CAMBRIA COMMUNITY SERVICES DISTRICT

TO: Board of Directors

AGENDA NO. **4.A**

FROM: Matthew McElhenie, General Manager
Jim Green, Utilities Department Manager

Meeting Date: February 8, 2024

Subject: Public Hearing to Receive Community Input on the Draft Project Description for the Water Reclamation Facility Coastal Development Permit Application, and Direct Staff to Release the Draft Project Description to the County of San Luis Obispo Department of Planning and Building Staff for Preliminary Evaluation, Input and Direction

FISCAL IMPACT:

There is no fiscal impact associated with this item. Costs for future actions related to this issue are undetermined.

DISCUSSION:

District staff, in collaboration with our consultant, SWCA Environmental Consultants and the CDP/WRF Ad Hoc Committee, have prepared a draft project description for the Water Reclamation Facility (WRF) Coastal Development Permit (CDP) Application for Board of Director's and community input. This is not the final project description for the WRF CDP Application.

Under the current emergency permit, the WRF may only be run under a declared Stage 3 Water Shortage Emergency. The three stages were expanded into six stages with the adoption of the 2020 Water Shortage Contingency Plan (WSCP). In the new WSCP, stages 4, 5, and 6 all represent shortage emergencies as defined by California Water Code Section 350; however, stages 5 and 6 most closely correlate with the legacy program's stage 3. Limiting WRF operations to periods when CCSD customers are already being asked to cut their consumption by 50-60% continues to place the burden of water shortages on customers and limits project operations to only the most severe water emergencies. Nine years after funding for the project was approved by ratepayers, the facility remains permitted for emergency use only. Annual debt service, maintenance costs, and operating reserves continue to be funded by ratepayers who are unable to reap the benefits of the project until severe water shortage emergencies are declared. The WRF should be operated proactively, yet conservatively, to prevent water shortages from escalating to emergency levels. This can only be done with a regular Coastal Development Permit.

It is recommended that the Board of Directors receive Board and community input on the draft project description for the WRF CDP Application, and direct staff to submit the draft project description to the County of San Luis Obispo Department of Planning and Building staff for preliminary evaluation, input, and direction.

ATTACHMENTS:

1. CCSD Draft Coastal Development Permit Project Description

2. Stillwater Sciences Technical Memorandum
3. Todd Groundwater Memorandum
4. San Simeon Instream Flow Report TAC Comments

CAMBRIA COMMUNITY SERVICES DISTRICT

DRAFT COASTAL DEVELOPMENT PERMIT
PROJECT DESCRIPTION

Summary Project Description

A request by the Cambria Community Services District (CCSD) for a Development Plan and Coastal Development Permit (DRC2013-00112) to operate the CCSD Water Reclamation Facility (WRF) previously approved to operate on an emergency basis pursuant to the Emergency Coastal Development Permit (ZON2013-00589) issued May 15, 2014. The WRF would operate up to 24 hours per day, 7 days per week, for 6 months per year, depending on precipitation. The WRF would produce approximately 400 gallons per minute (GPM) of treated water that would be injected into an existing reinjection well (RIW-1) and would migrate at least 60 days before reaching existing CCSD potable production Wells SS-1 and SS-2. Additionally, approximately 100 GPM of treated and de-chlorinated water would be discharged into San Simeon Creek to maintain and enhance the San Simeon Creek Lagoon during the dry season. The WRF is primarily designed to meet the current demands of the community and ensure a reliable water supply for the existing service connections of the CCSD. However, as part of future operations, evaluations will be conducted through research studies, biological assessments, and consideration of impacts on other stakeholders. These assessments will determine whether the WRF is sufficient to fulfill existing commitments. The project would result in approximately 50 cubic yards of new earthwork and would result in approximately 3.83 acres of new site disturbance on the approximately 95-acre CCSD-owned site (3.6 acres for removal of the pond liner and 0.23 acre for installation of a Zero Liquid Discharge (ZLD) facility). The project site is within the Agriculture land use category, within the California Coastal Zone, and is located at 990 San Simeon Creek Road, approximately 0.65 miles north of the Cambria urban reserve line and 1.23 miles south of the San Simeon urban reserve line.

Expanded Project Description

Entitlements and Modifications Requested

The Cambria Community Services District (CCSD) is seeking a Development Plan (DP) and Coastal Development Permit (CDP) pursuant to Condition of Approval #6 of Emergency CDP ZON2013-00589 to allow for the operation of the CCSD Water Reclamation Facility (WRF). No ordinance modifications, adjustments, or variances are requested.

Water Reclamation Facility History

All of Cambria's potable water is supplied from groundwater wells in the San Simeon and Santa Rosa Creek aquifers. The San Simeon and Santa Rosa aquifers are relatively shallow and porous, with the groundwater levels typically recharged every year during the rainy season. With pumping, groundwater levels generally exhibit a consistent pattern of high levels during the wet season, steady decline during the dry season, and rapid rise when the wet season resumes. To minimize potable groundwater losses at the aquifer and ocean interface, treated wastewater effluent is percolated into the San Simeon Creek aquifer downstream from its production wells. This practice also helps prevent saltwater intrusion into the freshwater water aquifer. If the groundwater level drops too far, treated effluent and seawater could migrate toward the water supply wells, deteriorating the water quality and potentially rendering the freshwater non-potable. The CCSD operations maintain a positive differential between the up-gradient groundwater levels at its potable well field and the down-gradient wastewater effluent percolation ponds. During later parts of the summer dry season, and depending upon the prior year's precipitation, the CCSD may occasionally operate with a negative gradient, and will periodically pump groundwater from its percolation pond area, in order to control this differential.

For water year 2013/2014, the total rainfall in Cambria was approximately 80 percent of the minimum rainfall needed to fully recharge the two coastal stream aquifers that are the sole water supply for Cambria. At a Special Meeting on September 9, 2013, the CCSD Board of Directors considered the CCSD's water supply conditions. At that time, CCSD staff presented a report to the Board regarding the status of the San Simeon well field and estimates regarding remaining water supply and demand. CCSD staff estimated there was a two-to-three-month supply of water remaining.

On December 26, 2013, the California Department of Health (Division of Drinking Water) issued a notice to public water purveyors, including the CCSD, urging them to develop water supply contingency plans for implementing water supply alternatives given the lingering extreme drought conditions in California. Shortly after, on January 17, 2014, California Governor Brown issued Emergency Proclamation B-17-2014 and declared a State of Emergency related to the drought. CCSD staff evaluated various alternatives for further reducing water demand and securing an emergency water supply.

These efforts included meetings with regulatory agency personnel, and consultants, planning, and contacting various emergency water equipment suppliers. Staff ultimately determined the most realistic and expedient solution would be to utilize prefabricated, portable, water treatment facilities to treat a brackish water supply. On January 30, 2014, the CCSD issued a Notice of Exemption pursuant to Public Resources Code 21080(b) for the construction and operation of the Emergency Water Supply Project (EWSP) (CCSD Resolution 05-2014). At this same meeting, the CCSD declared a Stage 3 Emergency Water Shortage based, in part, on well-level production information showing approximately 3 months of remaining water supply. The CCSD then entered into an agreement with CDM Smith to design and complete the EWSP. On February 13, 2014, the CCSD Board approved Resolution 06-2014 which directed staff to submit an Emergency CDP application to the County of San Luis Obispo (County) for the EWSP and on April 22, 2014, the CCSD submitted the application. The County granted an Emergency CDP (ZON2013-00589) on May 15, 2014, which included as a condition of approval a requirement to complete the EWSP within six months and to obtain a non-emergency CDP. On June 13, 2014, the CCSD applied for a non-emergency CDP (this application) for the WRF.

The CCSD commenced construction on the EWSP on August 25, 2014, and it became operational on January 20, 2015. The EWSP ran from January 2015 until April 2015 and produced 39.99 acre-feet of water, from September 2015 until December 2015 and produced 28.93 acre-feet of water, and from October 2016 until December 2016 and produced 23.07 acre-feet of water. The EWSP last ran on December 3, 2016.

Water Reclamation Facility Infrastructure Constructed Per Approved Emergency Coastal Development Permit and Emergency Water Supply Project

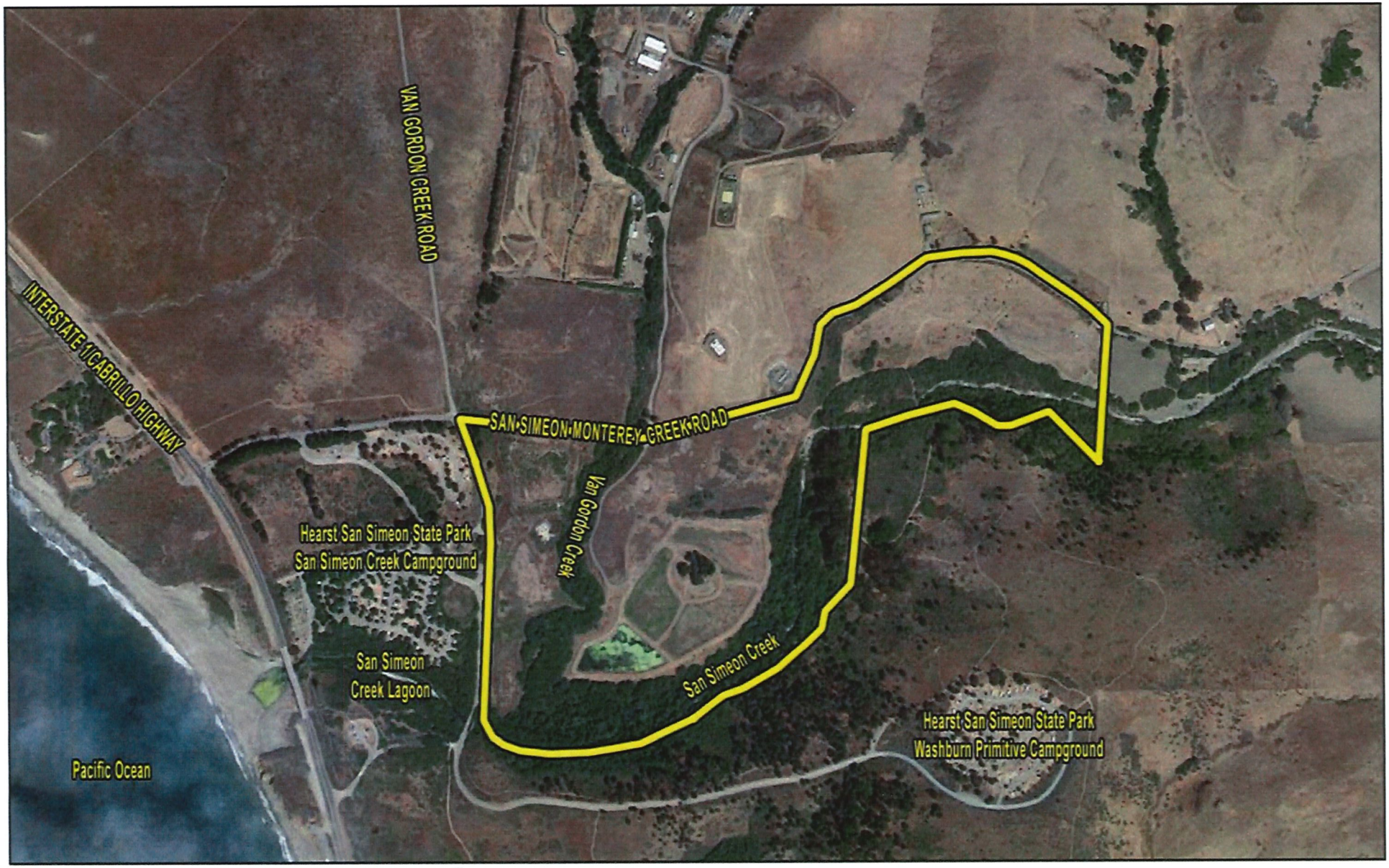
The majority of the proposed WRF was constructed in 2014 as part of the EWSP. Construction of the EWSP included approximately 15,000 square feet of site disturbance. The EWSP required general construction activities, including clearing, grading, excavating, trenching, pipe installation, placement of backfill, and installation of other limited equipment/improvements on structural footings and concrete housekeeping pads. Approximately 50 cubic yards of cut and 50 cubic yards of fill were generated during the construction of the proposed wells and Advanced Water Treatment Plant (AWTP), and approximately 200 cubic yards of cut and 200 cubic yards of fill were generated during pipeline installation trenching. Ground disturbance activities for well construction included drilling between 40 and 100 feet deep. Excavated soils were retained for backfill to avoid soil exportation and minimize truck trips. Additionally, approximately 2 acres of coyote brush and 1 acre of upland mustard vegetation were removed as part of the evaporation pond liner installation. The project was constructed entirely within CCSD property boundaries. The laydown/staging areas were located at the northern and western portions of the project site (Figure 1 and 2).

The EWSP was designed and constructed in accordance with applicable provisions of the County-issued emergency CDP, the California State Water Resources Control Board's (SWRCB) General Construction Storm Water Permit, American Water Works Association (AWWA) Standards, California State Building Code (CBC), and the Uniform Building Code (UBC). Ground disturbing activities were reviewed and monitored by biological, archeological, and Native American tribal monitors. The EWSP involved a design-build construction delivery method that included installing the water facilities described above. Construction of the EWSP occurred over approximately six months; construction began on August 25, 2014, and was substantially completed on November 14, 2014. Construction work occurred between 7:00 AM and 5:00 PM, Mondays through Fridays, and between 8:00 AM and 5:00 PM, Saturdays, consistent with the County's Coastal Zone Land Use Ordinance (CZLUO) Section 23.06.042 regulations. The construction phase was followed by an approximately two-month start-up period, including facility testing and commissioning.

As part of the EWSP, the following infrastructure and components were installed/constructed (Figure 3):

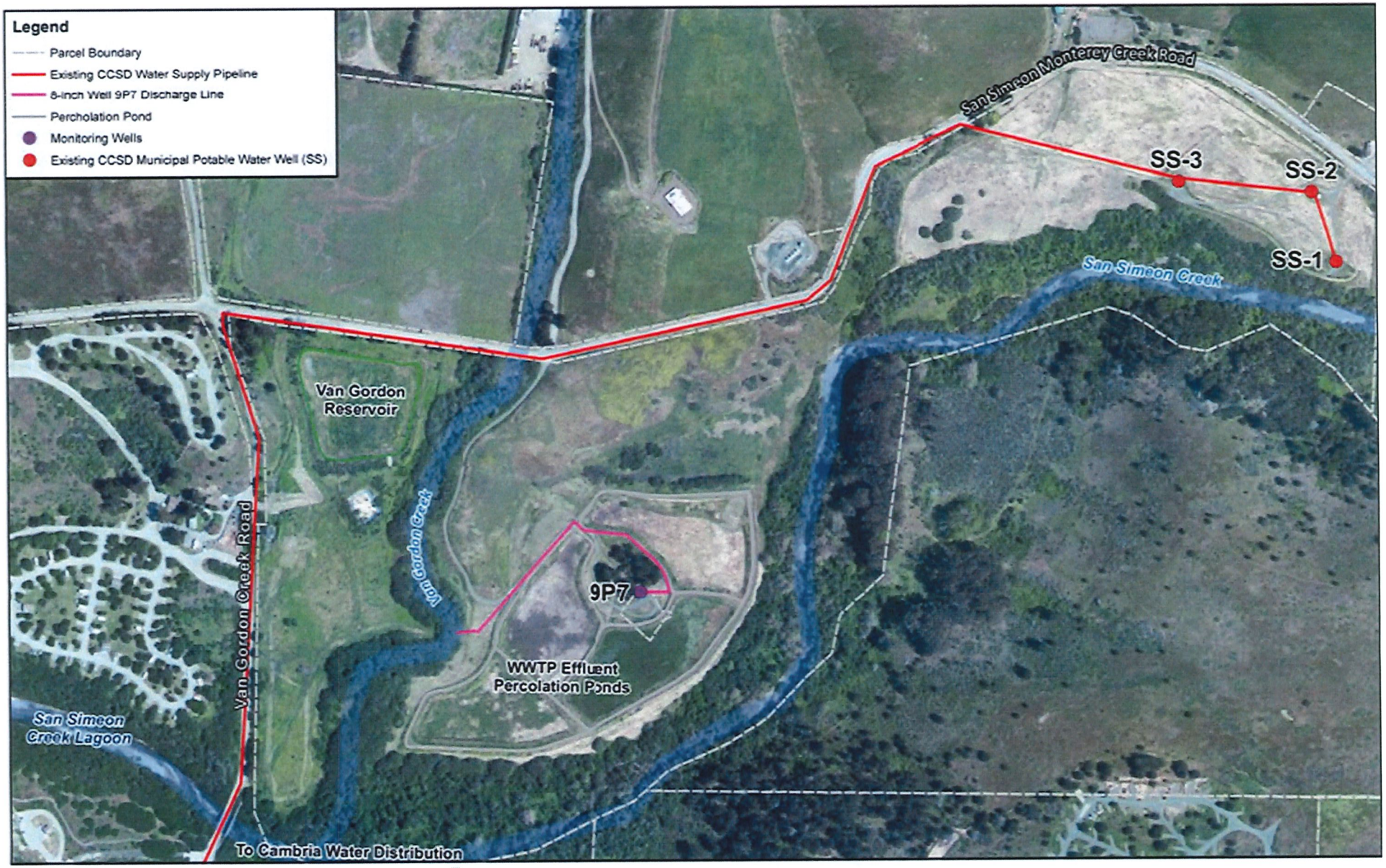
- AWTP including concrete pads, Conex containers, ultraviolet (UV) vessels, water tanks, pump skids, and self-contained chemical totes. Key AWTP unit equipment was pre-packaged and mounted in six shipping containers, installed within an area measuring approximately 100 feet by 170 feet. Each treatment plant container is about 15 feet in height. UV vessels, water tanks, pump skids, and self-contained chemical totes were installed outdoors on concrete housekeeping pads.

- Extension of an existing 8-inch pipeline between Well 9P7 and the AWTP (200 linear feet of polyvinyl chloride [PVC])
- Installation of a new 8-inch 1,800 linear feet PVC pipeline between the AWTP and Recharge Injection Well (RIW-1)
- Installation of a new 4-inch 4,400 linear feet high-density polyethylene [HDPE] pipeline between the AWTP and Lagoon Surface Discharge
- Installation of a new 4-inch 2,000 linear feet HDPE pipeline between the AWTP and Van Gordon Reservoir
- Modification of Van Gordon Reservoir from an effluent storage basin to a brine evaporation pond through installation of pond lining and five mechanical spray evaporators
- Installation of a leachate collection and removal system for Van Gordon Reservoir
- Construction of 4 monitoring wells (MIW-1, MIW-2, MIW-3, MIW-4)
- Construction of Lagoon Surface Discharge
- Construction of Recharge Injection Well (RIW-1); drilled 100 feet deep; 454 GPM of injection
- Installation of a new Pacific Gas and Electric Company (PG&E) pad mount transformer connected to an existing PG&E powerline serving Well 9P7 via a new power drop from the well site along the well site access road
- Installation of a new PG&E pad mount transformer connected to an existing PG&E overhead power line along San Simeon Road via a new power drop along Van Gordon Creek Road



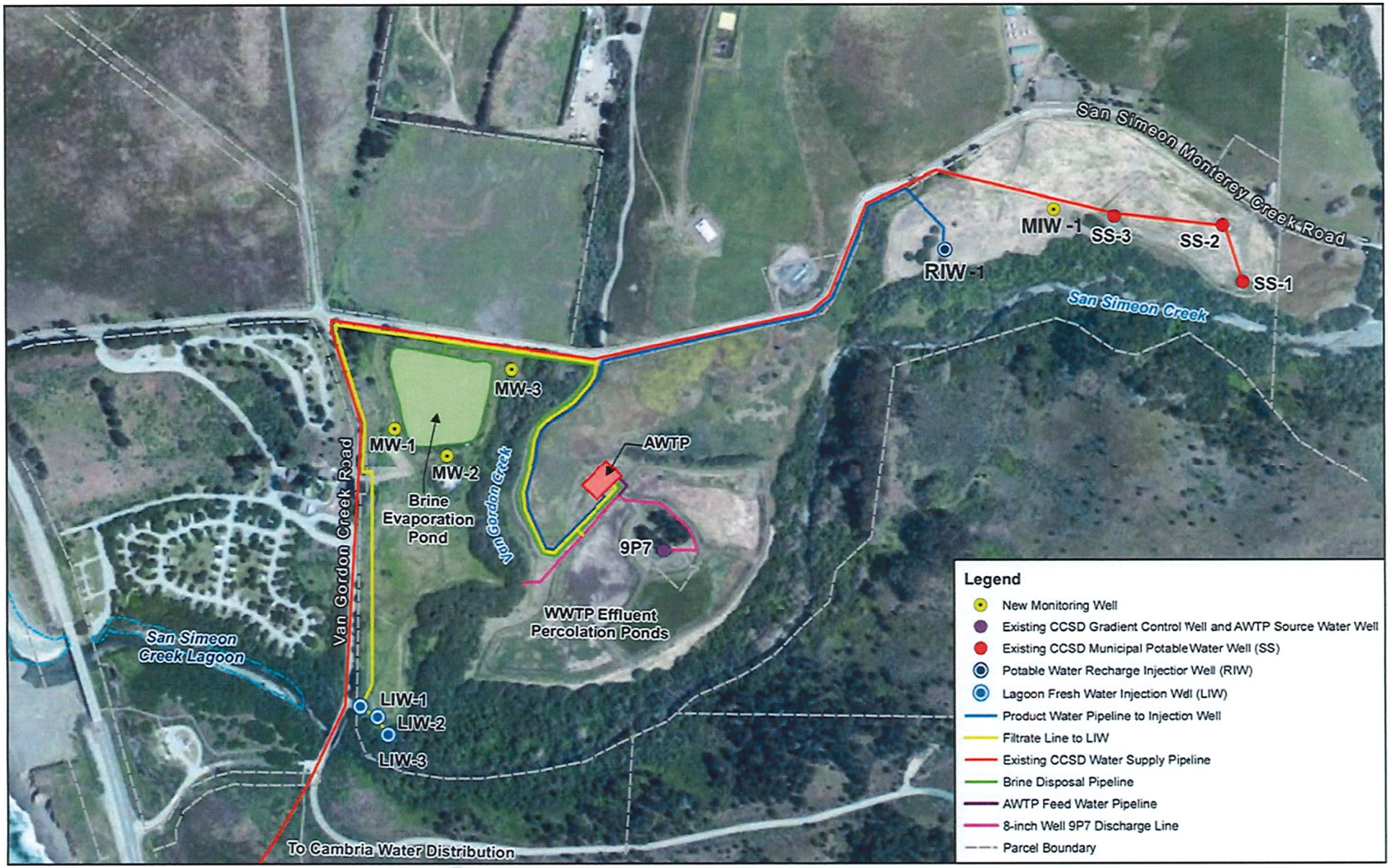
Source: RBF Consulting

Figure 1. Project Location and Boundaries



Source: CDM Smith 2014

Figure 2. 2014 Baseline Conditions.



Source: CDM Smith, June 2014

Figure 3. EWSP/WRF Components.

Proposed Project Modifications from Approved Emergency Coastal Development Permit

As part of this non-emergency CDP request, the CCSD is looking to convert the EWSP to a WRF. While the EWSP is approved to operate only during declared emergency water shortages, the WRF would operate during water shortages and also proactively to prevent water shortages. Several modifications to the EWSP are needed to achieve this goal (Table 1). The following infrastructure and components are proposed to be modified, installed, and/or constructed as part of this project. The components are summarized here and discussed in further detail in the next section.

- Removal of the five mechanical spray evaporators, leachate collection and removal system, and pond lining from Van Gordon Reservoir
- Potential Installation of permanent Zero Liquid Discharge (ZLD) facility and associated infrastructure
- Operation of the WRF 24/7 for six months (maximum) during normal and dry precipitation years
- Extension of the San Simeon Creek Lagoon Surface Discharge pipeline to relocate the discharge point further south to the San Simeon Creek bank (Figure 4).

Water Reclamation Facility Components

The EWSP (and WRF) treat brackish groundwater in the lower San Simeon Creek aquifer. The water goes through several stages of treatment to remove solids, salt, organic chemicals, and other contaminants before being reinjected into the aquifer's freshwater supply. The process is described in more detail below and shown in (Figure 5).

Source Water

The brackish source water for the WRF is pumped from existing Well 9P7 and is a blend of native basin groundwater (San Simeon Creek underflow), deep aquifer brackish water (diluted seawater that occurs from the subterranean dispersion of salts from a deeper saltwater wedge into an overlying freshwater interface zone), and percolated secondary effluent from the CCSD's wastewater treatment plant (WWTP).

Advanced Water Treatment Plant

The AWTP treats the brackish source water to advanced treated water quality standards suitable for injection further upstream into the groundwater basin to augment the CCSD's potable water supply. A portion of the advanced treated water is also conveyed to a point immediately upstream of the San Simeon Creek Lagoon to maintain water levels in the lagoon during dry weather conditions (discussed further below).

The AWTP uses three main treatment processes: membrane filtration (MF), reverse osmosis (RO), and advanced oxidation process (AOP) that utilizes UV light and hydrogen peroxide. The source water is first pumped from the existing CCSD well 9P7 and conveyed to the AWTP. The treatment process begins with MF, which removes fine particles from the source water. Next, reverse osmosis removes salt and other complex organic matter. The water then undergoes an advanced oxidation process where UV light and hydrogen peroxide are used to remove trace organic compounds that are not fully removed by the RO membranes. Finally, post-treatment stabilizes the water to prevent corrosion of the conveyance pipeline and pumping equipment. The AWTP process flow is shown in Figure 6.

Recharge Injection Well (RIW-1)

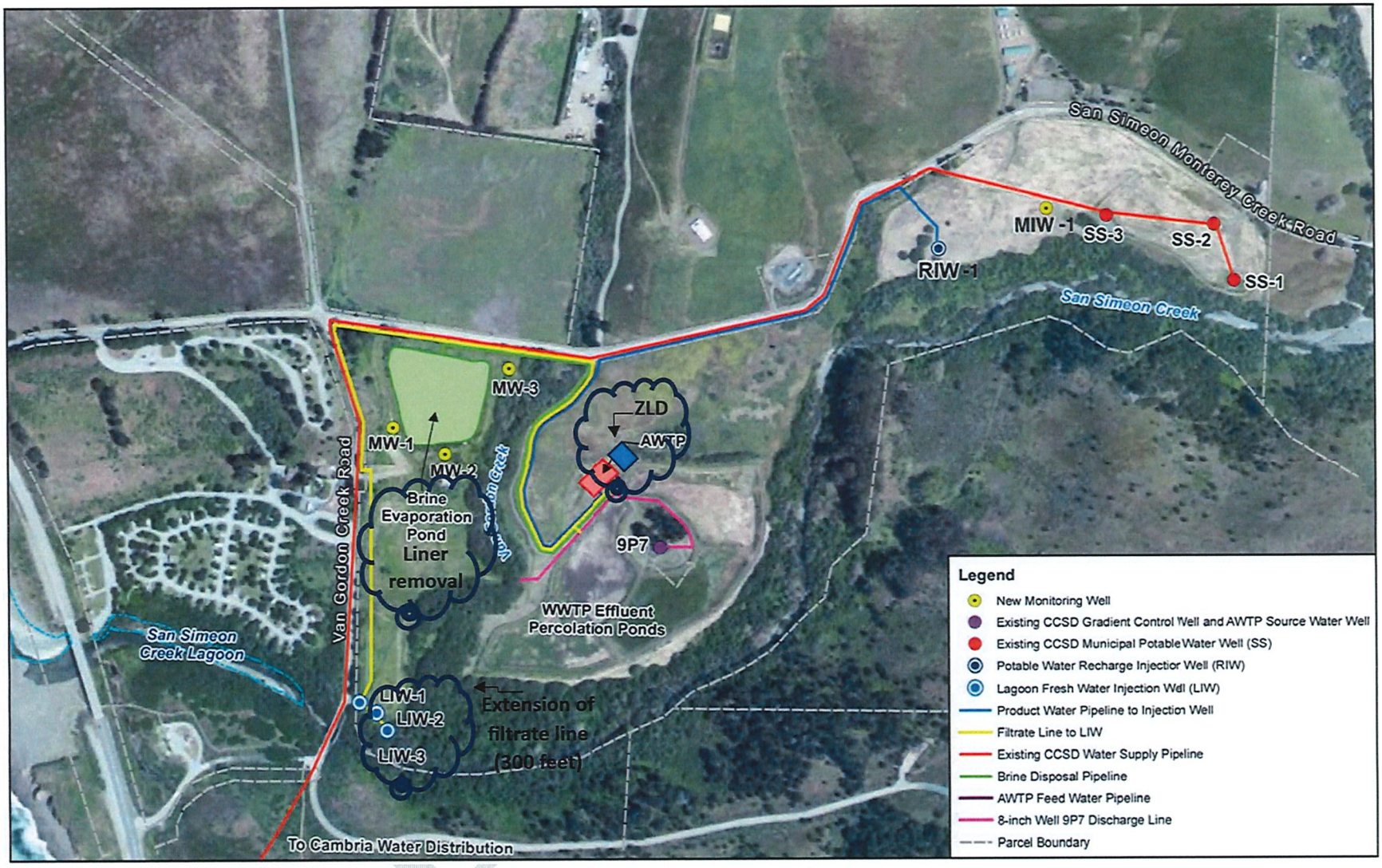
The AWTP treated product water is pumped for injection into the groundwater basin at the San Simeon Well Field utilizing the recharge injection well (RIW-1) constructed as part of the EWSP and located west

Table 1. Project Comparison: Approved Emergency Coastal Development Permit v. Requested Regular Coastal Development Permit

Project Component	Emergency Coastal Development Permit	Regular Coastal Development Permit
Name	Emergency Water Supply Project (EWS)	Water Reclamation Facility (WRF)
Permit	ZON2013-00589; issued May 15, 2014	DRC2012-00113 (pending)
Permit Limits	Until Stage 3 Water Shortage ends or Regular CDP issued	None proposed
CEQA Determination	Statutorily exempt per PRC 21080(b); NOE issued January 30, 2014, and filed September 9, 2014	TBD pending Project Description review by County
Physical Improvements	• Advanced Water Treatment Plant (AWTP) including concrete pads, Conex containers, UV vessels, water tanks, pump skids, self-contained chemical totes • Extension of existing 8-inch pipeline between Well 9P7 and AWTP (200 linear feet PCV or HDPE) • New 8-inch 1,800 linear feet PCV pipeline between AWTP and RIW • New 4-inch 4,400 linear feet HDPE pipeline between AWTP and Lagoon Injection Wells • New 4-inch 2,000 linear feet HDPE pipeline between AWTP and Van Gordon Reservoir • Modification of Van Gordon Reservoir to evaporation pond including pond lining and five mechanical spray evaporators • Leachate collection and removal system for Van Gordon Reservoir • Construction of 4 monitoring wells (MIW-1, MIW-2, MIW-3, MIW-4) • Construction of Lagoon Surface Discharge	• New 100-foot by 100-foot concrete pad • Two 40-foot trailers placed on concrete pad • Removal of evaporation pond lining and five mechanical spray evaporators from Van Gordon Reservoir • Removal of leachate collection and removal system for Van Gordon Reservoir • Extension (300 linear feet) of existing leachate conveyance piping

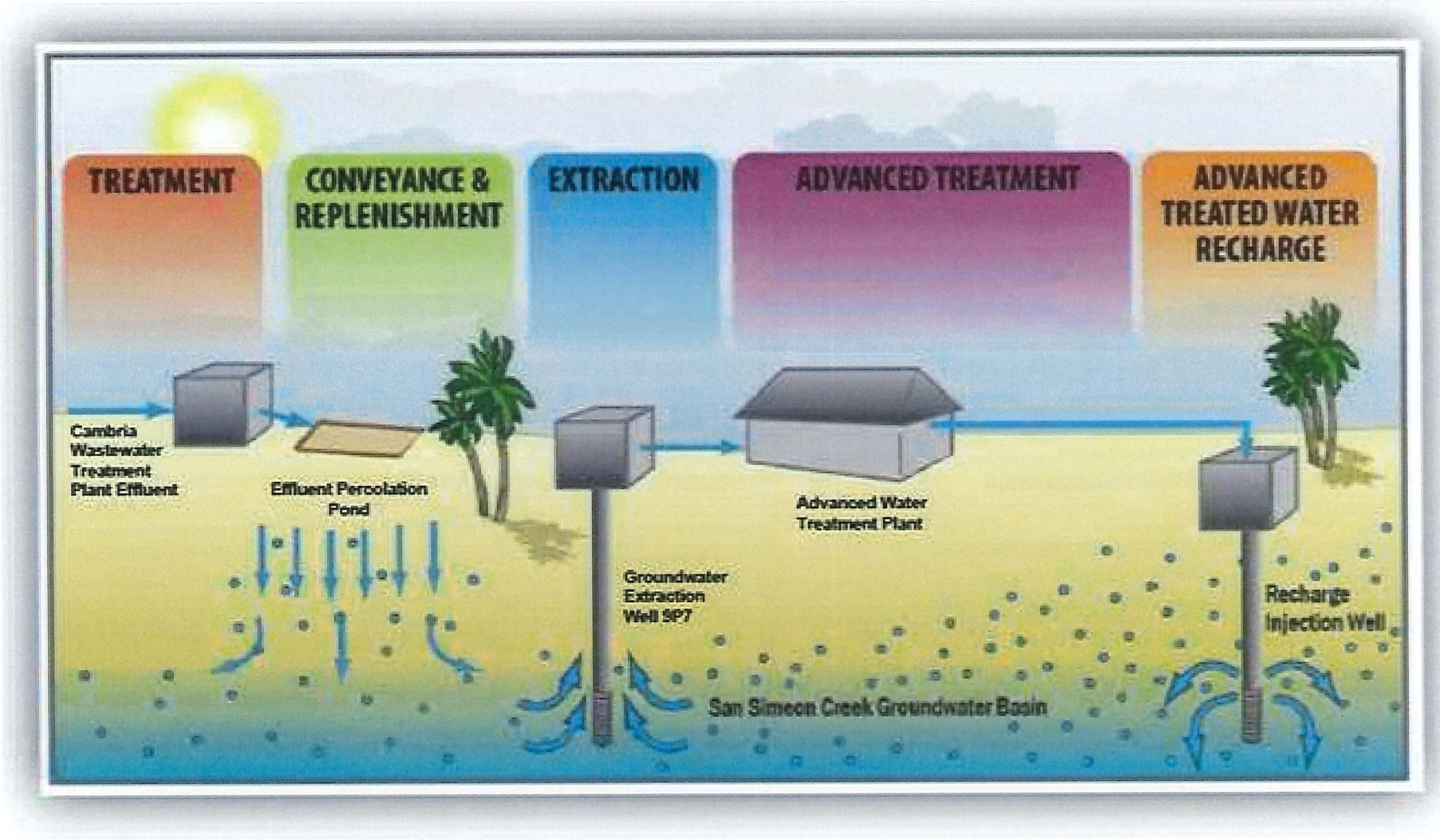
Project Component	Emergency Coastal Development Permit	Regular Coastal Development Permit
	• Construction of Recharge Injection Well (RIW-1); 100 feet deep; 454 GPM injection • New PG&E pad mount transformer connected to existing PG&E powerline serving Well 9P7 via a new power drop from the well site along the well site access road • New PG&E pad mount transformer connected to an existing PG&E overhead power line along San Simeon Road vie a new power drop along Van Gordon Creek Road	
Area of Improvements/Disturbance	15,000 square feet + 3.6 acres for pond liner	10,000 square feet + 3.6 acres for pond liner
Earthwork Quantities	50 cubic yards cut; 50 cubic yards fill (AWTP) 200 cubic yards cut; 200 cubic yards fill (pipeline trenching)	50 cubic yards cut; 50 cubic yards fill
Vegetation Removal	Van Gordon Reservoir – ruderal, 2 acres of coyote brush and 1 acre of upland mustard vegetation	No new vegetation removal is proposed
Water Production Potential	Between 30 AFY and 250 AFY (500 GPM; includes 100 GPM freshwater for discharge into San Simeon Creek Lagoon and 400 GPM for potable water supply)	Between 30 AFY and 250 AFY (500 GPM; includes 100 GPM freshwater for discharge into San Simeon Creek Lagoon and 400 GPM for potable water supply)
Connections Served	Existing authorized water connections	The WRF would initially serve to satisfy existing connections. As part of future operations, evaluations will be conducted through research studies, biological assessments, and consideration of impacts on other stakeholders. These assessments will determine whether the WRF is sufficient to fulfill existing commitments.

Project Component	Emergency Coastal Development Permit	Regular Coastal Development Permit
Operation	Water Shortage Emergencies; up to 24 hours/day/7 days/week for six months of the year; spray evaporators run approximately 12 hours per day; 2 employees per day for visual inspection	Water Shortage Emergencies and preventative; up to 24 hours/day, Monday-Friday, July-September; up to 6 employees per day in shifts
Extraction Well	Well 9P7 (gradient control well; San Simeon aquifer)	Well 9P7 (gradient control well; San Simeon aquifer)
Injection Well	Recharge Injection Well-1 (RIW-1; San Simeon aquifer)	Recharge Injection Well-1 (RIW-1; San Simeon aquifer)
Power	650 KVA (AWTP); 250 KVA (evaporation sprayers)	No new power is proposed
Water Treatment Method	Microfiltration, reverse osmosis, advanced oxidation, ultraviolet light, hydrogen peroxide	Microfiltration, reverse osmosis, advanced oxidation, ultraviolet light, hydrogen peroxide
Chemicals Used	Ammonium hydroxide, sodium hypochlorite, antiscalant, sulfuric acid, hydrogen peroxide, calcium chloride, caustic soda	Ammonium hydroxide, sodium hypochlorite, antiscalant, sulfuric acid, hydrogen peroxide, calcium chloride, caustic soda
Treated Wastewater Storage	Interim Baker tanks, Van Gordon Reservoir	Interim Baker tanks
Brine/Salt Disposal Method	5 mechanical spray evaporators weather controlled; natural evaporation; concentrated slurry pumped to trucks and hauled offsite; dried solids shoveled into barrels and hauled offsite	Zero Liquid Discharge (ZLD) facility, if successful, otherwise liquid or semi-solid brine concentrate from the RO treatment process would be hauled away to a permitted disposal site.
Access Improvements	n/a	n/a
Construction Commencement	May 22, 2014	Primarily existing; ZLD anticipated within 12 months of CDP approval; pond liner removal anticipated within 6 month of CDP approval
Construction Completed	November 14, 2014	TBD
Operational Date	January 20, 2015	TBD



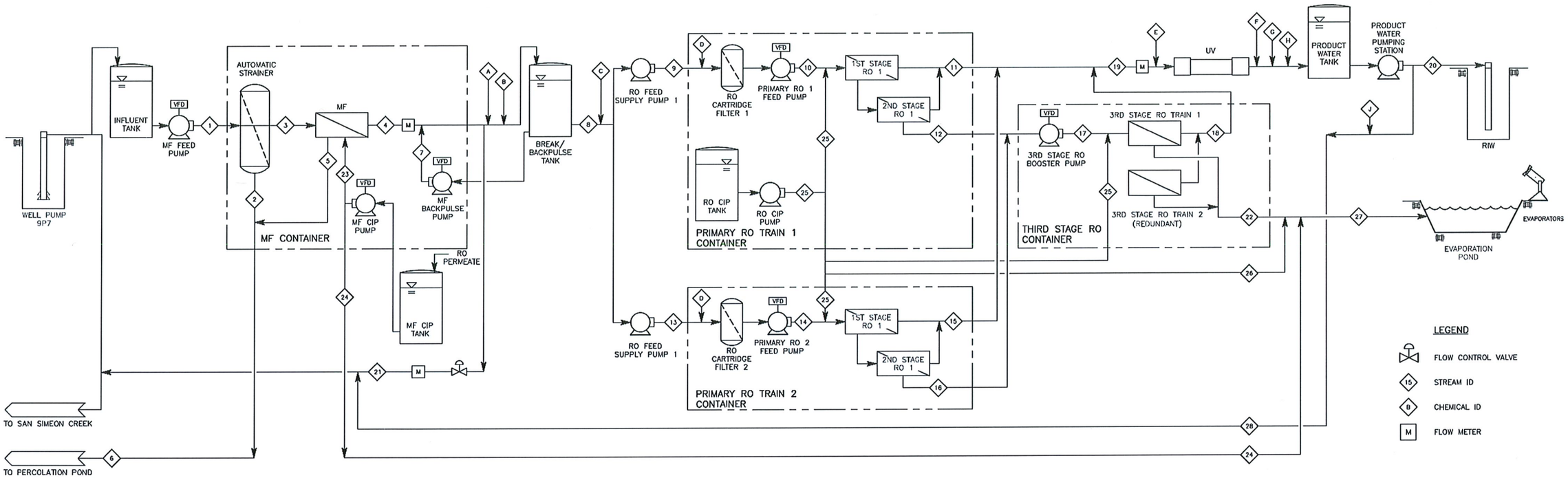
Source: CDM Smith, June 2014 (modified by SWCA)

Figure 4. Proposed Modifications.



Source: CDM Smith, June 2014

Figure 5. WRF Process.



Source: CDM Smith, May 2016
Note: Brine removal is shown as evaporation pond included with the EWSP. The WRF would utilize either ZLD or haul-off for brine removal.
Figure 6. AWTP Flow Process.

of the existing potable supply water Well SS-3. RIW-1 has a 5.0-foot stainless steel sediment trap below the well screen. A total of 400 GPM of treated product water is injected into RIW-1. The wellhead facilities are above grade and include steel pipe, a control valve to control the flow into RIW-1, a flow meter to measure the flow, and isolation valves to remove above-ground equipment. No pumps or noise-generating equipment are located at RIW-1. A small control panel is provided at the wellhead.

Reinjection of the AWTP treated product water, in addition to eventually being available for extraction as potable water, is intended to maintain the water elevation at the potable well field higher than the secondary effluent mound and higher than the mean sea level. This serves as a barrier to prevent secondary effluent and seawater (brackish water) from moving inland to the potable well field and freshwater water aquifer.

Brine Storage, Treatment, and Disposal

The EWSP modified and used Van Gordon Reservoir as a brine evaporation pond. However, during a flood emergency in early January 2017, stormwater drained across San Simeon Creek Road, with a portion of the stormwater entering the EWSP brine evaporation pond. This resulted in a cease-and-desist order from the RWQCB directing the CCSD to stop using the pond for brine disposal. Accordingly, the brine disposal facilities associated with the brine evaporation pond were subsequently decommissioned. The RWQCB approved the final pond closure and termination of the related Title 27 permits at its regional meeting on December 13, 2019.

Instead of using Van Gordon Reservoir for the WRF, the project proposes one of two methods for brine removal. The CCSD-preferred method includes the installation of a new Zero Liquid Discharge (ZLD) facility. The ZLD facility would reduce the amount of brine that must be disposed of by removing virtually all of the liquid from the brine, leaving behind a semi-solid brine concentrate. If the ZLD proves to be inefficient, ineffective, or is otherwise unable to be utilized, the CCSD would collect brine concentrate in storage tanks and once full would haul the waste offsite to an approved disposal facility.

Brine Storage Tanks. With the EWSP, the AWTP-generated waste stream from the RO process (RO concentrate or RO reject water), as well as any chemical cleaning waste, is temporarily sent to two 21,000-gallon Baker tanks for intermediate storage before being pumped to tanker trucks for offsite disposal at a properly licensed and regulated facility. The RO concentrate is conveyed to the brine storage tanks via the rerouted RO concentrate pipeline. Both tanks are staged within spill containment berms, and the truck-fill station is fitted with a drive-on perimeter berm to capture any water that could inadvertently spill during the fill operation. Conventional clay litter or other absorbent material is kept onsite to address incidental spillage.

If the ZLD facility is utilized, the CSSD would collect the brine wastewater in the two existing 21,000-gallon Baker tanks for intermediate storage, before pumping the brine to the ZLD. If the ZLD facility is not utilized, the CCSD would acquire four additional brine storage tanks. The tank(s) would be double walled with a capacity of approximately 60,000 gallons (the final tank selection will be sized based on maximum RO concentrate volume during peak operation). The RO concentrate pipeline would connect from the third stage RO unit to the intermediate storage tank(s) with a four-inch pipeline.

Under prolonged dry weather conditions, the WRF could run 24/7, during the driest time of the year, for approximately six months. When the project operates 24/7 during the driest time of year, the estimated RO concentrate volume would be approximately 50,000 gallons per day (GPD). Average operations during years of normal precipitation would likely result in an RO concentrate volume of approximately 20,000 GPD.

Zero Liquid Discharge

Assuming the ZLD pilot program is successful, the CCSD anticipates constructing a permanent ZLD facility to treat the RO wastewater. Construction of the ZLD facility is anticipated to require the pouring of an approximately 100' by 100' concrete pad that would house two 40-foot-long trailers that contain the ZLD equipment. The ZLD facility would be located on a previously graded and disturbed area immediately adjacent (northeast) of the AWTP.

Offsite RO Concentrate Disposal

Liquid or semi-solid brine concentrate from the RO treatment process would be hauled away to a permitted disposal site, such as the South San Luis Obispo County Sanitation District (SSLOCSD), which is in Oceano, approximately 53 miles south of the project site. SSLOCSD is a fully permitted 7.6-acre wastewater treatment, storage, and disposal facility.

Without the ZLD facility, under normal operations, three truck trips per day would be needed to haul the liquid RO concentrate to SSLOCSD, assuming a 4,500 to 6,000-gallon truck would be used. Up to nine truck trips per day would be required during peak operation (24/7).

Under prolonged dry weather conditions, the WRF could run 24/7, during the driest time of the year, for approximately six months. When the project operates 24/7 during the driest time of year, the estimated RO concentrate volume would be around 50,000 gallons per day (GPD). Average operations during years of normal precipitation would likely result in an RO concentrate volume of roughly 20,000 GPD. Until the ZLD pilot program is completed, it is unknown how much concentrate will be produced during normal and dry-year operations. However, CCSD estimates that semi-solid brine concentrate disposal would require approximately one truck trip per month, rather than the three to nine truck trips per day required for liquid brine disposal.

If the CCSD were to reach the SSLOCSD daily brine disposal limit, currently set at 50,000 GPD, an alternative disposal site, such as Kettleman Hills Hazardous Waste Facility, could be utilized.

San Simeon Creek Lagoon Surface Discharge

To maintain and enhance the San Simeon Creek Lagoon, MF effluent and/or de-chlorinated and oxygenated treated AWTP product water is pumped during dry weather conditions for surface discharge to the upstream end of San Simeon Creek Lagoon. The filtrate (lagoon water) pipeline (constructed with the EWSP) delivers the lagoon water from the AWTP to a surface discharge structure. The discharge structure, located just north of the San Simeon Creek tree line (Figure 3), dissipates velocity to create a sheet flow of lagoon water before entering the upstream end of the San Simeon Creek Lagoon. The quantity of lagoon water delivered depends on the results of monitoring and surveys performed under the Adaptive Management Plan (AMP) but is anticipated to be approximately 100 GPM when the creek is dry.

When treated product water is blended with the MF effluent for lagoon surface water discharge, it is de-chlorinated at the AWTP to reduce the high chlorine residual in the water. Sodium bisulfite is used to de-chlorinate the product water to meet the Regional Water Quality Control Board's (RWQCB) low-threat discharge permit requirements, with a maximum limit of 0.02 milligrams per liter (mg/l) for chlorine residual. Also included in the treated product water de-chlorination process is an in-line aeration system to ensure the water provided to the lagoon has sufficient dissolved oxygen before discharge.

The water discharged to the lagoon is treated and tested to meet RWQCB conditions specified within RWQCB Order No. R3-2011-0223, National Pollutant Discharge Elimination System (NPDES) Permit No. CAG993001, *General Permit for Discharges with Low Threat to Water Quality* (and its associated December 8, 2014 Monitoring and Reporting Program issued to the CCSD).

The WRF project would involve extending the filtrate pipeline to relocate the discharge point further south to the San Simeon Creek bank (Figure 4). The filtrate pipeline would be routed/placed by hand to protect the riparian habitat. This discharge location was identified to avoid interfering with Well 16D1 water quality samples and more efficiently deliver surface water into the upper San Simeon Creek Lagoon area.

At the relocated discharge point, articulating concrete block (ACB; ArmorFlex) lining or similar erosion prevention measures (approximately 87 square feet) would be installed to protect the San Simeon Creek channel bank. ArmorFlex would further protect the channel from potential erosion.

Monitoring Wells

The WRF includes five monitoring wells installed as part of the EWSP (MW-1, MW-2, MW-3, MW-4, and MIW-1; Figure 3). MW-1, MW-2, and MW-3 are up-gradient and down-gradient from the existing brine evaporation pond. MW-4 was installed outside the tree drip line and approximately 150 feet up-gradient from the lagoon water discharge structure to replace the existing Well MW-16D1. MW-4 was constructed in response to RWQCB concerns over the 100 GPM filtrate product water potentially biasing its testing towards higher quality results. MW-4 is used to monitor groundwater quality downgradient of the percolation ponds. These wells are approximately 3.0 feet in height. MW-1 is located between RIW-1 and the existing production wells at the well field.

Pipelines and Conveyances

Yard Piping. All yard piping was installed below ground at the AWTP site during construction of the EWSP.

Existing Conveyance Piping. The EWSP includes five interconnecting pipelines, as described below. The conveyance piping totals approximately 4,630 linear feet (LF), most of which was installed above grade (480 LF was installed below grade).

AWTP Feed Water Pipeline. This pipeline delivers the source water from CCSD Well 9P7 to the AWTP. This pipeline also connects with the Well 9P7 Discharge Pipeline, constructed initially to discharge pumped groundwater from Well 9P7.

Product Water Pipeline. This pipeline delivers the AWTP product water from the AWTP to RIW-1, where it is injected into the basin.

Filtrate Pipeline. This pipeline delivers de-chlorinated MF effluent/product water from the AWTP to the surface discharge structure near the confluence of San Simeon and Van Gordon Creeks. The pipeline combines a pipeline along the ground surface, a horizontal directionally drilled pipeline, and a direct burial pipeline. The pipeline was direct burial within the existing service road from the AWTP to the eastern edge of the Van Gordon Creek riparian corridor.

To avoid impacts to the Van Gordon Creek riparian corridor, a reach of this pipeline was installed using horizontal directional drilling under Van Gordon Creek. At the western edge of the Van Gordon Creek riparian corridor, the pipeline continued outside the Van Gordon Creek tree line and along the ground surface to the surface discharge structure. The discharge structure is located north of the San Simeon Creek tree line.

MF Backwash Waste Discharge Pipeline. This pipeline delivers the backwash water from the AWTP's MF system to an existing percolation pond.

RO Concentrate Disposal Pipeline. This double-contained pipeline delivers concentrate from the AWTP's RO process and chemical cleaning waste to the brine storage tanks for offsite hauling.

New Conveyance Piping. An extension of the existing filtrate pipeline is proposed. The new above-grade conveyance piping would total approximately 300 LF. This modification will avoid biasing Well 16D1 water quality samples (as requested by the RWQCB) and will more efficiently deliver water into San Simeon Creek to maintain water levels at San Simeon Creek Lagoon. The current surface discharge structure would be removed and relocated further south to the San Simeon Creek bank. At the discharge point, articulating concrete block (ArmorFlex or similar) lining would be installed to protect the northern San Simeon Creek channel bank from erosion. The lining would allow for the continued growth of riparian vegetation, further protecting the channel from potential erosion and avoiding/reducing sedimentation within the water bodies.

Operations

Water Reclamation Facility Production Flows

Table 2 summarizes recoveries, waste flows, and treatment process capacities for MF and RO systems required to meet the production goals to maintain the operational stability of the San Simeon aquifer without impacting environmentally sensitive habitat areas (ESHA) in Van Gordon Creek and San Simeon Creek.

The AWTP source water flow rate would be about 581 GPM. Assuming process-associated losses and a 100 GPM flow of treated product water to recharge San Simeon Creek Lagoon, the AWTP's daily average treated product water flow rate would be 400 GPM. Therefore, 400 GPM of treated product water would be pumped to RIW-1 and would incur at least 60 days residence time before reaching existing potable production Wells SS-1 and SS-2. A total of 400 GPM extraction from existing potable production Wells SS-1 and SS-2 (or a combination of both) could occur during WRF operation.

Table 2. AWTP Design Flows

Parameter	Unit	Average Flow
MF Recovery	%	92
RO recovery	%	92
Influent flow to AWTP	GPM	581
MF filtrate production (581 GPM x 92%)	GPM	535
MF filtrate flow to San Simeon Creek Lagoon	GPM	100
MF filtrate flow to RO feed	GPM	435
RO permeate production (435 GPM x 92%)	GPM	400
UV feed flow	GPM	400
AWTP product water flow for well RIW-1 injection	GPM	400
Automatic strainer backwash and MF backwash waste	GPM	37
RO concentrate and membrane cleaning waste	GPM	35

Source: CDM Smith, Cambria Emergency Water Supply Project Description Table 2-2, *October 2014. Modified to reflect production flow reductions required to achieve the 60 day retention time.*

Water Reclamation Facility Hours of Operation

During normal precipitation years, it is anticipated that operation of the WRF would begin in July and run until September. Operating and maintaining the WRF equipment during normal precipitation years requires onsite full-time staff, although the AWTP is designed to operate with minimal operator intervention. The WRF would be staffed Monday through Friday, 12 hours per day, with two employees per shift for two consecutive shifts (6:00 AM to 12:00 PM and 12:00 PM to 6:00 PM). This operation schedule would generate approximately 17.67 acre-feet of water per year.

In response to a prolonged dry season, the WRF could run for 24 hours per day, seven days per week (24/7), between July and September, subject to the AMP and the need to protect ESHA. Under less-than average precipitation, the WRF would be staffed Monday through Friday, 24 hours per day, with two employees per shift for three consecutive shifts (4:00 AM to 12:00 PM, 12:00 PM to 8:00 PM, and 8:00 PM to 4:00 AM). This operation schedule would generate approximately 35.4 acre-feet of water per year.

The plant would not need to be operated during wet or normal rainfall periods except for gradient control purposes to prevent saltwater intrusion into the freshwater water aquifer. During such periods of inactivity, the AWTP would be maintained in a ready state, which may include routine operation of equipment and valves and decalcifying the RO elements. Production start and end dates may vary due to well levels, previous wet season rainfall totals, date of flow cessation at Palmer Flats, and projected demands/supply shortfalls based on the CCSD Annual Water Supply and Demand Assessment. The CCSD may also adjust the WRF operational period based on the amount and timing of seasonal rainfall and the groundwater levels within the lower San Simeon aquifer. Other considerations that would influence the timing and duration of plant operation include the AMP, riparian water use, and licensed diversion totals.

Water Reclamation Facility Purpose

The WRF was designed and constructed to improve the reliability of the CCSD's potable water supply during drought conditions and other dry periods. The Emergency CDP authorizes the WRF to operate during CCSD Stage 3 Water Shortage declarations. (Note that the CCSD re-classified their water stages with the adoption of the 2020 Water Shortage Contingency Plan (WSCP), and the 2014 Stage 3 condition now correlates to WSCP Stage 5 and Stage 6 conditions.) The WRF is designed to provide a reliable water supply to the CCSD's service connections. The CCSD water system currently

serves 4,034 service connections (commercial and residential) while delivering an average of 520 acre-feet-per-year (AFY) of water to its customers. The WRF would initially serve to satisfy existing connections, but during future operations, impact assessments would be determined based on research studies, biological assessments, and impacts to other stakeholders to determine whether this mechanism would be adequate to serve existing commitments.

Attachments

1. Project Summary Table (history, permits, related technical studies)
2. County of San Luis Obispo Emergency Coastal Development Permit ZON2013-00589
3. Cambria Community Services District Resolution 05-2014 and Notice of Exemption for the Emergency Water Supply Project
4. Emergency Water Supply Project As-Built Plans
5. Water Reclamation Facility Proposed Plans
6. County of San Luis Obispo Emergency Coastal Development Permit ZON2013-00589 Condition of Approval #6 Compliance
7. Environmental Determination
8. Policy Consistency Analysis
9. Draft Adaptive Management Plan
10. In-stream Flow Study

Stillwater Sciences

895 Napa Ave., Suite B-3, Morro Bay, CA 93442
phone 805-570-7499

TECHNICAL MEMORANDUM

DATE: January 29, 2024

TO: James Green Cambria Community Services District

FROM: Ken Jarrett Stillwater Sciences

SUBJECT: Recommendations for District Operations in San Simeon Creek Basin

1 INTRODUCTION

The Cambria Community Services District (the District) commissioned Stillwater Sciences to conduct an Instream Flow Study in San Simeon Creek (Stillwater Sciences 2024), and Todd Groundwater to conduct groundwater modeling of the same area (Todd Groundwater 2022). The goal of the Instream Flow Study (Task 1) was to determine the amount of surface flows needed to support aquatic species while the goal of the groundwater modeling study (Task 2) was to assess the influence of operating the Water Reclamation Facility (WRF) on groundwater conditions from under a range of scenarios. Results from both studies will be used to inform District operations in the San Simeon Creek Basin and to inform the Adaptive Management Plan (AMP) for San Simeon Creek. This memo focuses on surface flow conditions as they relate to special status aquatic species and provides recommendations for District operations to be protective of sensitive species, including monitoring to help refine operational conditions and measures to be protective of aquatic species. Recommendations for operation of the WRF and associated monitoring is provided in a separate memo (Todd Groundwater 2023) because the WRF only operates during periods when surface flows have ceased and thus do not influence surface flows that provide habitat for aquatic species.

Habitat conditions for special status aquatic species were assessed within lower San Simeon Creek (lower 2.9 miles) where the creek flows over the groundwater basin, and stream flow is most likely to be influenced by groundwater pumping. Three sensitive species are known to occur in lower San Simeon Creek, including steelhead (*Oncorhynchus mykiss*), California Red-legged frog (*Rana draytoni*) and tidewater goby (*Eucyclogobius newberryi*). As described below, habitat conditions were assessed using 1-D modeling of habitat suitability, evaluating steelhead passage flows, identifying and monitoring frog breeding habitat, and analyzing lagoon water quality data.

2 1-D MODELING IN LOWER SAN SIMEON CREEK

The incremental flow instream flow methodology (IFIM) was used to develop a 1-D Model to determine the relationship between stream flow and steelhead habitat in lower San Simeon Creek. Conditions for California Red-legged frog and tidewater goby were assessed using qualitative habitat evaluations described in Section 3.

The 1-D model simulated habitat conditions for steelhead at stream flows ranging from 0 cfs to 7.6 cfs. Habitat conditions for flows above 7.6 cfs were not included in model simulations because flows of this magnitude are not expected to be influence by District groundwater pumping which have a maximum rate of 1.43 cfs, and high flows result from heavy precipitation events that occur when water demand is low and groundwater pumping is limited. Results from 1- D modeling indicate that during stream flows of 1.0 cfs and above, habitat conditions support juvenile steelhead rearing. Reductions in flow when stream flow is at 1.00 cfs or less leads to reduced habitat quantity and habitat quality for juvenile steelhead in lower San Simeon Creek. Stream flows of 1.0 cfs and above are also expected to support CRLF breeding and rearing habitat conditions.

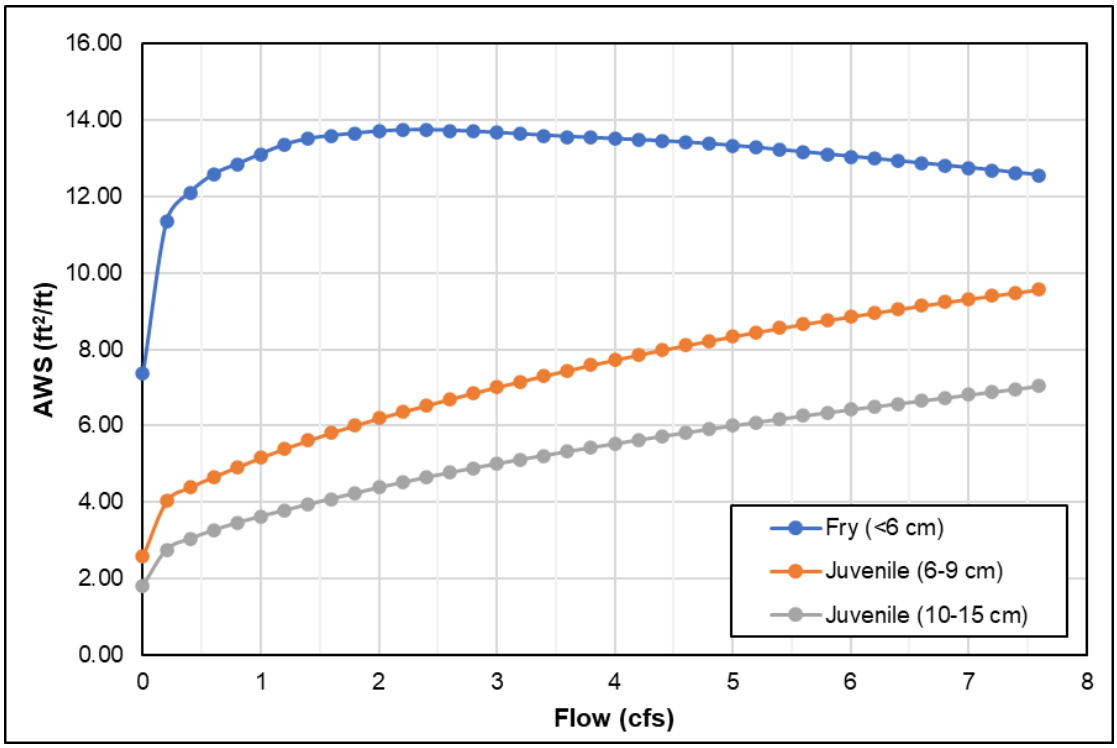


Figure 1. Flow habitat relationships (AWS) for fry and juvenile steelhead rearing in lower San Simeon Creek.

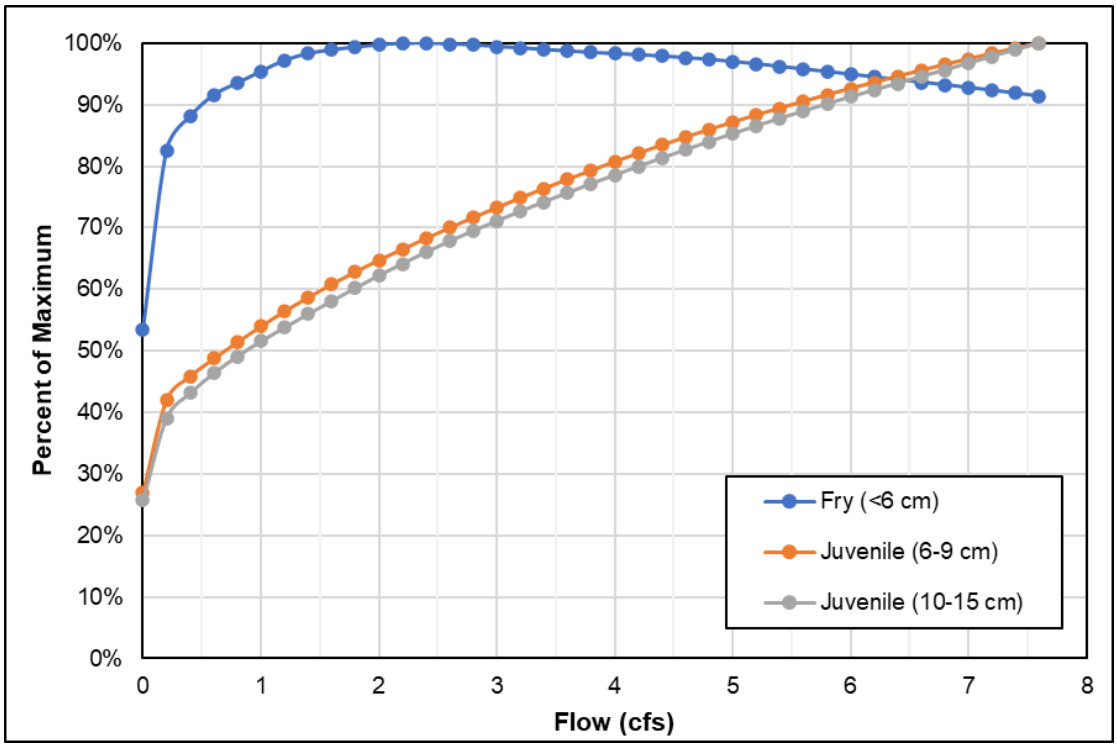


Figure 2. Percent of Maximum AWS for fry and juvenile steelhead rearing in lower San Simeon Creek.

3 STEELHEAD PASSAGE ASSESSMENT

Steelhead passage conditions were assessed within lower San Simeon Creek based on previous studies that identified passage flows, review of available stream flow data, and District pumping information. Adult steelhead passage requires high flows ranging from 21–60 cfs (D. W. Alley and Associates 1992) associated with large precipitation events and are not likely to be influenced by the District's maximum pumping rate of 1.43 cfs. Juvenile steelhead passage requires lower flows than adult passage, ranging from 4–11 cfs (D. W. Alley and Associates 1992), typical of the San Simeon Creek spring recession flows. Migration conditions for steelhead within the lower San Simeon Creek are generally supported under current District operations; however, District operations have the potential to reduce juvenile steelhead migration during the lower juvenile passage flow (4 cfs). (Figure 3).

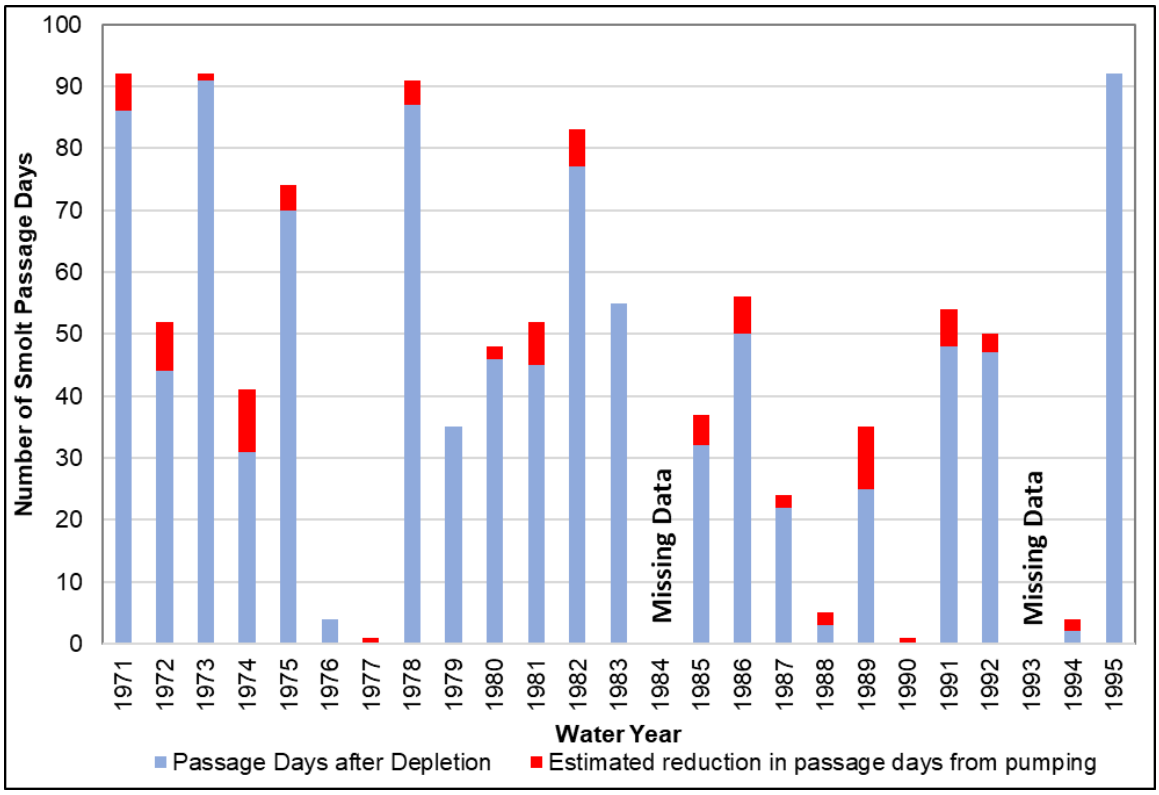


Figure 3. Estimated reduction in juvenile steelhead passage in San Simeon Creek based on stream flows recorded at Palmer Flats (1971–1995) during the juvenile steelhead migration season (March–May) assuming maximum District groundwater pumping at 1.43 cfs and passage requires at least 4 cfs.

4 CRLF AND LAGOON HABITAT

Suitable habitat for CRLF breeding was identified throughout lower San Simeon Creek and surveyed over a range stream flow conditions to determine suitable flows to maintain breeding habitat. Suitable CRLF breeding habitat was generally found in pools which continued to provide suitable habitat even as flows decreased to near zero cfs. However, once stream flow ceases, CRLF habitat becomes limited to a few isolated pools in lower San Simeon Creek and within the lagoon. District pumping when stream flows are low (less than around 1.0 cfs) is likely to increase the rate at which pool habitat becomes isolated and the rate at which pools dry out leading to stranded CRLF tadpoles.

Additional suitable habitat for CRLF is located within the San Simeon lagoon. Existing monthly water quality and stage elevation data from the San Simeon lagoon (collected by the California State Parks) covering the period of December 2019 through July 2022 was evaluated to assess the relationship between surface flow and aquatic habitat conditions within San Simeon Creek lagoon. Data collected from the San Simeon Creek lagoon were compared to water quality criteria (e.g., temperature, dissolved oxygen, and salinity) reported to be suitable for steelhead, tidewater goby, and CRLF to assess habitat conditions for special status aquatic species. Habitat conditions in the San Simeon lagoon are suitable for juvenile steelhead, tidewater goby, and CRLF under current conditions based on water temperature, dissolved oxygen, and salinity levels

reported throughout most of the year. During the few events when water quality thresholds are exceeded for any of these species, other locations within the lagoon were still within the suitable range.

5 RECOMMENDATIONS

The following actions are recommended to be protect aquatic resources and inform ongoing and future District operations in lower San Simeon Creek.

5.1 Operations Management

To be protective of aquatic resources in lower San Simeon Creek, we recommend the District adjust groundwater pumping operations during sensitive stream flow levels. Sensitive stream flows for steelhead include flows ranging from just above 0.0 cfs up to 1.0 cfs to support rearing habitat conditions, and stream flows at 4.0 cfs to support juvenile steelhead passage. Flows to support adult steelhead passage do not appear to be sensitive to District operations because they require high magnitude rain driven flow events (i.e., > 20 cfs). Sensitive stream flows for CRLF include flows ranging from just above 0.0 cfs up to 1.0 cfs. Flows to support tidewater goby were not identified during this study because tidewater goby habitat is primarily found within the lagoon where effects from district pumping do not appear to be impacting habitat conditions.

To be protective of these flows, we recommend the following District operations based on stream flows measured near the current county gage location:

1. District pumping does not occur when stream flows are between 0 and 1 cfs
2. District pumping rates shall be adjusted to be protective of stream flows of 4 cfs
3. When flows are above approximately 5.5 cfs, District pumping is not expected to affect aquatic habitat because the maximum District pumping rate is 1.43 cfs, and no pumping restrictions are recommended.
4. When surface flows cease (0 cfs), District pumping is not expected to affect aquatic habitat and no pumping restrictions are recommended.

5.2 Long-term Monitoring

Monitoring in association with the above operational recommendations is important to directing and informing the District's groundwater pumping operations. We recommend long-term monitoring of stream flow, fish stranding, and lagoon water quality as described below.

5.2.1 Stream Flows

Stream flow monitoring is recommended to develop a better long-term record of stream flows within San Simeon Creek and to inform District operations and Adaptive Management practices. Continuous monitoring of stream flow should be conducted near the San Simeon well field and near the upstream end of the groundwater basin at the Palmer Flats gage location. The County of San Luis Obispo currently operates a stream gage near the San Simeon well field which continuously records water levels. However, a stage-discharge rating curve needs to be developed and validated to apply to the stage data collected at this existing gage in order to convert stage level recordings to stream flow. A continuous stage measuring device is recommended at the Palmer Flats location, and additional flow data collection is required to develop a continuous flow record as described above.

5.2.2 Fish Stranding

Monitor isolated pools within the lower Simeon Creek to assess the risk of juvenile steelhead stranding. We recommend monitoring be conducted using visual observations of isolated pool habitat to assess relative abundance of juvenile steelhead "trapped" in isolated pools. Surveys should be conducted during the spring once surface flows decrease below 1 cfs near the District well field and recur as flows continue to drop and pools become intermittent. Biologists familiar with the identification of juvenile steelhead should walk the channel identifying locations of isolated pool habitats and visually inspecting pools from the shore to estimate the number of steelhead within each pool. All observations of potential stranding will be reported to CDFW for relocation consideration.

The District will work closely with the California Department of Fish and Game (CDFW) who would take the lead relocating stranded fish (Z. Crumb, CDFW, pers comm January 15, 2024). Relocation details will be determined based on site specific conditions which can change between years but is expected to include backpack electrofishing to capture steelhead and relocation to the San Simeon lagoon.

5.2.3 Lagoon Water Quality

We recommend monitoring lagoon stage levels and water quality conditions (temperature, dissolved oxygen, and salinity) at the upstream and downstream ends of the lagoon during the late spring through fall. Water quality measurements should be collected throughout the water column (i.e., upper, lower and middle) at each monitoring location on a monthly basis and evaluated in relation to flows within lower Simeon Creek.

5.3 Annual Reporting

We recommend results from the long-term monitoring be summarized annually in a report provided to the Technical Advisory Committee. The report should include the information below to assist in ongoing evaluation of District operations in the San Simoen Creek basin:

1. District pumping operations in relation to stream flows near the county gage, especially for the range of between 0 and 1 cfs, including the number of days and the rate of extraction shall be reported,
2. The number of days that pumping reduced juvenile steelhead migration flows below 4 cfs,
3. Summary of fish stranding observations and if fish relocation occurred, and
4. Summary of lagoon water quality monitoring results.

6 REFERENCES

D.W. Alley and Associates. 1992. Passage requirements for steelhead on San Simeon Creek, San Luis Obispo County, California. 1991. Prepared by Donald W. Alley for the Cambria Community Services District, Cambria, California.

Stillwater Sciences 2024. San Simeon Creek Instream Flows Assessment. Final Report. Prepared by Stillwater Sciences, Morro Bay, California for Cambria Community Services District, Cambria, California.

Todd Groundwater. 2022. Simulated Effects of Sustainable Water Facility Operation. Prepared by Todd Groundwater Inc., Alameda, California for Cambria Community Services District, Cambria, California.

Todd Groundwater. 2023. Guidance Manual for Use of Cambria Community Services District's Water Reclamation Facility. Prepared by Todd Groundwater Inc., Alameda, California for Cambria Community Services District, Cambria, California.

December 11, 2023

MEMORANDUM

To: James Green, Cambria Community Services District

From: Gus Yates, Senior Hydrologist

Re: **Guidance Manual for Use of Cambria Community Services District's Water Reclamation Facility**

BACKGROUND

Cambria Community Services District (District) constructed an indirect potable reuse facility near its wastewater percolation ponds in the San Simeon Creek groundwater basin in 2014. The facility was permitted on an emergency basis to address water supply shortages during the drought that was then occurring. The plant was operated sporadically during 2014-2016 and has remained idle since then. The facility is now known as the Water Reclamation Facility (WRF), and the District expects to use it during future droughts, if needed. This guidance manual presents systematic decision rules for when and how much to operate the WRF, including when to turn it on, how to adjust the production rate on a weekly or biweekly basis, and when to turn it off. It also describes a monitoring program that should be implemented before and during WRF operation to detect and mitigate any impacts to pools in San Simeon Creek or to its terminal lagoon.

WHEN TO TURN ON WRF

Criteria for when to turn on the WRF in any given year emerged from simulations of WRF operation under various drought and water shortage conditions using a groundwater flow model of the San Simeon Creek groundwater basin (Todd Groundwater, 2022). There are several constraints on the amount of water that the WRF can produce. The limitation that most commonly constrained operation in the simulations was the water-level gradient between well SS-4 and well 9P2 (see locations in **Figure 1**). To prevent the subsurface flow of percolated wastewater toward the well field, the water level in SS-4 should always be higher than the water level in 9P2. The existing permit for operating the percolation ponds allows temporary excursions to a reverse gradient, with SS-4 as much as 0.79 foot below 9P2 (a gradient of -0.79 foot). In practice, CCSD operates the system to avoid a water level difference less than +0.75 foot (that is, SS-4 water level at least 0.75 foot higher than 9P2 water level), and this was the criterion used in the scenarios. Other constraints including the capacity of the supply well (well 9P7), the microfiltration and reverse osmosis capacities, water rights and environmental impacts proved not to be limiting.

The SS-4/9P2 gradient typically declines during the dry season as pumping from the well field gradually lowers water levels near SS-4. The simulations demonstrated that relatively uniform WRF operation could be achieved by turning on the WRF before the gradient fell to less than +0.75 foot. In scenarios where San Simeon Creek flow dropped to near zero at the beginning of April, the WRF needed to start operating in early September. When creek flow approached zero at the beginning of March, the WRF needed to start operating in early August. The minimum gradient occurred later (November or December).

In general, WRF operation will be needed in years when the dry season starts early. The dry season for this purpose is defined as the date when San Simeon Creek flow at Palmer Flats falls below 2 cfs, which is the estimated amount of creek percolation between Palmer Flats and the well field. If the dry season starts early, groundwater levels in the lower San Simeon Creek basin should be checked regularly and trends projected out to the likely end of the dry season to determine whether WRF operation will be needed. The specific steps for implementing this process are as follows:

1. Measure or estimate stream flow at Palmer Flats weekly from March 1 to May 1. Determine the date when flow drops below 2 cfs, which is the start of the dry season. If that date occurs before May 1, continue with the remaining steps.
2. Plot the average water level at the District's three San Simeon production wells on a dry-season hydrograph like the one shown in **Figure 1**, which the District prepares every year. If the curve for the current year is in the bottom third of the range of curves as of August 1, plan to turn on the WRF by mid-August or the beginning of September.

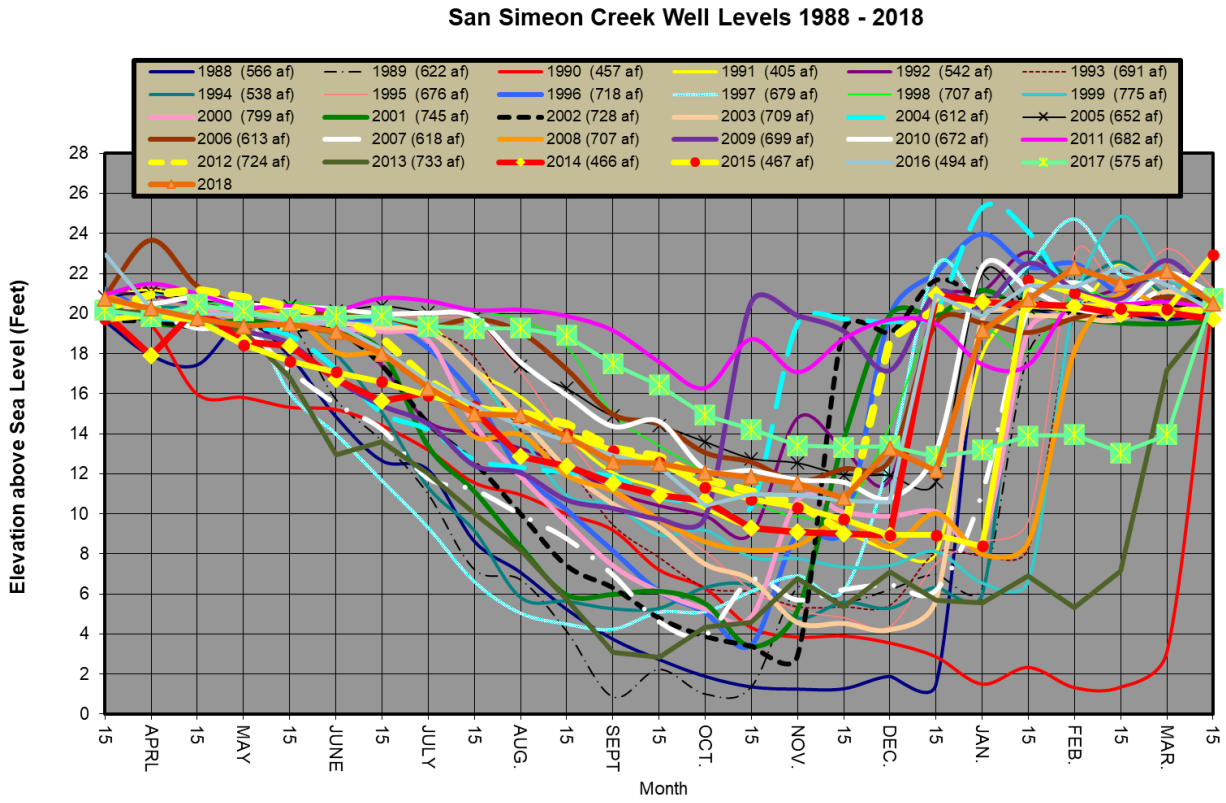


Figure 1. Historical San Simeon Creek Groundwater Levels during the Dry Season, 1988-2018

3. A second and more important criterion is a similar plot of the SS-4/9P2 gradient. Calculate the difference in groundwater elevation between SS-4 and 9P2 (SS-4 minus 9P2) and plot it as a dry-season hydrograph. The District has not historically done this, but an example using simulation results is shown in **Figure 2**. The water-level difference was declining rapidly during April-August of the first year of the simulation (labeled as 2013) and would clearly fall below +0.75 foot before mid-December. In the "Stage 4" scenario, the difference continued to decline to -0.6 by March of the second year. In the "Stage 4 + WRF" scenario, the WRF was turned on at the beginning of September in the first year of the simulation, and the WRF flow was adjusted to maintain a water level difference greater than +0.75 foot.

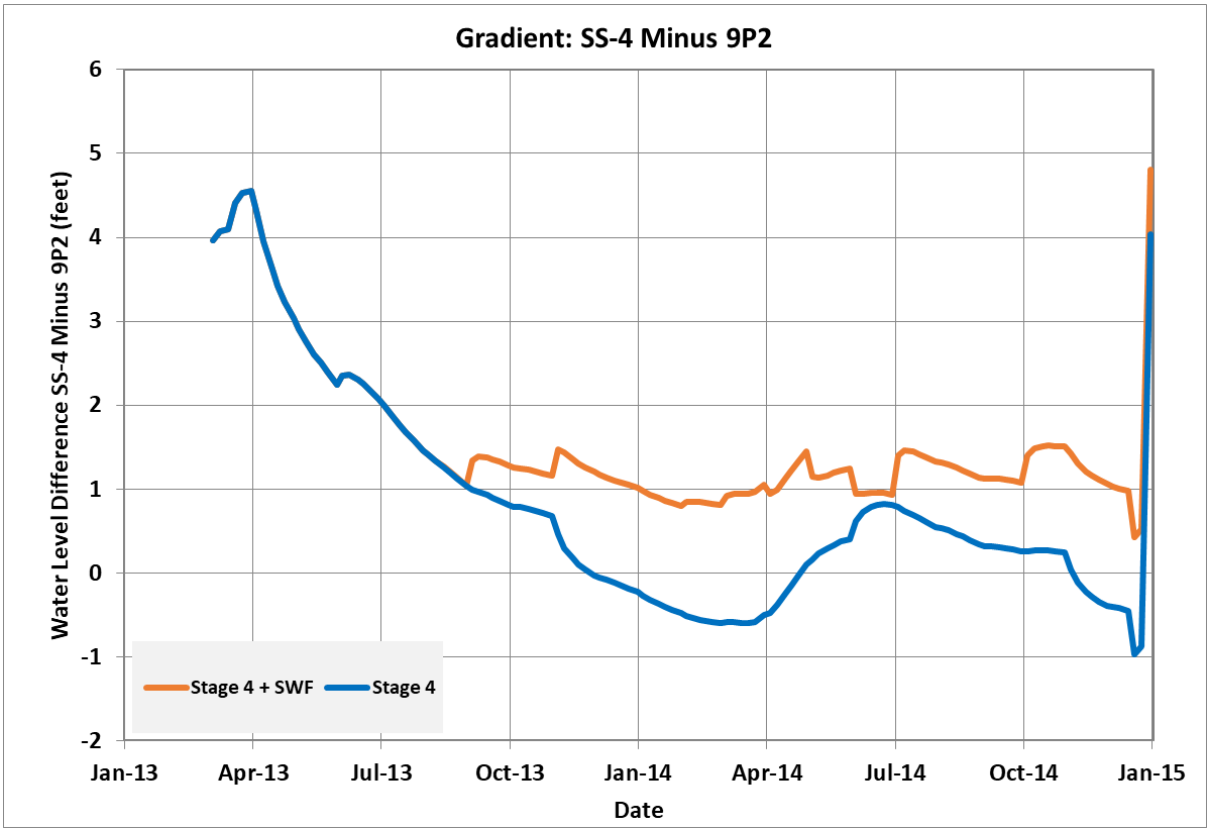


Figure 2. Hydrograph of Simulated SS-4/9P2 Water Level Difference for Two Scenarios

SELECTING WRF FLOW RATE

Well 9P7 is the supply well for the WRF, and it is not designed for variable output. The amount of WRF flow over a week or month is adjusted by changing the percent of time that 9P7 and the microfiltration (MF) and reverse osmosis (RO) treatment trains are operating. This would typically be the number of hours per day and/or days per week that the facility operates.

In a series of scenarios covering Stage 4 and Stage 6 water shortage conditions with and without concurrent increases in pumping by nearby agricultural users, it was found that WRF production rates of 10-35 AF/mo were needed to maintain the SS-4/9P2 gradient above +0.75 foot. This production rate is the volume injected at the injection well. Working backwards through the RO efficiency (92.1%) and microfiltration efficiency (94.5%) and allowing for the lagoon mitigation discharge (100 gpm of microfiltration water), the amount of pumping at the WRF supply well (well 9P7) can be calculated, as shown in **Table 1** below.

Table 1. Well 9P7 Pumping to Supply Target Injection Volume

Recycled Water Injection Well (AF/mo)	9P7 WRF Supply Well Production		
	AF/mo	Equivalent gpm	Percent of Time Operating
10	26.6	198	34%
15	31.4	234	40%
20	37.2	277	48%
25	42.9	319	55%
30	48.7	363	62%
35	54.5	406	70%

The SS-4/9P2 gradient responded fairly quickly to changes in WRF production rate in the simulations. Effects could be seen within 2 weeks, which was the time interval used in the simulations. If the gradient accidentally falls below the target of +0.75 foot, an increase of 5-10 AF/mo of WRF production will likely put it back above +0.75 foot within 2-4 weeks.

Adjustments to WRF production should be made every 2 weeks until the facility is turned off.

WHEN TO TURN OFF WRF

WRF operation is no longer needed when stream flow in San Simeon Creek resumes. Typically, a major storm in early winter (November-January) will initiate substantial flow that replenishes the groundwater basin within a few weeks. In dry winters, there may be periods when the SS-4/9P2 gradient stays slightly above +0.75 foot without WRF operation then falls back below a few weeks later. In that case, the WRF can be turned on and off at low rates to continue meeting the target gradient until a larger stream flow event arrives.

MONITORING BEFORE AND DURING WRF OPERATION

One concern with operating the WRF is that pumping from its supply well might lower the water level in the lagoon or in perennial pools in San Simeon Creek just upstream of the lagoon. The mitigation discharge is designed to ensure that impacts do not occur, but monitoring is recommended for confirmation.

Data Collection

Monitoring should begin before the WRF starts operating because the detection of impacts relies on analysis of trends. In any year when WRF operation is expected, monitoring should start about 2 months in advance. Most of the monitoring focuses on water levels. However,

other variables that can affect water levels also need to be monitored so that the cause of a change in water level trend can be correctly identified. This leads to the following steps:

1. Contact San Simeon Basin agricultural pumpers (Jon Pedotti and Clyde Warren) to find out their irrigation plans for the remainder of the dry season. Above-average irrigation by those growers tends to hasten the date when the WRF needs to be turned on and may cause independent, additional impacts on water levels and flow in the creek and lagoon.
2. Contact the Central Coast Wetlands Group to find out whether their monitoring of stage in San Simeon Creek lagoon is still active and will continue through the anticipated WRF operational period. CCWG is located in Moss Landing. The contact person is Kevin O'Connor, Program Manager. (831) 771-4495 (office). E-mail: koconnor@mlml.calstate.edu
3. Start the monitoring program detailed in **Table 2**. The table lists the variables to be monitored and the monitoring frequency for the periods leading up to and during WRF operation.

The "continuous" measurements recommended in the table are assumed to use a pressure transducer with data logger, such as the HOBO© Water Level Loggers currently deployed in the four piezometers near the percolation ponds. Measurements of beach berm width at the ocean end of the lagoon are recommended because the width of the berm can gradually increase during the dry season, and it affects lagoon level and outflow. Those measurements can best be obtained from drone aerial photography.

Table 2. Monitoring Program Locations, Variables and Measurement Frequencies

Start Date for Monitoring Phase	Starting at Least 2 Months Before WRF Operation[1]	SS-4 to 9P2 Gradient Will Decline to 0.75 ft within 3 Weeks	Comments
WRF Status	**Off**	**On**	
Water Levels			
16D1	Biweekly	Weekly	To compare with historical record as means of detecting impact.
MW4	Continuous	Continuous	This well near 16D1 may be tidally influenced. Continuous measurements by data logger are needed to detect tidal fluctuations so they can be subtracted from the measurement record to reveal any 9P7 pumping drawdown.
SS-3, SS-4, 9P2	Continuous	Continuous	SS-3 will be idle when WRF is injecting, so it will have relatively reliable water levels. All of these wells will be influenced by nearby pumping well on/off cycles, so continuous HOBO records will be more accurate. SS-4 and 9P2 define the gradient that is the primary criterion for WRF operation.
Four piezometers in percolation area	Continuous	Continuous	Continuous recording with loggers when WRF turns on will confirm the spread of drawdown from 9P7 and whether it reaches San Simeon Creek.
San Simeon Creek pools (e.g. Van Gordon and red-legged)	Biweekly	Weekly	Install staff plates in the pools at the start of monitoring. Remove prior to the next high flow season.
Lagoon	Continuous	Continuous	Obtain data from Central Coast Wetlands Group, or deploy a separate water level data logger.
Flows			
Pumping at SS-1, SS-2 and SS-3	Weekly	Weekly	Many of these flows have hourly and daily variations that would be attenuated to average rates by the time any effects reached the creek or lagoon. Evaluation of more frequent pumping subtotals is not necessary.
Warren pumping	Weekly	Weekly	Weekly volume is sufficiently frequent. Well is metered.
Pumping at 9P7	Weekly	Hourly to Weekly	When the WRF is first turned on, monitor the pumping rate at 9P7 hourly for the first 12 hours, and at the beginning, middle and end of each operational cycle for the next week. This is to support aquifer test analysis in conjunction with piezometer water levels. Thereafter, weekly pumping subtotals are sufficient.
Wastewater percolation	Weekly	Weekly	Weekly volume is sufficiently frequent. Record which pond receives the water.
WRF lagoon discharge	n.a.	Weekly	Weekly volume and instantaneous rate when operating.
San Simeon Creek at campground bridge (or nearby upper end of lagoon)	Biweekly	Weekly	Instantaneous flow, in cubic feet per second. Inflow may consist of a barely visible trickle entering ponded conditions in the lagoon. Measurement by pygmy meter would not likely be feasible. An alternative such as salt dilution may be needed.
Other			
Drone air photos of beach berm	Montly	Monthly	Preferably taken at similar tide levels. Altitude of drone needs to be high enough to include fixed objects (such as outcrops, Highway 1) that can be used to georeference and overlay successive photos.

Notes:

[1] WRF operation can be anticipated to start around September 1 in years when the dry season starts before May 1 or when a Stage 4, 5 or 6 Water Shortage Condition has been declared.

Routine Data Analysis

The general approach to detecting impacts on creek and lagoon water levels and flows is to plot time series of those variables to identify departures from normal seasonal trends that commence after the WRF is turned on. Comparison with time series plots of other variables will indicate whether WRF operation caused the change in water levels and flows. Step by step instructions are as follows:

1. Create time series graphs of all monitored variables so that trends and changes in trends can be seen. Update the graphs with new data as they are obtained. If there appears to be a new or increased downward trend in the water level at well 16D1, in creek pool water levels or in stream flow entering the top of the lagoon, continue to step 2.

2. Download and plot the continuous water level data from well MW4 to confirm whether the trend is also present in that well (if it's a real trend, it should be). Otherwise, the apparent trend at 16D1 and the pools could be an artifact of tidal noise in the weekly measurements.

3. Compare the 16D1 water level hydrograph with the historical range of water levels at that well, which is shown in **Figure 3**. For more exact comparison, dates and elevations defining the line that bounds the lower end of the historical range are listed in **Table 3**. For context, there has been a long-term declining trend in 16D1 water levels since about 2002 correlated with and probably caused by decreased percolation volumes at the nearby wastewater percolation ponds (Todd Groundwater, 2019). Thus, low water levels specifically associated with the period of WRF operation are more diagnostic than low water levels in general.

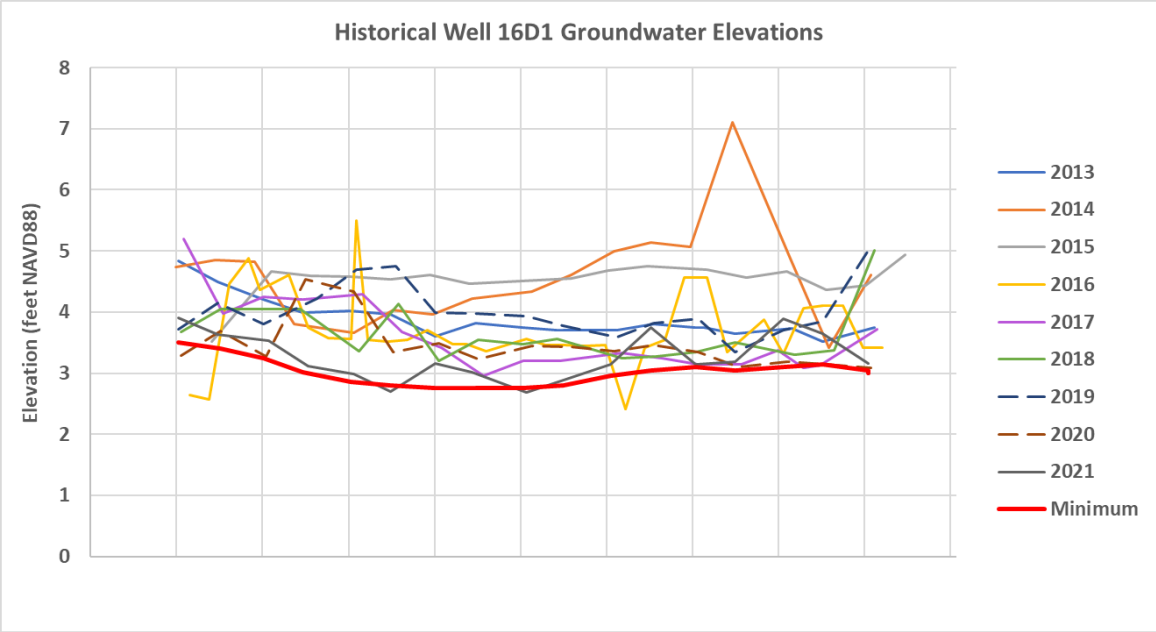


Figure 3. Historical Dry Season Water Levels at Well 16D1

Table 3. Historical Minimum Dry-Season Water Levels at Well 16D1

Date	Julian Day	Elevation (ft NAVD88)
Apr 1	91	3.50
Apr 15	106	3.40
May 1	121	3.25
My 15	135	3.02
Jun 1	152	2.85
Jun 15	166	2.80
Jul 1	182	2.75
Jul 15	196	2.75
Aug 1	213	2.75
Aug 15	227	2.80
Sep 1	244	2.95
Sep 15	258	3.05
Oct 1	274	3.10
Oct 15	288	3.05
Nov 1	305	3.10
Nov 15	319	3.15
Dec 1	335	3.05
Dec 15	335	3.00

4. Compare the creek pool water level hydrographs with hydrographs from previous years to assess whether current declines appear unusual. Biological monitoring reports from prior years have shown relatively stable pool depths during the dry season, as illustrated by the hydrographs for the Van Gordon and Red Legged pools during 2017 in **Figure 4**. The temporary upward spikes in water levels in August, October and December coincided with spikes in lagoon level and probably resulted from wave overwash at the beach berm.

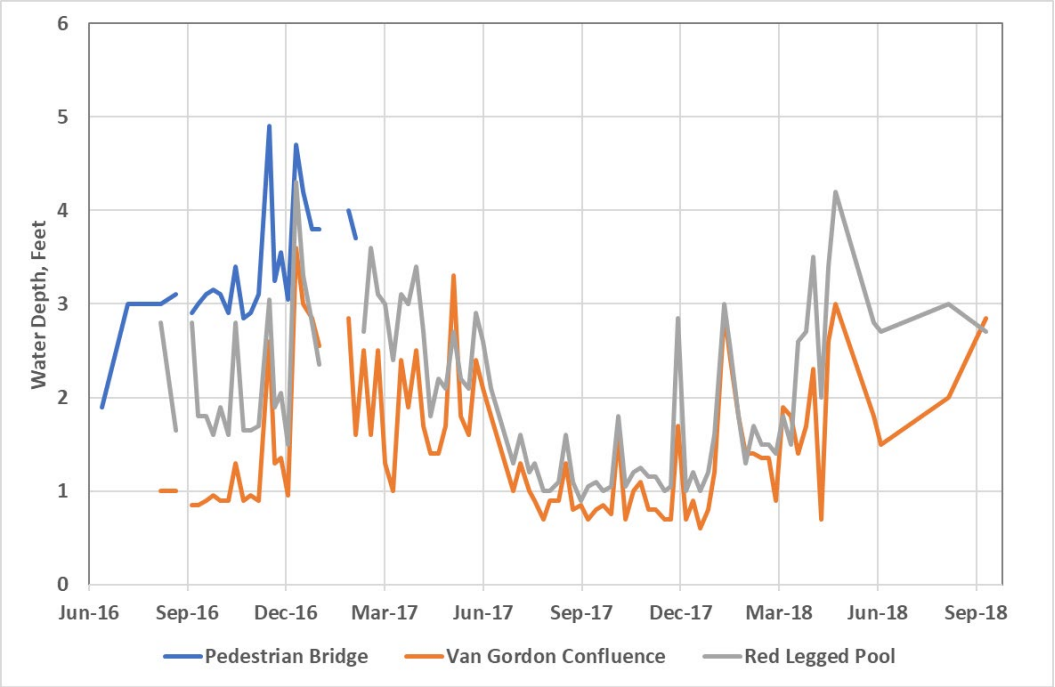


Figure 4. Water Levels in San Simeon Creek Pools, 2016-2018

5. If the changes in trends in well 16D1, well MW4, creek pool levels and lagoon inflow appear real, compare those hydrographs with the time series plots for variables that could cause a change in water levels:
    a. Wastewater percolation volumes
    b. 9P7 pumping
    c. Warren pumping
    d. Beach berm width
    e. SS-4 to 9P2 gradient
    f. CCSD well field pumping
    g. Piezometer water levels (rate of radial spread of drawdown around 9P7)

    The features to look for are a significant change in magnitude of any of those variables that occurred shortly before the observed decline in MW4 water level, such as an increase in pumping at 9P7, 9P4 (Warren) or the CCSD well field, a decrease in beach berm width, a change in the wastewater percolation location, or a decrease in the SS-4 to 9P2 gradient.

6. If it appears that accelerated decline in water levels and/or inflow at the top end of the lagoon may be caused by WRF operation, increase the lagoon discharge rate by an amount approximately equal to the reduction in lagoon inflow.

7. Repeat steps 1-6 again every 2 weeks and adjust lagoon discharge as needed.

8. Monitoring may be discontinued when stream flow resumes in winter and WRF operation ceases.
9. In subsequent years of WRF operation, monitoring is not needed as long as groundwater conditions at the time WRF is turned on are similar to those during the initial year. Aquifer characteristics and stream-aquifer interaction do not change over time. New monitoring would be needed only if operating conditions are significantly different than during the first year, such as substantial increases in WRF production, CCSD well field pumping, agricultural pumping or decreases in wastewater percolation.

Additional Analysis for First Year of WRF Operation

After the first month of WRF operation, the 9P7 pumping data and water-level data for the percolation pond piezometers should be analyzed to quantify the magnitude and spread of drawdown around that well. By applying the Theis Equation for drawdown around a pumping well, the arrival time of drawdown at creek pools and the upper end of the lagoon can be calculated. The extent to which wastewater percolation in Pond A blocks the spread of drawdown in that direction can also be calculated. Finally, the percent of 9P7 pumping derived from storage depletion versus stream flow depletion can be estimated. All of these calculations reveal whether 9P7 pumping is impacting pools in the creek or the lagoon.

This analysis does not need to be repeated in future years unless WRF operation is significantly greater in terms of pumping rate or duration.

REFERENCES CITED

Todd Groundwater. March 22, 2022. Simulated effects of water reclamation facility operation. Technical memorandum prepared for Cambria Community Services District, Cambria, CA.

San Simeon Instream Flow Report TAC Comments

Comment Response table

Comment #	Commenter/ agency	Comment	Response
Tom Luster - Coastal Commission Jan 23, 2023 email			
1	Tom Luster - Coastal Commission	**General:** The report notes that project pumping under certain conditions is likely to reduce habitat quality and quantity. It describes these reductions as fairly minimal – e.g., a two-day reduction in the suitable period for juvenile steelhead migration – however, it appears that the project could result in greater adverse effects if some additional project-related or streamflow characteristics were included in the analysis. These include 1) the range of expected project extraction rates; 2) effects of nearby well extractions; and 3) no analysis of the effects of delayed streamflow "rebound."	The juvenile fish passage analysis was expanded to cover the range of extraction rates for CCSD wells from the minimum extraction rate during peak juvenile steelhead migration season (0.41 cfs during April and May) to the maximum extraction capacity of 1.43 cfs. In addition, we include analysis for a total of 1.85 cfs extraction which covers the CCSD max pumping rate plus the estimated max pumping rate for the Pedotti Private Well (0.42 cfs) in lower San Simeon Creek. The Warren groundwater pumps are downstream of well field and not expected to influence passage based on location in watershed and groundwater modeling (Yates 2022). The maximum district pumping rate of 1.43 plus the estimated max pumping rate for the Pedotti Private Well (0.42 cfs) may have a noteworthy effect on juvenile passage (~25% decrease in passage days); however, average pumping rates by the district during spring which range from 0.4-0.6 cfs has very little effect on juvenile passage (~5% decrease in passage days).

Comment #	Commenter/ agency	Comment	Response
2	Tom Luster - Coastal Commission	**Range of extraction rates:** It is not clear what pumping rate(s) served as the basis for the analysis. The report mentions that the CCSD expects an average extraction rate of 0.6 cfs, though it also mentions that pumping could occur at rates ranging from 0.41 to 1.43 cfs. It is not clear whether the analysis evaluated the expected effects from just the average extraction rate or from the full range of extraction rates. It is also not clear how these different extraction rates could result in different effects depending on their timing and streamflow conditions at the time of extraction – e.g., a high extraction rate in summer when streamflow and aquifer levels are declining versus that same rate during winter high flows. We recommend the analysis be modified to address these issues.	This study assessed a range of pumping rates for the juvenile steelhead passage assessment and expanded those rates to include the maximum CCSD extraction rate of 1.43 cfs to address the above comment. Outside of the Juvenile steelhead passage assessment, this study chose to evaluate the potential impacts from District operations to steelhead habitat using the maximum pumping rate of 1.43 cfs. We concluded that flows less than 2.5 cfs were sensitive to district pumping operations and pumping during stream flows within this range could lead to decreased quality and quantity of steelhead habitat. The 2.5 cfs threshold is independent of season because juvenile steelhead rearing occurs year-round.
3	Tom Luster - Coastal Commission	**Effects of pumping from the project-related Well 9P2:** The report (at page 10) notes that the CCSD operates three groundwater wells along Lower San Simeon Creek and provides their expected extraction rates. It also notes that there are several agricultural wells in the area, though it does not describe how or whether their effects were evaluated in the study. Of particular importance is Well 9P2, which is less than 100 feet from one of the CCSD wells and is operated in part through an agreement between CCSD and a nearby property owner. Well 9P2 can extract at up to 275 gallons per minute, which is roughly the same rate at the CCSD's average 0.6 cfs rate. When Well 9P2 is operating concurrently with nearby CCSD wells, it appears likely that there would be cumulative adverse effects on streamflow and that the combined operations could increase those adverse effects	See response to comment 1 above.

Comment #	Commenter/ agency	Comment	Response
		substantially. We recommend that the report be modified to incorporate allowable extractions from Well 9P2 into the analysis.	
4	Tom Luster - Coastal Commission	**Effects of delayed streamflow "rebound" due to facility-related pumping:** The report describes some of the streamflow drawdowns expected from the facility's groundwater extraction, but it doesn't identify the effects associated with delayed streamflow "rebound" from facility pumping. That is, it describes the "front end" of the effects when extraction reduces streamflows but doesn't evaluate the "back end" additional recovery time it would take for the late summer/autumn lower aquifer levels to increase sufficiently to allow for renewed streamflows.	The comment inquires whether groundwater depletion by CCSD pumping during the dry season increases stream percolation losses when flow first resumes the following winter and thereby delays the start of the passage opportunity for up-migrating adult steelhead. Based on multiple flow measurements during a large storm event that initiated flow in San Simeon Creek on December 23-26, 1988, percolation losses along the creek at the start of the flow event were approximately 25 cfs. Percolation decreased over four days to 2.2 cfs on December 27. This reduction was because groundwater levels had rapidly recovered and caused a rejection of additional percolation along most of the length of the groundwater basin. The minimum flow required for adult up-migration has been estimated at 67.5 cfs based on surveys of several riffles along the creek (D.W. Alley & Associates, 1992). Because the high magnitude of flows required that are required for adult migration in lower San Simeon Creek, groundwater "rebound" is not expected to have a significant effect on adult migration conditions.
5	Tom Luster - Coastal Commission	We recommend the report be modified throughout (including in response to the comments below) to reflect these additional considerations.	NA
6	Tom Luster - Coastal Commission	**Streamflow data and expected flow rates:** The report's Section 3.3.3 notes that flow rates were based on data collected from two locations between 1972 and 2001 and that the models were calibrated based on those rates. It is not clear why the report didn't use more recent data – for example, a 2014 CCSD report used stream gauge data from up through 2013	The report was revised to clarify the steam flow data used in the report is the most accurate and up to date flow data available. The Palmer Flats gage located at the upstream end of the Study Area was discontinued in 1995. Data from this location only covers from 1971 through 1995. A gage near the well field was maintained by USGS (#11142300) with data covering

Comment #	Commenter/ agency	Comment	Response
		(see CDM Smith, San Simeon Creek Basin Groundwater Modeling Report, May 2014). It's also not clear how applicable the 1972-2001 data may be to expected future conditions in the San Simeon Basin – e.g., more extreme precipitation events due to climate change. It would be useful for the report to either incorporate more recent stream gauge data or provide the reasoning for why it isn't being used. It would also be helpful to identify predicted changes in precipitation and describe how those would affect San Simeon's streamflows and habitat values. This may be particularly important, given the report's apparent acknowledgement (on page 42) that older data may not adequately reflect current watershed conditions.	from 10/01/1987 through 07/11/1989; SLO County took over that gage (ID718) in 1992 and continued to monitor stream flow through 2001. However, after 2001, SLO County ceased maintaining the rating curve and has only recorded stage, not flow. Because the rating curve for the gage stopped being maintained in 2001, flow data reported after 2001 for this location is not expected to be accurate. The report includes a recommendation to monitor stream flow in the future to better understand flow conditions in the future. Calibration flows for the IFIM model used in the instream flow study were measured at each transect in the field and did not use stream flow gage data for calibration purposes. Stream flow data was used to select calibration flows, that is the range of flows assessed with the model. Modeling predicted habitat over a range of flow from 0 to 7.6 cfs. While a higher maximum flow (i.e. >7.6 cfs) could have been included in the model simulations, District operations which with have a max extraction rate of 1.43 cfs have the greatest influence on lower flows. Results of the modeling also suggest the range of flows (0 to 7.6 cfs) captured the critical range of flows because fry habitat peaks at about 2 cfs while juvenile steelhead continues to increase up to and above 7.6 cfs, about 50% of the maximum modeled habitat occurs at 1 cfs.

Comment #	Commenter/ agency	Comment	Response
7	Tom Luster - Coastal Commission	**Juvenile steelhead assumptions:** Section 3.5 describes three assumptions used in the assessment of juvenile steelhead migration. One of them – that CCSD pumping occurs at 0.6 cfs during the April-May migration season – does not appear adequate to fully characterize the project's potential effects. We recommend the report be modified to apply the full range of expected extraction rates to the analysis.	The analysis for juvenile steelhead migration was expanded to include 3 extraction rates (1) CCSD minimum average pumping for April-May or 0.41 cfs (2) the CCSD maximum extraction capacity of 1.43 cfs, and (3) the CCSD maximum extraction capacity of 1.43 cfs plus the estimated max pumping rate for the Pedotti Private Well (0.42 cfs) which equals a total of 1.86 cfs.
8	Tom Luster - Coastal Commission	**Habitat characterization results:** Section 4 notes that field surveys to conduct stream habitat typing were conducted between December 2021 and July 2022, with the report's flow analyses then applied to the identified habitat types – e.g., riffles, pools, etc. The seven-month survey period omits late summer, which may not be of concern during times when streamflow is non-existent, but it also omits the return of streamflows in autumn, which could be an important period for adult steelhead upstream migration as well as steelhead incubation. This omission, along with the concern above about the potential delay in streamflow "rebound," may result in the report underestimating the project's effects on steelhead.	Habitat surveys and IFIM surveys were conducted over a range of targeted stream flows. The targeted flows were selected to assess conditions when surface flows are most likely to be influenced by CCSD operations were present to calibrate the model to simulate habitat conditions over a wide range of flows. Additional surveys targeting different seasons would not change the model results which uses physical habitat features (i.e., cross section topography and channel gradient) which are not affected by seasonal changes in flow. Model simulations included conditions for flows ranging from 0 cfs up to 7.6 cfs which is when CCSD operations are likely to have the greatest affect on aquatic habitat conditions.

Comment #	Commenter/ agency	Comment	Response
9	Tom Luster - Coastal Commission	**Long-term monitoring:** The report's Section 6 suggests the CCSD conduct long-term stream flow monitoring at and near the CCSD's well field to better characterize flows. We recommend the report describe whether any of these monitoring efforts are occurring (or when they are scheduled to occur) and identify how any data collected from these monitoring efforts will be used to further calibrate the modeling conducted to date or to "ground truth" current modeling results.	The report has been revised to clarify the Long-term monitoring in Section 6 is being proposed, as such, this monitoring is not currently taking place. The SEFA model used for the IFIM component of the instream flow study allowed us to determine the flows where habitat conditions are most sensitive to CCSD pumping activities which include flows between 0 and 2.5 cfs. The model was fully calibrated using standardized methods. Long-term flow monitoring will allow the district to know when sensitive flows (i.e., flows between 0 and 2.5 cfs) are occurring in real time and can be used for managing operations to be protective of steelhead.
Tom Luster - Coastal Commission March 6, 2023 email			
1	Tom Luster - Coastal Commission	Re: location of project components in sensitive habitat - underpinning our evaluation is the ongoing and unresolved nonconformity of having project elements (and former project elements, such as the evaporation basin) located within ESHA. We are about to get to Year 9 of the project being located in sensitive habitat without mitigation and without a determination about feasible alternative locations.	This comment is outside the scope of the Instream Flow Study

Comment #	Commenter/ agency	Comment	Response
Schani Siong - SLO County March 2, 2023 email			
1	Schani Siong - SLO County	1. The County agrees that it would be a good idea to broaden the scope of the analysis to show a range of pumping within all seasons to analyze the potential impacts during those different scenarios. The study mentions that higher reduction of suitable migration days for juvenile steelhead may occur if pumping rates are above the daily average rate of 0.6 cfs assumed for the analysis. The analysis should include information that would account for worst case scenario (highest 1.43 cfs pumping rate) to fully understand the full extent of impacts. *If there is desire not to incur additional impacts beyond analyzed thresholds in this IFS– provide information on how operation will avoid doing so*.	The juvenile fish passage analysis was expanded to cover the range of extraction rates for CCSD wells from the minimum extraction rate during peak juvenile steelhead migration season (0.41 cfs during April and May) to the maximum extraction capacity of 1.43 cfs. In addition, we include analysis for a total of 1.85 cfs extraction which covers the CCSD max pumping rate plus the estimated max pumping rate for the Pedotti Private Well (0.42 cfs) in lower San Simeon Creek. The Warren groundwater pumps are downstream of well field and not expected to influence passage based on location in watershed and groundwater modeling (Yates 2022). The maximum district pumping rate of 1.43 plus the estimated max pumping rate for the Pedotti Private Well (0.42 cfs) may have a noteworthy effect on juvenile passage (~25% decrease in passage days); however, average pumping rates by the district during spring which range from 0.4-0.6 cfs has very little effect on juvenile passage (~5% decrease in passage days).
2	Schani Siong - SLO County	2. As part of the CDP review, the County must make required LCP findings for SRA and ESHA that CCSD have identified mitigation measures to lessen impacts to sensitive resources and species to maximum extent. For example, CCSD have been advised to incorporate a rescue and relocation protocol as part of the project. At what point would the rescue and relocation protocol be initiated? What does that look like and who are the responsible entities? Avoidance	Recommendations were provided in more detail in separate recommendation memos that include avoidance and minimization measures along with annual reporting to the Technical Advisory Committee to evaluate the effectiveness of avoidance and minimization measures.

Comment #	Commenter/ agency	Comment	Response
		and minimization measures should be detailed out for identified impact, duration of impact, and responsible parties should be developed as part of the AMP.	
3	Schani Siong - SLO County	**SRA Findings:** **e. Required findings:** Any land use permit application within a Sensitive Resource Area shall be approved only where the Review Authority can make the following required findings: **(1)** The development will not create significant adverse effects on the natural features of the site or vicinity that were the basis for the Sensitive Resource Area designation, and will preserve and protect such features through the site design. **(2)** Natural features and topography have been considered in the design and siting of all proposed physical improvements. **(3)** Any proposed clearing of topsoil, trees, or other features is the minimum necessary to achieve safe and convenient access and siting of proposed structures, and will not create significant adverse effects on the identified sensitive resource. **(4)** The soil and subsoil conditions are suitable for any proposed excavation; site preparation and drainage improvements have been designed to prevent soil erosion, and sedimentation of streams through undue surface runoff.	This comment is outside the scope of the Instream Flow Study

Comment #	Commenter/ agency	Comment	Response
4	Schani Siong - SLO County	**ESHA Findings:** **b. Required findings:** Approval of a land use permit for a project within or adjacent to an Environmentally Sensitive Habitat shall not occur unless the applicable review body first finds that: **(1)** There will be no significant negative impact on the identified sensitive habitat and the proposed use will be consistent with the biological continuance of the habitat. **(2)** The proposed use will not significantly disrupt the habitat.	This comment is outside the scope of the Instream Flow Study
Steph Wald and Tim Delany – CLC, March 17, 2023 email			
0	Steph Wald and Tim Delany - CLC	It might be helpful to readers to understand that the CCSD commenced its San Simeon diversions in 1979, that no supplemental water from Santa Rosa Creek was needed until 1984 and that in 1984, 1985, and 1986, Santa Rosa Creek underflow had to be used to supplement San Simeon supply (McClelland Engineers 1987).	It's not clear how this historical operation is relevant to current management. The District's water rights allow up to 370 AF of dry-season extraction from the San Simeon Basin and up to 155 AF from the Santa Rosa Basin. CCSD operates within these limits.
1	Steph Wald and Tim Delany - CLC	Is the intent of the report to provide an instream flow assessment that evaluates impacts of the WRF facility during Stage 3 droughts only, the operation of the WRF across a range of water year types, or the operation of all CCSD pumping activities across a range of water year types?	The intent of the report is to establish sensitive flows for aquatic species that will be used to inform District operations. The stream flows that are established are independent of water year type (i.e., 1 cfs is needed to maintain juvenile steelhead rearing habitat no matter if it is a wet year or critically dry year).

Comment #	Commenter/ agency	Comment	Response
1 part 2.	Steph Wald and Tim Delany - CLC	In Study Goals and Objectives (Section 2.3, page 11), the following statement is made, "The analysis focuses on drought periods when the WRF would likely be operated and when potential ecological impacts would be most severe." It is unclear if this refers to Task 1 (instream flow assessment) or Task 2. Based on language used throughout the study and in the conclusions, it seems the instream flow assessment is intended to cover all CCSD operations including existing operations. If this is the case, then an expanded instream flow assessment is needed– for example to inform the potential impact CCSD operations has on habitat in lower San Simeon Creek in wetter years.	The report has been revised to clarify the statement about analysis being focused on drought years is referring to Task 2 (Groundwater modeling). The instream flow study covered by Task 1 applies to all CCSD operations in San Simeon Creek basin because it identifies important flows protective of aquatic species in lower San Simeon Creek. The report specifies that stream flows of 1 cfs is required to provide juvenile steelhead rearing habitat based on the instream flow study and incorporates the range of CCSD extraction rates which max out at 1.43 cfs to a protective flow level of 2.5 cfs (approximately 1 cfs plus 1.43 cfs) These results are independent of water year types.
2	Steph Wald and Tim Delany - CLC	CCSD operations, and their potential impacts to aquatic habitats, began in 1979. Section 2.2 (Operations Information) only presents CCSD operational data starting in 2012. The operations summary does not provide an overview of CCSD operation since 1979, nor how operations or their impacts have changed over time, nor the potential impact of existing operations on flow data utilized in the study.	The last 10 years of operational data was included to provide a representative summary of District operations in the watershed. Historical operations and changes in operations over time where not the focus of the study, rather we assessed the range of District groundwater extraction rates from the lower average pumping rate of 0.41 cfs to the maximum pumping rate of 1.43 cfs and how that range of extraction would affect aquatic habitat over a range of surface flows in the study area. All available stream flow data was used to evaluate the frequency of specific surface flows in the study area but the key flows identified from our study remain static for informing District operations.
3	Steph Wald and Tim Delany - CLC	The cumulative impact from existing water uses including historical CCSD operations and impacts of senior water rights upstream of CCSD should be acknowledged and integrated into the report.	Impacts from the privately operated Pedotti water extractions have been incorporated into the report to assess impacts to juvenile migration conditions. The Warren pumps are downstream of well field and not

Comment #	Commenter/ agency	Comment	Response
			expected to influence passage based on location in watershed and groundwater modeling (Yates 2022). The report recommends establishing and maintaining a stream flow gage at the location of the county gage, which currently only records stage, is included in the report to inform future district operations. Stream flow data at this location would capture any influence on surface flows from the Warren wells.
4	Steph Wald and Tim Delany - CLC	If there is sufficient data, flow statistics and conclusions about flow patterns could be made distinct for two different periods in San Simeon Creek. a. Stream flows before 1979 (the first year CCSD began diverting from the Creek) b. Stream flows from 1979 onward (active period of CCSD diversions)	There is not sufficient flow data to calculate flow patterns between pre-CCSD operations and post- CCSD operations. The San Simeon Gage only covers from 1988-2001, which is after CCSD operations began and Palmer Flats does have some data from before and after 1979 (1971-1995) but that only provides 8 years before and 15 after 1979 which is limited for this type of comparison.
4 part 2	Steph Wald and Tim Delany - CLC	If this is not possible, the historical operations and their potential impacts on flow data should be acknowledged.	It's not clear how this historical operation is relevant to current management. The District's water rights allow up to 370 AF of dry-season extraction from the San Simeon Basin and up to 155 AF from the Santa Rosa Basin. CCSD operates within these limits.
5	Steph Wald and Tim Delany - CLC	Given the importance of historical flow data, all flow collection methods need to be explained, and flow data (including rating curves) should be published as an appendix if not publicly available elsewhere (in which case references are needed).	Mean daily flow data for each stream gage was used to characterize flow conditions for the Instream Flow Study and is included as an appendix to the report. More detailed flow data for the watershed could not be located.

Comment #	Commenter/ agency	Comment	Response
6	Steph Wald and Tim Delany - CLC	Page 4. While it is true that San Simeon is flashy like other streams, this does not mean that the extent of temporal and spatial intermittent trends is natural. Rather as stated in Yates & Konyenburg (1998) flows in this reach have been impacted by existing land and water management practices. Please acknowledge and edit language throughout the report as appropriate.	The report was revised to acknowledge that groundwater pumping (municipal and agricultural) likely increases the extent and frequency of intermittent flows above natural levels.
7	Steph Wald and Tim Delany - CLC	Page 4, last sentence that lower San Simeon is dry "to the Lagoon" is vague, please be specific.	The report was revised to clarify that the dry section of San Simeon Creek often extends to just downstream of Van Gordon Creek.
8	Steph Wald and Tim Delany - CLC	Page 19, Section 3.3.3. Paragraph 2. More information about the rating curves and sampling intervals at Palmer Flats and Gage #718 is needed.	See response to CLC comment 5.
9	Steph Wald and Tim Delany - CLC	Page 21, Section 3.4, Paragraph 1. "Palmer Flats is located just upstream of the San Simeon Creek groundwater basin and is not affected by groundwater pumping." Please cite data or a report for this. Regardless of groundwater basin delineation, data from wells 27S/8E-10G1 and 10G2 appear to show seasonal declines that would be consistent with pumping influence (Yates & Konyenburg 1998)2. Subsequent statements about how Palmer Flats represents the maximum potential surface flow is thus also called into question by this data. This also applies to Section 4.3 Paragraph 1.	This comment questions whether the Palmer Flats stream gage was in fact upstream of the influence of groundwater pumping. The gage was located at the San Simeon Creek Road bridge 600 feet downstream of the confluence with Steiner Creek. That location is near the upstream end of the groundwater basin and 1,390 feet upstream of the nearest water supply well (Pedotti irrigation well 27S/8E-11C1). Previous reports going back to at least Yates and Van Konynenburg (1998) have considered the gaged flows to represent surface inflow to the basin, and that assumption was reasonable for most purposes. On closer inspection, geologic maps show alluvium extending about 1 mile farther up San Simeon Creek and Steiner Creek (for example, Dibblee and Minch, 2007). Although the alluvium is narrower and undoubtedly shallower upstream of the gage, it would still be capable of

Comment #	Commenter/ agency	Comment	Response
			conveying water via the subsurface. Natural stream percolation would likely be relatively high upstream of the gage because sediments at the apex of alluvial fans tend to be relatively coarse. There could be additional percolation upstream of the gage caused by pumping at 11C1 during April-May, but it is probably negligible for several reasons. First, the irrigation season does not usually get underway until April, and when the well starts pumping most of the water derives from storage as the cone of depression expands outward. It would take days to weeks to extend as far as the gage location. Second, well 11C1 is only about 100 feet from the channel of San Simeon Creek. When flow is present in the creek, any percolation induced by pumping would be along the reach closest to the well. The well was tested at 250 gpm when it was drilled in 1977, which equals 0.57 cfs. Channel percolation between the gage and the well (and an equal distance downstream) could supply most or all of that flow rate.
10	Steph Wald and Tim Delany - CLC	Page 30, Section 4.3, Paragraph 1. "Note that flows at Palmer Flats during the spring and summer are generally expected to be higher than flows within the Study Area…" It should also be acknowledged that good passage conditions at Palmer Flats do not always result in passage conditions in the lower reaches.	The methods used for Juvenile steelhead Passage Assessment (Sect. 3.5) was revised to clarify our approach and acknowledge that fish passage conditions at Palmer Flats are not necessarily the same as passage conditions.
11	Steph Wald and Tim Delany - CLC	Page 42, Section 5, Paragraph 3. This paragraph should explain why the creek's intermittency in the lower reaches should cause the EWD analysis points to be moved upstream near Steiner Creek.	The lower reach is unsuitable for EWD analysis because it is naturally intermittent and EWD analysis was intended for locations with perennial flows.

Comment #	Commenter/ agency	Comment	Response
		Is the lower reach unsuitable for EWD analysis because of natural conditions or because of human impacts or both?	
12	Steph Wald and Tim Delany - CLC	Page 42, Section 5, Paragraph 3. Is "natural groundwater losses" the correct term here? The cause of natural groundwater loss is natural subsurface drainage out to sea. The rest of groundwater losses are not natural and are caused by pumping water out for human uses. This sentence should include an acknowledgement of the fact that some proportion of groundwater losses are also anthropogenic.	Revised text to say the lowermost analysis points used in the EWD study (Stillwater Sciences 2014) should be relocated upstream of the groundwater basin to the confluence of Steiner Creek or adjusted to reflect the intermittent flow conditions in lower San Simeon Creek.
13	Steph Wald and Tim Delany - CLC	Page 42, Section 5, Paragraph 5. "CCSD pumping operations have the potential to reduce the amount and quality of juvenile steelhead rearing habitat within the Study Area at flows less than 2.5 cfs" Please specify at what point(s) along the creek this 2.5 cfs threshold is relevant. When flow is 2.5 cfs at Palmer Flats?	This threshold is relevant within Reach 1 of the Study Area. The location of the current county gage would serve as the best indicator for these flows; however, that gage only records stage elevation and lacks a current stage discharge rating curve to convert measurements to flow. The ISF Report includes developing and maintaining a rating curve for the county gage to inform CCSD operations to be protective of steelhead.
14	Steph Wald and Tim Delany - CLC	Page 42 first sentence: "The lower reach of San Simeon Creek in the absence of CCSD pumping operations potentially provides migratory and rearing habitat for steelhead in the winter and spring and is typically dry during the summer and fall. This reach would only provide steelhead rearing habitat during the dry season infrequently"	The historical gaging record at Palmer Flats, along with measurements of net percolation losses from Palmer Flats to the lagoon and anecdotal descriptions of the dry channel in summer (with a few swimming holes!) from local residents who grew up there (Jon Pedotti and Clyde Warren) indicate that lower San Simoen Creek (from Palmer Flats to just downstream of Van

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		Please indicate the specific reach that is dry under existing land and water management conditions – from Palmer to the footbridge? In all water year types? For example, this sentence might read "Limited data is available to assess natural flow conditions in San Simeon Creek. However, based on the geology and similar watersheds, some portion of lower San Simeon Creek was likely historically intermittent. Under existing land and water management practices, the lower reach of San Simeon Creek typically provides migratory and rearing habitat for steelhead in the winter and spring and is dries out in the summer and fall from Palmer Flats to one mile upstream of the lagoon."	Gordon Creek) commonly went dry during the summer before CCSD operations began in the basin.
15	Steph Wald and Tim Delany - CLC	Page 43, Section 6.1, Paragraph 1: The recommendation to collect additional flow data at Palmer Flats is good, but the comment above (Page 21, Section 3.4) about the non-influence of groundwater pumping at this location suggests that going somewhat further upstream (perhaps on both Steiner and upper San Simeon) could be a better way to monitor inflows to the groundwater basin. There is a water right in the vicinity of Palmer Flats that could influence surface water levels at this site when water is being pumped. Reported flow rate for the well associated with this water right is 300 gpm (0.67 cfs).	The Palmer Flats gage was located at the San Simeon Creek Road bridge 600 feet downstream of the confluence with Steiner Creek. That location is near the upstream end of the groundwater basin. Previous reports going back to at least Yates and Van Konynenburg (1998) have considered the gaged flows to represent surface inflow to the basin. Continuing to reoccupy the former gage site allows the data to continue the historical record and allows long-term trends to be analyzed.
Clyde Warren - Landowner, March 6, 2023 letter			
1	Clyde Warren - Landowner	The report on page 10 only mentions that my irrigation well (formally the Molinari well) has an annual use of 183.5 acre feet. It does not mention the pumping rate of 275 gpm and not less than 105 psi at	The report was revised to include the pumping rate for this well is 0.61 cfs (275 gpm).

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		the meter which is located at my property line. See attachment.	
Clyde Warren - Landowner, April 4, 2023 letter			
2	Clyde Warren - Landowner	Comments focused on affects off CCSD pumping on Private wells operated by C. Warren that pump near Van Gordon Creek and how CCSD operations might affect private water rights	These comments are being addressed in a separate memo from Gus Yates. In addition, CCSD operations and their potential affects to aquatic habitat conditions in Van Gordon Creek were assessed based on review of the 2022 Groundwater Modeling Memo (Yates 2022) and field surveys conducted in June 2023.