1,025 acre-feet per year. The Project water demand is slightly less than two times the 550 acre-feet used by the previous tomato processing operation in 2019. It is also a very small fraction (approximately 0.2 percent) of the 499,000 to 551,000 acre-feet per year sustainable yield for the Colusa Subbasin (see Table 4-3).

To place the Project water demand in further context, the water volumes shown in Tables 4-2 and 4-3, above, are presented in thousands of acre-feet per year. The Project water demand of 1,025 acre-feet per year is equivalent to 1.025 thousand acre-feet per year.

6.0 DRY YEAR SUPPLY

To evaluate the amount and sustainability of dry-year water supply for the project, historical rainfall data and groundwater levels were evaluated. Publicly-available rainfall data from the Western Regional Climate Center (WRCC, 2021) were obtained for this evaluation.

The nearest meteorological station to the Project site from which long-term precipitation data are available is the Colusa 2SSW station, located 7.5 miles to the northeast. This location is also designated as Station 041948 as part of the National Weather Service Cooperative Network (WRCC, 2021). Rainfall data are available from October 1948 through April 2021. In the discussion in this report, the rainfall data are presented for a water year. A water year in this region of California begins on October 1 and extends through September 30 of the subsequent calendar year. A water year better represents rainfall and hydrologic patterns than a calendar year does. In the discussions below, water years are designated by the year in which they end. For example, the 2019 water year began on October 1, 2018 and extended through September 30, 2019.

The average annual rainfall from 1949 to 2021 is 15.58 inches. Figure 6-1 presents the annual water year rainfall based on the Sacramento Valley Water Year Hydrologic Classification Index (DWR, 2021b). This index was developed based on total discharge through the Sacramento River system. However, for this analysis, it has been applied specifically to the water year rainfall. Wet years are defined as those with rainfall that is greater than 118 percent of the annual average. Above normal years have rainfall that is between the annual average and 118 percent of the annual average. Below normal years have rainfall between the annual average and 83 percent of the annual average. Dry years have rainfall between 83 percent and 70 percent of the annual average. Critical years have rainfall of less than 70 percent of the annual average.

As shown on Figure 6-1, the two wettest years on record were 1995 and 1998, with 32.78 inches and 32.75 inches of rain, respectively. The driest complete water year was 1976, with 5.51 inches of rain. While the 2021 water year is not yet complete, the total rainfall through April 30 has been 5.31 inches. If no significant additional precipitation occurs this water year, then 2021 will be the driest year on record. As can be seen on Figure 6-1, multi-year periods of below normal rainfall occurred from 1987 through 1991, 2007 through 2009, 2012 through 2016[2], and 2020 through 2021.

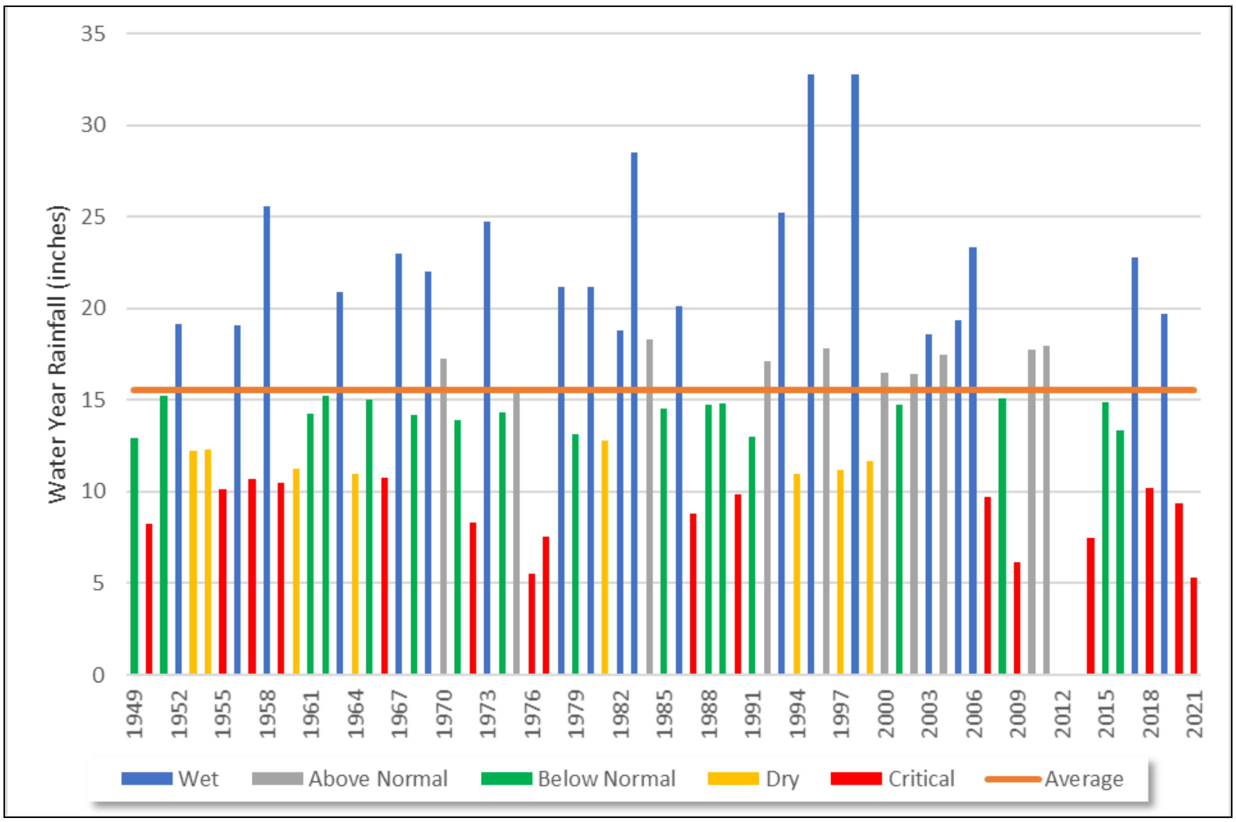

Figure 6-1. Annual Rainfall by Water Year Index

[2] While insufficient data are available from the Colusa 2SSW station for 2012 and 2013, data from other sources confirms that these were below normal years.

The draft GSP uses a 26-year hydrologic evaluation period from 1990 to 2015 to evaluate historic conditions in the Colusa Subbasin (Colusa GSA and Glenn GSA, 2021). For this WSA, an evaluation period that extends from the beginning of the 1987 dry period through April 2021 is used so that the effects of several multi-year dry periods can be assessed. Figure 6-2 shows the annual rainfall totals from 1987 through 2021 and the cumulative departure from the mean. The 1987 to 1991 dry period resulted in a cumulative rainfall deficit of almost 17 inches. However, from 1991 through 2006, there was a persistent period of excess rainfall, with a total excess of 52 inches that resulted in a net cumulative excess of over 35 inches by the end of the 2006 water year. However, since 2006 several multi-year dry periods have essentially erased that cumulative net excess.

Comparison of Figure 6-2 with the hydrographs in Figures 4-2, 4-3 and 4-4 indicates the overall effects of wet and dry periods on groundwater levels. As discussed in Section 4.1, past dry periods primarily affected the summer season low groundwater elevations but did not substantially affect the winter season high groundwater elevations. Single dry years do not have any appreciable effect on the volume of groundwater in storage. However, in many parts of the Colusa Subbasin, the cumulative rainfall deficit related to the most recent multi-year dry periods has caused both the seasonal high and low groundwater elevations to decline appreciably, especially since 2012. The reduction in groundwater levels during these dry periods is most like due to both reduced rainfall available for recharge and increased groundwater pumping due to curtailment of surface water deliveries.

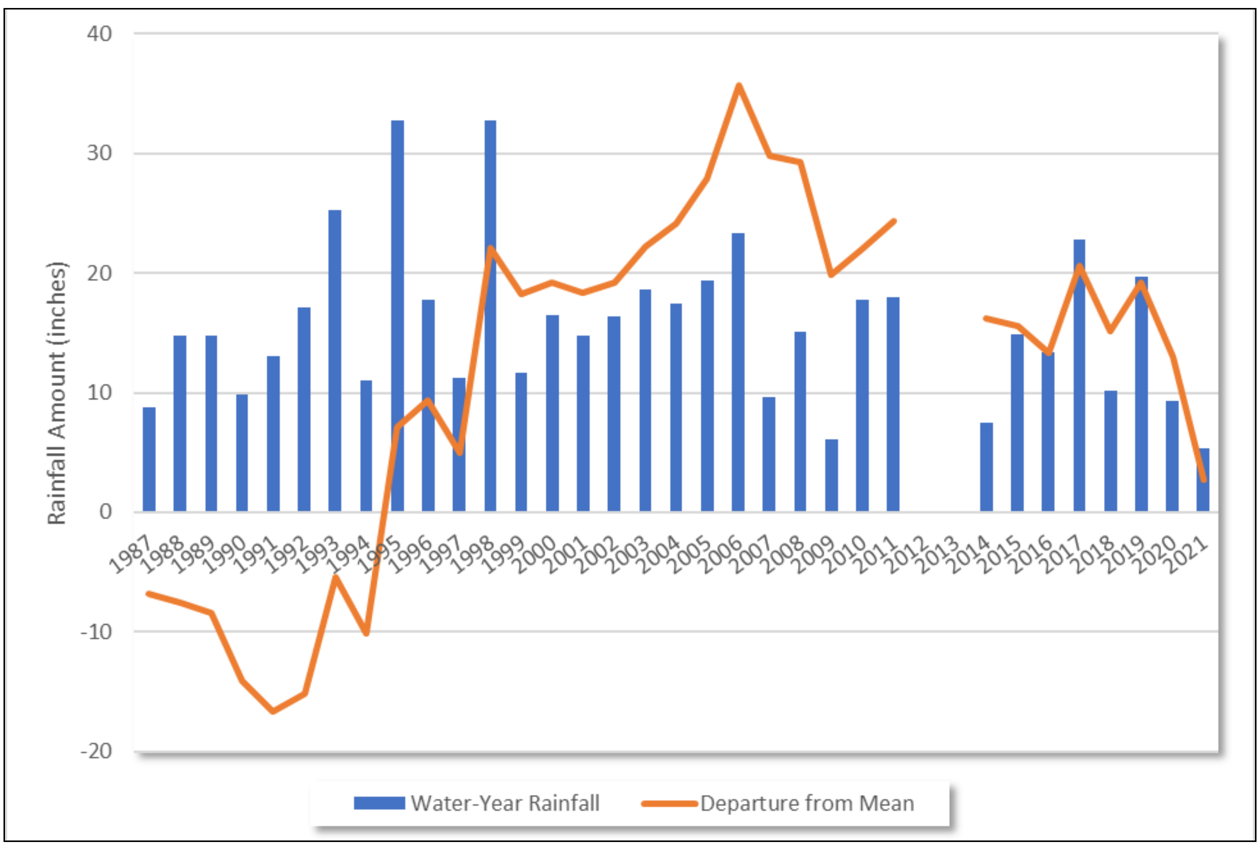

Figure 6-2. Annual Rainfall and Departure from Mean 1987-2021

Overall, the declines in the groundwater elevation during single and multi-year dry periods is relatively small compared with the total available freshwater column in the subbasin and in the supply wells at the Project site. A temporary decrease of 10 feet to 40 feet in the groundwater level at the supply well locations would not measurably affect the amount of water that could be produced from the wells since the total water column in each well is over 400 feet.

7.0 FINDINGS AND DISCUSSION

This WSA has been prepared in accordance with SB 610 and SB 1262 to support the CEQA environmental review for the proposed Project and provides an assessment of water supply adequacy for the project in accordance with Water Code Sections 10910 through 10915. The water demand for the proposed Project will consist of water needed for dust control, industrial process supply, and for employee potable uses. The ongoing water demand over the next 20 years will be approximately 1,025 acre-feet per year for all uses.

Evaluation of conditions in the groundwater basin indicates that the sustainable yield is anticipated to increase from approximately 500,000 acre-feet per year currently to 523,000 acre-feet per year in 10 years and 551,000 acre-feet per year in 50 years. The potential net reductions in groundwater storage of 3,000 acre-feet per year in 10 years and 7,000 acre-feet per year in 50 years are nominal compared to the total volume of groundwater in storage, estimated to range from 26 million acre-feet to 140 million acre-feet. Evaluation of groundwater levels during wet and dry periods demonstrates that the groundwater elevation, and thus the volume of water in storage, rebounds after dry climatic cycles. The available groundwater data do not indicate any significant potential that current practices and the incremental additional water demand from the Project would lead to any undesirable results, as defined in SGMA. According to the draft GSP (Colusa GSA and Glenn GSA, 2021), sustainable basin operation is expected to be achievable under current and future scenarios. Therefore, there will be sufficient water available for the Project during single dry year and multiple dry year periods over at least the next 20 years.

8.0 REFERENCES CITED

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California Department of Water Resources (DWR), 1979, Evaporation from Water Surfaces in California, Bulletin 73-79

Department of Water Resources (DWR) 2021a, SGMA Basin Prioritization Dashboard, https://gis.water.ca.gov/app/bp2018-dashboard/p1/, accessed May 20, 2021.

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_____. 2006, California's Groundwater, Bulletin 118, Sacramento Valley Groundwater Basin, Colusa Subbasin.

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Western Regional Climate Center (WRCC), 2021, Colusa 2 SSW, California meteorological data, https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1948, accessed May 14, 2021.

Appendix "H"

ATTACHMENT A

Well Completion Reports For Well #2 And Well #3

TRIPLICATE
Owner's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

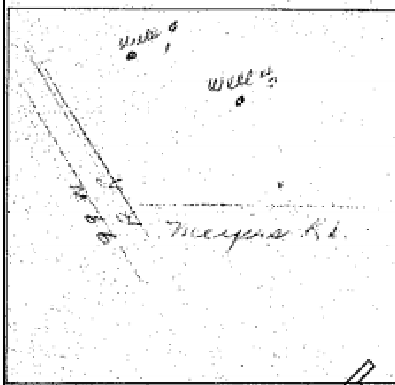
Well 2

Do not fill in
No. 072778

Notice of Intent No. ________
Local Permit No. or Date ________
State Well No. ________
Other Well No. ________

(1) OWNER: Name Naas Foods (P. O. #8880)
Address P. O. Box 1029
City Portland, Indiana Zip 47371

(2) LOCATION OF WELL (See instructions): 7T-795-2
County Colusa Owner's Well Number W-3713
Well address if different from above ________
Township 15N Range 2W Section 32 SW qtr
Distance from cities, roads, railroads, fences, etc. ________



WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☐
Industrial ☒
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) EQUIPMENT:
Rotary ☐ Reverse ☒
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size Birdseye
Diameter of bore 50-440 38"
Packed from 50 to 440 ft.

(7) CASING INSTALLED:
Steel ☒ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	440	16" ID x ¼	
collared			
0	50	30" x ¼ wall conductor	

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size
360	440	.090
		Ful-Flo

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 50 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval ______ ft.
Method of sealing conductor cemented

(10) WATER LEVELS:
Depth of first water, if known ______ ft.
Standing level after well completion ______ ft.

(11) WELL TESTS:
Was well test made? Yes ☐ No ☐ If yes, by whom? ______
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test ______ ft. At end of test ______ ft.
Discharge ______ gal/min after ______ hours Water temperature ______
Chemical analysis made? Yes ☐ No ☐ If yes, by whom? ______
Was electric log made? Yes ☒ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 500 ft. Depth of completed well 440 ft.

from ft. to ft.	Formation (Describe by color, character, size or material)
0– 18	top soil and sand
18– 28	sandy clay
28– 36	sand and gravel
36– 44	sandy clay
44– 53	gravel
53– 86	sand and sandy clay
86–148	gravel, sand and clay streaks
148–276	clay and sandy clay
276–282	sand
282–290	sandy clay
290–308	clay
308–316	gravel
316–362	clay and sandy clay
362–370	sandy clay
370–390	gravel
390–420	clay and sandy clay
420–424	gravel
424–440	sand and gravel
440–500	clay and sandy clay

Work started ______ 19__ Completed ______ 19__

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
SIGNED ______ (Well Driller)
NAME Eaton Drilling Co. Inc.
(Person, firm, or corporation) (Typed or printed)
Address P. O. Box 975
City Woodland, California Zip 95695
License No. 133783C57 Date of this report 12-14-1981

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

File Original with DWR

Page 1 of 1

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. E0307136

DWR Use Only - Do Not Fill In

State Well Number/Site Number

N | W

Latitude | Longitude

APN/TRS/Other

Owner's Well Number: 8967

Date Work Began: 2/22/2016 Date Work Ended: 2/25/2016

Local Permit Agency: Colusa County Environmental Health Dept

Permit Number: WP0000815 Permit Date: 9/25/2015

Geologic Log

Orientation: ☑ Verticle ☐ Horizontal ☐ Angle Specify

Drilling Method: Reverse Circulation Rotary Drilling Fluid: Water

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	120	Brown Clay
120	150	Sand And Brown Clay
150	310	Brown Clay
310	350	Gravel And Sand
350	370	Brown Clay
370	440	Gravel And Sand
440	800	Brown Clay

Total Depth of Boring 470 Feet

Total Depth of Completed Well 450 Feet

Well Owner

Name: Olam Spices & Vegetable Ingredients

Mailing Address: 205 E. River Park Circle, Suite 310

City: Fresno State: CA Zip: 93720

Well Location

Address: .11 Mi Nof Myers Rd & 185' Eof Frontage Rd

City: County: Colusa

Latitude: Deg. Min. Sec. N Longitude: Deg. Min. Sec. W

Datum: Decimal Lat.: Decimal Long.:

APN Book: 017 Page: 090 Parcel: 062

Township: 15 N Range: 2 W Section: 31

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West

East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

☑ New Well

☐ Modification/Repair

☐ Deepen

☐ Other

☐ Destroy (Describe procedures and materials under "GEOLOGIC LOG")

Planned Uses

☑ Water Supply

☐ Domestic ☐ Public

☑ Irrigation ☐ Industrial

☐ Cathodic Protection

☐ Dewatering

☐ Heat Exchange

☐ Injection

☐ Monitoring

☐ Remediation

☐ Sparging

☐ Test Well

☐ Vapor Extraction

☐ Other

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Outside Diameter (Inches)	Wall Thickness (Inches)	Screen Type	Slot Size if Any (Inches)
0	235	28	Access TB	Mild Steel	3	SCH 40		
0	365	28	Gravel CHT	Mild Steel	2	SCH 40		
0	280	28	Blank	Mild Steel	16	0.375		
280	300	28	Comp. Sec.	Mild Steel	16	0.375		
300	350	28	Screen	Mild Steel	16	0.375	Triple Millslot	0.060
350	370	28	Blank	Mild Steel	16	0.375		
370	420	28	Screen	Mild Steel	16	0.375	Triple Millslot	0.060
420	450	28	Blank	Mild Steel	16	0.375		

Water Level and Yield of Completed Well

Depth to First Water (Feet below surface)

Depth to Static

Water Level 57 (Ft) Date Measured 3/18/2016

Est. Yield * 2,050 (GPM) Test Type Constant

Test Length 6 (Hrs) Total Drawdown 43 (Ft)

*May not be representative of a well's long term yield.

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	230	Cement	Sand Slurry
230	240	Bentonite	Bentonite Chips
240	470	Fill	#8 Graded Sand

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name: Eaton Drilling Co., Inc. (Person, Firm or Corporation)

2 West Kentucky Ave (Address) Woodland (City) CA (State) 95695 (Zip)

Signed: (C-57 Licensed Water Well Contractor) 4/15/2016 (Date Signed) C57A 133783 (C-57 License Number)