
**CAZADERO WATER
COMPANY
PRELIMINARY
ENGINEERING
REPORT**

**RURAL COMMUNITY
ASSISTANCE
CORPORATION**

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1. BACKGROUND

The Cazadero Water Company Inc. (CWC), a privately owned company, owns and operates a water system that serves a portion of the unincorporated community of Cazadero, California, in Sonoma County. The water system serves approximately 250 people through 157 connections of which 148 are residential. The water system is classified as a public water system (PWS). The California State Waterboard, Division of Drinking Water (DDW) provides regulatory oversight of PWSs.

DDW staff inspected the system in December 2016 and issued a letter identifying compliance deficiencies, required actions and deadlines for the required actions to bring the water system into compliance. Subsequently, DDW issued compliance orders and citations for the unresolved compliance issues. A copy of the letter, compliance orders, and citations are attached in Appendix A.

CWC requested technical assistance (TA) from the State Water Board to address the deficiencies identified in the inspection letter, compliance orders, and citations. The Rural Community Assistance Corporation (RCAC) was assigned the project by the State Waterboard, Division of Financial Assistance (DFA) to provide technical assistance through a contract between DFA and RCAC. This report is a component of the TA work plan.

2. PURPOSE

The purpose of this report is to provide a description of the existing facilities, a general engineering evaluation of the CWC facilities, and identify improvements necessary to meet current regulatory requirements and enhance system reliability and resilience. This report provides water system management and customers the information needed to make decisions with respect to developing a capital improvement program necessary to bring the system into full compliance with the regulations. The report will also be used by the perspective funding agency(ies) to review the proposed improvements for funding under their respective funding programs.

The report objectives include the following:

- Documentation of general water system facilities and performance
- Identification of water system deficiencies
- Improvement recommendations to correct identified water system deficiencies
- Development of project budgets for recommended improvements

2.1 ORGANIZATION OF REPORT

The remainder of this report is organized as follows. Section 3 provides a general description of the existing water system and its components. Section 4 provides the criteria used to evaluate the existing facilities and provides the basis for improvement recommendations. The criteria include applicable state, local, and industry standards that pertain to public water systems. Section 5 compares the existing system to the evaluation criteria to identify deficiencies, possible improvements to correct the deficiencies and improvement implementation recommendations. Section 6 presents cost estimates for the proposed improvements. Climate vulnerability is discussed in Section 7.

3. SYSTEM DESCRIPTION

3.1 GENERAL

The water system description was developed from site observations, operator interviews, and information obtained from the files maintained by DDW. Figure 1 shows the parcels CWC provides water service to within the water service area boundary and the general layout of the existing water system. CWC charges customers for water service. The average annual water bill for the CWC customers is \$410, which equates to about \$34/month.

3.2 SUPPLY QUANTITY AND QUALITY

The Cazadero Water System has five supply sources located at four different sites. The sources consist of two vertical wells, two horizontal wells with collection pipes and one collection pipe/spring, described below. A summary of the sources and their record capacities is shown in Table 1. The total capacity varies from 51.75 gpm to 100 gpm. 51.75 gpm will be used because it is the minimum that the existing sources can provide. Table 2 lists past exceedances for primary and secondary Maximum Containment Level (MCL) standards. The locations of existing sources are shown on Figure 2.

Table 1: Water Sources and Capacities

Source Name	Type	Capacity (gpm)
Buckeye Well	Vertical Well	22
Hotel Well	Vertical Well	22
Buckeye Source	Horizontal Well/Collection Pipe	1.5-20
Bei Source	Horizontal Well/Collection Pipe	0.25-30
Hotel Spring	Collection Pipe	6
Total		51.75 to 100 gpm

Table 2: MCL Exceedances

Source	Date	Constituent	Detected Level	MCL
Hotel Well	3/22/2020	Iron	430 µg/l	300 µg/l
Buckeye Well	3/22/2019	Turbidity	6 NTU	5 NTU
Buckeye Well	3/22/2019	Iron	420 µg/l	300 µg/l
Buckeye Well	5/26/2017	Iron	600 µg/l	300 µg/l
Buckeye Well	3/27/2013	Iron	430 µg/l	300 µg/l
Bei Horizontal Well	6/10/2013	Iron	4300 µg/l	300 µg/l

3.2.1 Well Site

The Buckeye Well and Hotel Well are located at the Well Site on a property on the west bank of Austin Creek near the intersection of Cazadero Highway and Bei Road. The wells are shallow

vertical wells. Each well has a wood well house for protection from the elements and security. The Well Site has a fixed backup generator in case of loss of commercial power provided by PG&E. The electrical equipment is older equipment.

3.2.1.1 Buckeye Well

The Buckeye Well was drilled in 1956 to a depth of 23 feet and has a 12-inch diameter steel casing. The well drillers log indicates the material is sand and gravel, underlain by rock at a depth of 23 feet. The bottom 14 feet of the casing is perforated. The records do not indicate there is an annular seal. In 2020, an 8-inch PVC liner was installed and backfilled with aquarium gravel. The pump was replaced in 2021 with a Goulds 25GS50 pump designed to provide 25 gpm driven by a 5 horsepower (hp) motor. DDW's records indicate the well produces 22 gpm. The concrete surface seal has a small hairline crack. There is a concrete pier and wood lagged retaining wall on the creek side of the well slab.

A wood framed and sided well house (Photo 1) is constructed on the surface seal slab. The well house is leaning and strapping has been installed to stabilize the building. In addition to the well, the well house contains the electrical panels and controls for the site.

Photo 1: Buckeye Well house



Water produced by the Buckeye Well is classified as groundwater under the direct influence of surface water (GWUDI). The well is to be used only between May 15 and September 15 each year without DDW permission. The water produced by this well generally meets chemical MCL standards but has exceeded the iron and turbidity MCL's in the past (see Table 2). The Buckeye Well primarily provides water to the Buckeye Tank.

CWC has a spare well pump on hand for immediate replacement of a failed vertical well pump.

3.2.1.2 Hotel Well

The Hotel Well was drilled in 1956 to a depth of about 30 feet and has an 8-inch diameter steel casing. The Hotel Well is located approximately 20 feet from the Buckeye Well. The drillers log indicates the first 15 feet of material was silt, 15 to 28 feet was sand, and 28 to 30 feet was blue shale. The bottom 18 feet of the casing is perforated. The perforations were torch cut. There is a concrete surface seal slab. The ground has subsided under the slab leaving a gap between the bottom of the slab and the existing ground as shown in Photo 2. There are no records of an annular seal. The wood framed and wood sided well house is constructed on the surface seal slab. The operator indicates the Hotel Well utilizes a Goulds 25GS50 pump designed to provide 25 gpm driven by a 5 hp motor. The record production also matches the Buckeye well at 22 gpm.

Photo 2: Subsidence under Hotel Well surface seal



Water produced by the Hotel Well is classified as GWUDI. The well is to be used only between May 15 and September 15 each year without DDW permission. The water produced by this well generally meets chemical constituent standards. However, it had an exceedance of the iron MCL in the past (Table 2).

The Hotel Well primarily supplies water to the Hotel Tank. If necessary, it can supply water to the Buckeye Tank.

3.2.2 Buckeye Source

The Buckeye Source (not the Buckeye Well), located in the hills to the west of the service area near the now abandoned buckeye spring, consists of a drilled horizontal well and an open cut installed collection pipe. The Buckeye horizontal well was drilled in 1999. The well consists of 75 feet of 1.5-inch diameter PVC pipe that extends into the hill. The pipe is sloped upward to allow collected water to flow out by gravity. The first 20 feet of casing is sealed with bentonite. The collection pipe consists of 3-inch perforated pipe also installed sloping upwards. The water produced by the

Buckeye Source is mixed before the sampling point. Records indicate this source produces between 1.2 and 20 gpm.

Water produced from the Buckeye Source is classified as GWUDI. The records indicate this source is meeting the MCL standards (Table 2).

The Buckeye Source supplies water to the Buckeye Tank via water tanks that are maintained by the water company. See the transmission discussion for further information regarding the unowned tanks.

3.2.3 Bei Source

The Bei Source is on the Bei property west of the Cazadero service area near the now abandoned Bei Spring. It consists of a drilled horizontal well and an open cut installed collection pipe. The horizontal well, constructed in 1999, consists of 150-feet of 1.5-inch diameter PVC pipe that extends into the hill above where the spring box was. The pipe slopes upward allowing collected water to flow out by gravity. Photo 3 shows the entry point of the horizontal well. The first 20 feet of casing was sealed with bentonite. The open cut installed collection pipe consists of a 3-inch drainpipe that extends into the hill approximately 20 to 25 feet. This collection pipe also slopes upward to allow gravity flow. The water collected is combined before the sampling point. Records indicate this source produces between 0.25 gpm and 30 gpm.

Water produced by the Bei Source is classified as GWUDI. The records indicate this source generally meets the chemical constituent standards with one exceedance of the Iron MCL (Table 2).

The Bei Horizontal Well supplies water to the Buckeye Tank.

Photo 3: Bei Horizontal Well entry point



3.2.4 Hotel Spring

The Hotel Spring is a spring located west of the Hotel Tank. It is reported the spring has been in operation for approximately 144 years. In 1998, the Hotel Spring was converted from a surface

water collection system to a subsurface collection pipe system. The collection pipe consists of 27 feet of 3-inch perforated drainpipe four to ten feet below grade. Photo 4 shows the entry point of the collection pipe. The pipe is bedded with two inches of pea gravel and backfilled with 24 inches of pea gravel. Building felt was placed on top of the pea gravel to reduce soil intrusion into the pea gravel. There is a clay barrier installed in the trench at the outlet end of the perforations. Records indicate production is 6 gpm.

Photo 4: Hotel Spring entry point



Before the inspection in 2016, DDW was not aware of the Hotel Spring. After the inspection, DDW ordered the CWC to perform source sampling and a source water assessment for the Hotel Spring. Water produced by the Hotel Spring is classified as GWUDI.

The Hotel Spring supplies water to the Hotel Tank.

3.3 TREATMENT

The Cazadero Water System disinfects source water to inactivate pathogens. The water is disinfected at the Buckeye and Hotel Tank sites before flowing into the respective tanks. Slug dosage treatment systems are used at both sites. These systems involve a 50-gallon tank dosed with a 12.5% sodium hypochlorite solution. The sodium hypochlorite solution used is certified to meet ANSI/NSF 60. The injection system is manually controlled. A portion of the source water flows into the solution tank and then into the tank. Although the disinfection system is not ideal, according to the reporting logs, the disinfection systems achieve 4-log inactivation of viruses.

The water generally meets the primary and secondary MCLs. Exceedances are shown in Table 2.

CWC purchased three Harmsco MUNI-1-2FL-304 cartridge filtration housings, two HC/170-5 filter cartridges for pretreatment, and one HC/170-LT2 filter cartridge. The purchase of the cartridges

and housings was made as a step towards meeting surface water treatment rules. The filters have not been installed.

3.4 TRANSMISSION

Transmission mains are predominantly 2-inch steel with some 2-inch PVC piping. The system moves water from the five sources to the Hotel Tank and Buckeye Tank, discussed below. The transmission piping is shown on Figure 2.

The Bei and Buckeye sources flow into the Buckeye Tank. Before the water produced by the Buckeye Source reaches the Buckeye Tank, it flows through three 5,000-gallon high density polyethylene (HDPE) tanks and a small concrete tank shown in Photo 5. According to the operator, while the tanks are maintained by CWC, CWC does not own the tanks. The piping in this area is both steel and PVC. There are ten customers that draw untreated water out of these transmission tanks. The transmission pipe is a gravity flow pipe. The water produced by the Buckeye Source that exceeds the use of the customers receiving water from the transmission tanks flows into a pipe that connects to the Bei transmission main to reach the Buckeye Tank. The majority of the transmission piping is above ground between the source and the tank.

Photo 5: Transmission tanks upstream of the Buckeye Tank



The Bei source flows directly to the Buckeye Tank. The water produced by the Buckeye Source that overflows the above transmission tanks is combined below the untreated tanks before reaching the Buckeye Tank Site. The Bei Source transmission main is approximately 10,500 feet long and primarily steel. The water flows by gravity from the source to the Buckeye Tank. The pipeline route is cross country and does not follow the access road. The majority of the transmission main is above ground.

The transmission mains for the two vertical wells are both 2-inch steel pipe that lead from the Well Site across Cazadero Highway and up the hill, crossing Bei Road and then to the respective tanks. Excepting the Hotel Spring Source, there are interconnections to allow water that is produced by the sources that generally fill the Buckeye Tank to be diverted to the Hotel Tank and vice versa. These transmission mains are primarily buried in areas of general public access.

The Hotel Spring Source is just above the Hotel Tank and is transmitted by 2-inch steel and PVC piping. This source cannot be diverted to the Buckeye Tank because the Hotel Spring Source is below the Buckeye Tank and there isn't a pump or power to run a pump at the Hotel Tank site.

3.5 STORAGE

There are three tank sites used in Cazadero's water system: The Buckeye Tank site, the Hotel Tank site, and the Luther Tank site. The tank locations are shown on Figure 2. A summary of the tanks' sizes, construction material, supply, and service area are presented in Table 3.

3.5.1 Buckeye Tank Site

The Buckeye Tank site consists of an 84,000-gallon concrete tank and a 5,000 HDPE tank. The tank site is situated on a ridge that generally runs downhill as it goes east. The concrete tank, constructed circa 1962, is approximately 48 feet long by 24 feet wide and 11 feet tall. The walls are about ten inches thick and there is a 10-inch-thick baffle at the midpoint of the long walls bisecting the tank. At the middle of the short sides, there is a rod that runs from end to end keeping the ends of the tank from spreading any further. The roof is a corrugated metal roof supported by a wood frame. The bottom of the tank is below grade and the walls act as a retaining wall as well as the tank wall. The adjacent finished grade varies from approximately the bottom of the tank to nine feet above the bottom. The concrete tank has not been reinforced since construction and there are visible cracks and seeps through the tank walls. Photo 6 shows the tank wall with seeps. The seeps are concentrated at the corners but there are others throughout. The 5,000-gallon HDPE tank is a standby tank used when the concrete tank is removed from service.

Photo 6: Buckeye Tank walls and general tank condition



This tank site is the highest in the system at about 420 feet above sea level (ASL) and supplies water to the Luther pressure zone and the Luther Tank. It can supply water to the Hotel Tank Site and Zone.

3.5.2 Hotel Tank Site

The Hotel Tank site consists of a 30,000-gallon concrete tank and 5,000-gallon HDPE standby tank. The concrete tank, constructed circa 1962, is approximately 20 feet by 30 feet by 11 feet deep. The tank was reinforced with an approximately 12-inch-thick concrete wrap on the walls in 2009. The rebar reinforcement in the concrete wrap appears to be spaced at approximately 6-inch intervals based on a provided photo. Photo 7 shows the tank conditions. The wrap added in 2009 can be seen just below the roof. The tank is mostly buried with the finished grade varying from approximately three feet below the top of the tank walls on the downhill side to about one foot below the top of the tank walls. The roof is a wood framed corrugated metal. The standby tank is used only when the concrete tank is removed from service.

This tank site only serves the Hotel Zone of the water system.

Photo 7: Hotel Tank general condition



3.5.3 Luther Tank Site

The Luther Tank site consists of a single 40,000-gallon concrete tank. Photo 8 shows the Luther Tank's overall condition. The Luther Tank was constructed in about 1986 and was reinforced with 12-inch concrete wrap circa 2010. The rebar reinforcement appears to be spaced at approximately 6-inch intervals. The tank is partially buried with the finished grade varying from about two feet from the top of the walls to the bottom being unknown. A new wood framed corrugated metal roof was constructed on the Luther Tank in approximately 2010. One corner of the tank has a void under it and is unsupported, as shown in Photo 9. A subdrain has been installed on the uphill side of the tank and the down spouts have been piped beyond the failing foundation support. The site has steep slopes both above and below it. There is a house below the tank site on the downhill side.

Photo 8: Luther Tank overall condition



Photo 9: Void under the Luther Tank foundation



Table 3. Summary of Tank Data

Tank	Shape/Material	Receives Water from	Delivers to	Capacity (gallons)
Hotel Tank	Rectangular/Concrete	Hotel Spring, Hotel Well, Buckeye Well, Buckeye Tank	Hotel Zone Distribution,	30,000
Hotel Standby Tank	Circular/HDPE			5,000
Buckeye Tank	Rectangular/Concrete	Buckeye Well, Buckeye Horizontal Well, Bei Horizontal Well, Hotel Well	Buckeye Zone Distribution, Luther Tank, Hotel Tank,	85,000
Buckeye Standby Tank	Circular/HDPE			5,000
Luther Tank	Rectangular/Concrete	Buckeye Tank	Distribution, Luther Zone	40,000
Total				155,000

3.6 DISTRIBUTION

The distribution system has three pressure zones, the Buckeye Zone, the Hotel Zone, and the Luther Zone. The mains distributing the water from the tanks to the services consist primarily of 1- to 2-inch piping. The piping is predominantly steel with some more recently installed PVC. The water system has undergone many leaks repairs. Although some mains are buried in roadways, much of the system is in backyards, or overland. The existing distribution system is shown in Figure 2.

3.7 CONTROLS & MONITORING

The water system controls are all manual. Tank levels are monitored manually during site visits. The horizontal wells and spring are controlled by manually adjusting valves on the tank inlets to bypass excess water. The inlet valves are adjusted based on the level in the tanks and the operator's experience with the system. The vertical wells are controlled by manually adjusting timers. The operator adjusts the timer controlling the well pump based on tank level, flow rate and experience in order to keep the tanks full. The Luther Tank level is controlled by manually adjusting the zone inlet valves adjustments made based on the tank level and the operators' experience.

The disinfection system controls are manual and inconsistent. Chlorine residual monitoring is performed daily with a portable chlorine residual analyzer. The operator adds the chlorine based on their estimate of how much water is going to flow into the system before the next site visit.

4. EVALUATION CRITERIA

CWC is private company that operates a public water system and is therefore subject to the applicable codes in the California Codes of Regulations (CCR). The CCR's assign regulation oversight responsibilities to DDW to ensure that the water system is providing safe drinking water to the public. As part of the regulation, DDW issues water supply permits which contain requirements that must be met in addition to those in the CCR's.

In addition to the CCR's, the Sonoma County Code and industry standards are used to develop the criteria. The criteria define facilities and processes that produce reliable and safe drinking water. The criteria are used to identify deficiencies within an existing system and to develop facility and process improvement recommendations that result in a water system that can produce reliable and safe potable water.

Drinking water must meet state and federal drinking water standards for maximum allowable concentrations of various contaminants and treatment. The maximum allowable concentrations are known as the Maximum Containment Level or MCL. The drinking water standards are split into two categories: primary standards and secondary standards.

Primary drinking water MCLs are legally enforceable; no water that exceeds a primary MCL may be used for drinking water unless it is treated to reduce the constituent concentration to below the MCL. The primary standards address acute and chronic health concerns related to contaminants. If a system exceeds a primary MCL based on a running annual average of the chemical results, the system will receive a citation and potentially a fine from DDW for not being in compliance with the state or federal primary MCLs. The California Code of Regulations requires that a system collect and analyze samples quarterly for any primary chemical if previous analyses of the chemical indicate a continuous or persistent trend toward higher levels of that chemical.

In California, secondary standards are enforceable for community water systems and establish guidelines for aesthetic issues related to drinking water such as taste, odor, and visual appeal. The California Code of Regulations requires that, if a community water system exceeds a secondary standard, quarterly sampling must be initiated. Compliance is then determined based upon the average of four consecutive quarterly samples. For non-compliant water, the system must either treat the water to meet the secondary standards or obtain a waiver from the State. The waiver process can be initiated only if the constituent level is not greater than three times the secondary MCL. The waiver process requires the community served be surveyed as to whether they would be willing to pay for treatment, and submission to DDW of the system's water quality complaint log and an engineering report evaluating reasonable treatment alternatives and costs to bring the system into compliance with the secondary MCL. If the source that exceeds the secondary MCL is a designated standby source, the system is allowed to use the source without treatment or a waiver provided when the source is in use, the system meters the source, conducts public notification, and takes corrective actions such as flushing to minimize constituent levels in the distribution system after use of the source.

Table 4. Evaluation Criteria for assessing Existing Water System Facilities

System Component	Evaluation Criteria
Source	
Source Capacity	Maximum day demand of last ten years plus an estimated 10 percent. (Current standards require a new system to meet this requirement with the largest source offline.).
Well Construction	50-foot annular seal for classification as ground water
	Wellhead 18 inches above finished grade
	Concrete surface seal: 2 feet laterally in all directions from casing and 4 inches thick
Well Equipment	Pumping capacity to deliver rated capacity (minimum)
	Automatically controlled and remotely monitored
	Flow meter on discharge of the well
	Water level measurement
Treatment	
Disinfection	Negative results on bacteriological tests and 4-log virus treatment
Treated Water Quality	Treated water to meet current drinking water standards
Treatment Equipment	Capacity to treat MDD
	Provide treated water meeting surface water treatment rules
	Corrosion control as necessary to meet lead and copper standards
	Automatically controlled and remotely monitored
Storage¹	
Fire Storage	60,000 gallons (1,000 gpm for 60 minutes) ^{2,3}
Domestic Storage	Maximum Day Demand plus 10%
Distribution System	
Minimum Distribution Pressure	40 psi during normal operations
	20 psi at all times including during emergency operations
Maximum Distribution Pressure	150 psi ⁴
Maximum Service Pressure	80 psi at the structure
Piping Material	HDPE, PVC, DIP; durable and corrosion-resistant
Water Main Sizes	4-inch minimum, sized to provide fire protection

¹ Storage requirement shall be the cumulative of the fire and domestic storage requirements.

² All new houses are required to install fire sprinklers.

³ The cumulative of the MDD and fire storage shall be available for use in each service zone.

⁴ Maximum distribution pressure may be higher if pipe materials are selected to withstand higher pressures.

System Component	Evaluation Criteria
Services	1-inch minimum service lateral and meter
Fire Flow	1,000 gpm for existing houses 500 gpm for new houses ²
Fire Hydrant Spacing	500 feet maximum; 400 feet on dead end roads, 200 feet from end of road

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5. SYSTEM EVALUATION AND IMPROVEMENTS

The system evaluation compares the existing system facilities and processes to the design criteria in Section 4, identifies facility or process deficiencies, and provides options to bring the system into regulatory compliance.

Performing their oversight responsibilities, DDW inspected the system in 2017 and issued an inspection report which included required facility and process changes to bring the system into compliance with the current regulations. Improvements to the system were not made by the stated deadlines resulting in DDW issuing Compliance Orders and Citations to CWC requiring various deficiencies be addressed.

An evaluation of each of the water system's facilities, improvement options, and recommended improvements follows.

5.1 DEMANDS

Analysis of the data available from CWC records and from the electronic annual reports indicate that the highest CWC maximum day demand (MDD) in the last ten years occurred in 2016 and was approximately 60,000 gallons. Daily production records are not available, and, in some years, monthly production records are not available. Therefore, for years which monthly production records are available, the MDD was calculated based on the month with the largest production. For years that monthly production records are unavailable, the MDD was calculated based on the average yearly production. During the month of maximum production, CWS served a total of 157 connections according to DDW records, the recently appointed administrator indicates there may be as few as 123 connections resulting in a maximum day demand of 381 to 488 gallons per day per connection. An MDD of 381 to 488 gallons per day per connection is reasonable. The upper end of the range is getting high for the area. The peak hour demand calculated based on the MDD is approximately 24 gallons per hour per connection (gphpc).

Sonoma County is in the process of updating the general plan. The draft housing element indicates that recently rural areas in the county have experienced a slight decreased in population. Therefore, a very conservative estimate of ten percent growth is going to be used to size the facilities.

The maximum annual average day production from the records available during the last ten years was 27,250 gallons per day which results in an average day demand (ADD) per connection of approximately 174 to 223 gallons per day per connection. Table 5 summarizes the ADD, MDD and PHD for each zone and the system as a whole. The number of connections listed in the table are based on the DDW records of 157 connections.

Table 5 – Demands by zone and for the whole system.

Zone	Connections	ADD (gallons per day)	MDD (gallons per day)	PHD (Gallons per hour)
Buckeye	81	14,026	30,830	1,944
Hotel	41	7,134	15,605	984
Luther	35	6,090	13,321	840
Total	157	27,250	59,756	3,768
Total with 10% growth	173	29,975	65,732	4,145

5.2 SOURCES

5.2.1 Source Capacity

A water system must have sufficient supply capacity to serve its customers. A system is required to have sufficient source capacity to meet the MDD in the system as a whole and in each service zone. By January 2027, SB 552 will require the water system to have at least one backup source of water that meets current water quality requirements and is sufficient to meet average daily demand

The average production throughout the maximum day to produce 60,000 gallons is approximately 42 gallons per minute (GPM). Ten percent growth results in 46 gpm. The minimum total source production capacity is 51.75 GPM, therefore the system has enough capacity to meet the MDD requirements. While the system can meet the MDD. The system does not have supply capacity to meet the MDD with the largest source offline therefore, it lacks supply redundancy. The system does, however, have a spare pump that can be used in either well (the largest source), allowing the system to restore the supply capacity shortly after a well failure is discovered.

Based on available records the system's two largest sources can produce approximately 31,700 gallons per day, which is greater than the ADD of 27,250 or 29,975 with the ten percent growth added. If one of the wells fails, the system's production capacity continues to exceed the average day demand as will be required by SB 552 starting in 2027.

5.2.2 Buckeye and Hotel Wells

The Buckeye (Photo 10) and Hotel (Photo 11) wells do not have annular seals that meet the public water supply well requirement of 50 feet and the Hotel Well surface seal is not entirely effective due to subsidence. The depth to bedrock is less than 50 feet and the water bearing strata is above the bedrock, so installation of a 50-foot-deep annular seal is precluded. Surface seals are required to be constructed of concrete, extend two feet laterally in all directions from the well casing, and be a minimum of four inches thick. It appears the surface seals of both wells exceed the required dimensions. Due to ground subsidence, the Hotel Well surface seal does not contact the ground completely and the Buckeye Well surface seal may have the same deficiency. Neither well has a level indication device which is required by SB 552 starting this year.

Photo 10: Buckeye wellhead and surface seal condition



Photo 11: Hotel wellhead and surface seal condition



The water produced by these sources is required to be treated in accordance with surface water treatment rules because of the increased risk due to the lack of annular seals and the determination that the water produced by these sources is classified as GWUDI. These wells do not have a water level monitoring device in the wells to measure the well water level as will be required by SB 552.

5.2.3 Buckeye and Bei Sources

DDW has determined that the water produced by the Buckeye and Bei sources is classified as GWUDI and requires the water produced by these sources be treated in accordance with surface water treatment rules due to the increased risk.

5.2.4 Hotel Spring

The Hotel Spring was only recently added to DDW's database in 2016 and little is known about the water quality, although recent test results were uploaded to California's Drinking Water Watch database. A recent Compliance Order, NO. 02_18_20R_002, cited data for the Hotel Spring that showed that over the period of June 29, 2017, to March 21, 2019, levels of total coliform bacteria exceeded regulatory levels. The acceptable level for total coliforms in drinking water is less than 100/100ml for 90% or more of the samples in the past six months, as described in CCR § 64652.5.

DDW has classified this source as a GWUDI source requiring treatment in accordance with surface water treatment rules. Once surface water treatment is implemented, and after DDW has issued a permit for the operation of the Hotel Spring, the Hotel Spring is a viable source of water for the system.

5.2.5 Power Source

Historically, power outages have generally occurred within the area during the winter, when water use is lower. Power outages in the winter have historically occurred most often due to equipment failure or storm damage. The commercial electricity provider (PG&E) implements PSPS during times of high wildfire danger, increasing power outage frequency during the summer and fall, the time of the year when water use is highest. To maintain water production capacity during power outages, the CWC installed an emergency generator at the Well Site. The power distribution and controls equipment are located in the Buckeye Well house which is leaning. The existing Well Site electrical equipment is near or has reached the end of its useful life.

5.2.6 Source Improvements

The shallow depth of the water bearing strata precludes installation of new sources that will meet current well construction standards. Drilling new wells is not expected to reduce the contamination risks and remove the surface water treatment requirements for water produced by new wells drilled on the existing Well Site. In addition to the two wells being shallow, experience has shown the water supply wells along the Austin Creek corridor generally produce water classified as GWUDI.

While a new well wouldn't reduce treatment requirements, it would provide supply redundancy when demand approaches the MDD.

Removal and replacement of the Hotel Well surface seal would restore the integrity of the surface seal by filling the gaps under the slab. Replacing the surface seal requires the well house to be removed. The wells could be protected using cages or the wellhouses could be replaced. Protecting the wells using cages would require installing the electrical equipment in an alternate protected location. Installing protective cages around the wells on surface seal slabs rather than a new well building would reduce the loading on the surface seals, reducing the subsidence tendency. The new Hotel Well surface seal should have a deepened footing on the creek side of the surface seal.

The well heads do not seem to have adequate access to the well to add well level monitoring equipment, such as a submersible level transducer. To correct this deficiency, the well head fitting and the flange on top of the well should be replaced in order to add the required well level monitoring equipment.

Alternate protected locations for the replacement electrical equipment could be a new well control building or in the existing storage shed after rehabilitation.

Installation of a level transmitter in both vertical wells would provide well water level monitoring which assists the operators in identifying well or pump problems and ensures compliance with SB552 when water level monitoring becomes required.

5.2.7 Source Improvement Recommendations

The following improvements at the well site are recommended: removal and replacement of the existing Hotel Well surface seal with a deepened footing on the creek side of the slab; removal of the existing Buckeye Well house; installation of cages to protect the wells on the surface seals; rehabilitation of the storage shed to house the electrical equipment; and replacement of existing electrical equipment that is at or near the end of its useful life; and replacement of existing well flanges and well heads with new well heads such that the new pressure transducer can be installed in the wells.

5.3 TREATMENT

The primary objective of treatment is to ensure that water supplied is high quality and meets state and federal drinking water standards. DDW has classified all CWC sources as GWUDI and the sources are required to be treated in accordance with the surface water treatment rules. Surface water treatment rules require filtration, disinfection and daily or continuous monitoring of the water produced. The disinfection system uses the slug dose method. The current industry standard is to use a continuous feed to provide consistent disinfection.

Additionally, the lead and copper sampling results exceed the action level and therefore require treatment to reduce the lead and copper levels. A corrosion control study will need to be performed to determine the appropriate treatment to be used.

5.3.1 Treatment Alternatives

The following discusses treatment siting options, filtration types, disinfection system, and monitoring. The lead and copper treatment will be assessed in a separate corrosion control study.

5.3.1.1 Treatment Siting Alternatives

There are three existing sites that could be selected for the treatment facilities, the Well Site, the Buckeye Tank Site, and the Hotel Tank Site.

The Well Site is the lowest facility in the system at about 120 feet. It can receive water by gravity from the Buckeye Source, the Bei Source, and the Hotel Spring. The Buckeye and Hotel wells require the water to be pumped. The Well Site has existing power to operate instruments and other ancillary equipment and has an emergency generator for the most reliable power. The Well Site has the easiest all-weather access of the three sites. While modifications to the existing transmission mains would allow water to be transmitted to the Well Site, additional distribution facilities would be

required to move the water into the distribution and storage systems. The existing storage shed at the Well Site could be rehabilitated to house the treatment, electrical and controls.

The Hotel Tank Site is at approximately elevation 320 feet and can receive water by gravity from the Buckeye Source, the Bei Source, and the Hotel Spring. The existing Hotel Well transmission main will move water from the Hotel Well to the Hotel Site. The Buckeye Well transmission facilities would need to be modified to primarily move water to the Hotel Site. The Hotel Tank Site has the least reliable access, does not have existing power, and is the furthest site from power.

The Buckeye Tank site is located at approximately elevation 400 feet. The Buckeye and Bei sources flow by gravity to this site. The Hotel Spring is below this site and would require a pump to move water to this site if the Hotel Spring is retained and the water produced by the Hotel Spring is treated at the Buckeye Tank Site. The Buckeye Source transmission facilities currently move water to this site. The Hotel Well transmission facilities would require expansion using an existing treated water pipe to move the water to the Buckeye Tank site. Currently the site does not have power, but it is reasonably close to power and appears to have all-weather access.

Any site selected as a treatment site requires equipment to provide filtration, disinfection, monitoring and control, and will require operation and maintenance access. While multiple treatment sites could be used, limiting the number of treatment sites results in lower initial site construction costs (fewer facilities) and lower operation and maintenance (O&M) costs (fewer sites to monitor and maintain). The cost savings from reducing the number of treatment sites needs to be balanced with the potentially increased costs to move the water from the sources to the treatment site(s). The remote sources can all be transmitted in existing piping infrastructure to either the Hotel Site or the Well Site.

5.3.1.2 Filtration Alternatives

Filtration options include Media Pressure Vessel, Membrane, Cartridge, etc. The selection of the filtration type will be based on efficacy, required ancillary equipment (backwash waste handling, coagulation), and O&M costs. Each filter type has different influent pressure requirements and maximum effluent pressure that can be provided.

The media pressure vessel filtration would consist of injection of a coagulant before a clarifier followed by a finish filter. The clarifier and finish filter consists of a pressure vessel filled with filter media to remove contaminants. The clarifier would contain larger media to remove most of the material in the water and the finish filter would remove the remaining material that can be removed. The pressure rating of the vessels is the operational pressure limit which can be high for this type of filter. The high internal pressures allow the well pumps or the gravity supply of the springs to push the water through the filtration system and to the tanks. This type of filtration system requires backwashing to clean the clarifier and filter. The filter media requires infrequent replacement about every seven or more years.

Membrane filters force the water through the walls of tubular membranes in modules. There are two general types of small capacity membrane filtration systems, filter skids and wall mounted filter units, but the process is generally the same. The buildup of contaminants on the outside of the membranes is removed during backwashes, maintenance cleans and clean in place processes. The filter skids automatically test the membrane integrity on a daily basis, the wall mounted units require the operator to manually perform the membrane integrity tests. The filter skids have a more robust backwashing process than the wall mounted filters. The chemical cleaning processes are semi-automatic on the skid units while the wall mounted units require a manual cleaning process. Each of

these processes creates waste that needs to be disposed of through various means. The discharge pressure is limited with the membrane filters such that a clear well to store recently filtered water and a booster pump system would be required if installed lower (Hotel Site or Well Site) in the system. The membranes generally require replacement every seven to ten years.

The cartridge filter system consists of filter cartridge(s) housed in a filter housing. Water is filtered by the cartridge until it either exceeds the time allowed or the pressure differential across the filter cartridge exceeds the manufacturer's specifications. Once one of the two conditions has been met or exceeded, the filter cartridge is replaced with a new one and the old one is properly disposed of. This type of system is not backwashed resulting in only the cartridges for disposal. Cartridge systems can handle high internal pressures limited by the pressure rating of the filter housings.

Regardless of the type of filtration selected, the filtration unit, monitoring, electrical, and controls equipment should be housed in a building to protect from the weather and damage. The building could be either a new building at the site(s) or an existing building that is rehabilitated. The buildings at the tank sites are not large enough to house the filtration and other equipment, therefore a new building would be required at those sites. The Well Site allows for both options but is located between Austin Creek and Cazadero Highway which significantly limits the area a new building could be constructed and permitting will be more difficult than rehabilitating an existing structure.

Table 5 includes a comparison of the three types of filtration systems. There are two subtypes of membrane filters.

Table 5 – Filter Type comparison.

Filter Type	Pressure Media	Membrane		Cartridge
		Skid	Wall Mount	
Pre-Treatment	Coagulant	Not Required	Not Required	Not Required
Backwash	Yes	Yes	Yes	No
Membrane Integrity Testing	N/A	Automatic	Manual	N/A
Membrane Cleaning Processes	N/A	Maintenance Clean and Clean In Place Semi-Automatic	Clean in Place Manual	N/A
Inlet Pressure	Pressure Vessel Limits	Low	30 to 50 Psi	Cartridge Housing limits
Outlet Pressure	Pressure Vessel limits	Low	Low	Cartridge Housing Limits
Clearwell	Not Required	Required	Required	Not Required
Replacement	Media 7 years Plus	Membranes 10 years	Membranes 10 years	Cartridges 1 year or less

5.3.1.3 Disinfection

The final step of treatment, before being introduced into either the storage system or the distribution system, is disinfection. The disinfection system applies a disinfectant and provides enough contact time in the contact chamber to ensure the potential viruses are inactivated. The chlorine contact chamber could be a tank, a pipe, or a combination of the two sized to include enough volume to meet the required chlorine contact time. CWC records indicate that 7 degrees C is the coldest that the water gets, therefore the required CT is 8 min*mg/L. Providing treatment to meet this requirement at 52 gpm with a treated water chlorine residual concentration of 0.75mg/L requires an effective treatment volume of 555 gallons minimum.

While the existing slug disinfection process produces acceptable 4 log virus inactivation according to records, each site requires daily manual sodium hypochlorite replenishment, monitoring, and adjustment. Surface water treatment rules require a disinfectant residual to be maintained throughout the distribution system. Sodium hypochlorite is certified for potable water use, is commonly used as a potable water disinfectant, and will maintain a residual throughout a distribution system. The disinfection byproduct concentrations resulting from sodium hypochlorite on record are an order of magnitude below the MCL's. The most common sodium hypochlorite application method is to use a small pump to inject the sodium hypochlorite solution into the supply stream before a chlorine contact chamber. The chamber could be a small storage tank associated with the filtration system or a properly sized pipe that provides the proper amount of disinfectant contact time before the first customer to ensure the proper inactivation of viruses and giardia.

5.3.1.4 Monitoring

Regulations require the water supplied to the filters and the water produced by the filters to be monitored. Chlorine residual monitoring after the chlorine contact chamber is also required. Regulations allow using continuous online equipment or daily manual sampling. The initial equipment cost for the online monitoring is higher than the manual equipment. However, because monitoring is continuous, the operator does not need to visit the site as often, limiting the labor and associated cost to monitor the system. The monitoring can also be programmed to shut the treatment system down if a threshold has been exceeded. This ability reduces the potential to inadvertently supply water to the customers that has not been treated properly resulting in a more robust treatment system.

5.3.2 Treatment Improvements

A single treatment system located at the Well Site would minimize the initial construction and O&M. Rehabilitating the existing storage shed shown in Photo 12 (with gabled metal roof) would allow it to be used to house the disinfection system, filtration system, monitoring system, and controls system. Rehabilitation of the storage shed would include, installing a concrete foundation and slab, installation of shear walls to provide lateral stability, replacement of the roof, repainting, and roof framing modifications to allow a ceiling to be installed. Rehabilitation of the existing structure would have reduced permitting issues compared to a new building on the Well Site. Alternatively, installation of two treatment systems (one at the Hotel Tank site and one at the Buckeye Tank site) would require twice as many treatment systems with twice as much onsite O&M as a treatment system at the existing Well Site.

Photo 12: Existing Well Site storage shed (with gabled metal roof)



Cartridge filtration has low installation costs, is a simple system, and has low O&M requirements. However, the preliminary filterability analysis performed indicates the Hotel Spring is the only source the Harmsco LT1 cartridge filter would effectively treat. See Appendix B for the results of the filterability analysis. The remaining sources exceeded 0.35 NTU after filtration using a Harmsco LT1 filter patch. The filterability analysis results indicate that a 0.6um pore size is required to treat water produced by the vertical wells at the Well Site and a 0.4um pore size is required to treat the water produced by the Bei and Buckeye Sources to produce water that meets turbidity standards. Membranes have a pore size between 0.1um and 1 um. The testing results indicate selection of a membrane with a pore size less than 0.4um would produce water with a turbidity of less than 0.35 NTU.

Each treatment site would have a membrane treatment skid with a minimum capacity to treat the water produced at that site. Continuous monitoring would include: prefilter and post filter turbidity, pre and post filter pressure or differential pressure, chlorine residual, pH, and temperature. Continuous monitoring minimizes the onsite O&M costs, allows the control system to shut the system down when a parameter is out of specification, as well as provides the ability to notify the operator(s) that a parameter is trending towards being a problem. The filter skid will perform testing to verify the membrane module integrity once a day.

CWS's violations of the Lead and Copper rule require a corrosion control study be completed and provide recommendations regarding the most appropriate corrosion control treatment.

Continuing to use sodium hypochlorite as the disinfectant is appropriate because it has proven to provide 4 log removal and it has not caused disinfection by products violations to date. A flow paced continuously dosing injection system would consist of a solution vat, chlorine injection pump, and an online chlorine residual monitoring device. This system would provide a consistent dose. Using a chlorine injection pump that has a flow meter and pressure sensor to provide verification that the solution is being injected into the water.

The existing emergency generator power would continue to be used providing emergency power to all systems at the Well Site and meet the requirements of SB 552. Additional treatment sites will require additional emergency power facilities.

5.3.3 Treatment Recommendations

It is recommended that one treatment site be established at the existing Well Site. The treatment should include membrane filtration, backwash recovery, disinfection and corrosion control treatment with the associated continuous monitoring and automatic controls with remote monitoring. The storage shed should be rehabilitated to house the treatment system, electrical system, and controls system to minimize permitting issues.

5.4 STORAGE

System storage is required to equal or exceed the MDD overall and in each individual pressure zone. SB 552 will require systems to have source capacity, treatment capacity and distribution capacity to meet fire flows by 2032, provided funding is available. Table 6 below summarizes the storage and MDD for the entire system and for each zone.

Table 6 – Comparison of Storage Capacities to Requirements

Zone	Connections	MDD (gallons)	MDD (gallons) with 10% growth	Storage (gallons)
Buckeye	102	38,823	42,705	84,000
Hotel	41	15,605	17,166	30,000
Luther	14	5,329	5,862	40,000
Total	157	59,756	65,733	154,000

Fire protection requirements for the community vary widely due to the size, age, and construction type of the existing structures. For residential structures, it is generally between 500 gpm for 30 minutes equaling 15,000 gallons of storage to 1,000 gpm for 1 hour equaling 60,000 gallons of storage. Commercial structures require up to 3,000 gpm for 3 hours which requires 540,000 gallons of storage. Generally, the funding programs will only fund storage up to three times the domestic storage requirements.

The total existing system storage exceeds the domestic storage requirement of approximately 66,000 gallons. Each zone also exceeds the domestic storage requirement for those customers in that zone, as shown in Table 6. The Buckeye Zone is the only zone that meets the residential fire protection storage minimum. The system does not meet the estimated commercial fire protection storage requirements for the largest building. The fundable storage of three times the MDD would not even be half of the estimated storage required for the largest commercial building. Storage that is extremely oversized can also cause water quality issues due to low turnover.

The Buckeye Tank is in poor structural condition requiring rehabilitation or replacement. The tank is the highest in the system at about elevation 400. It provides storage for the majority of the system and, once the distribution system is upgraded, can serve all customers currently served by the three potable water storage tanks.

The Transmission Tanks are privately owned and operated by CWC. The transmission tank site is at about elevation 750 which is more than 100 feet above the houses that are currently supplied untreated water by the Transmission Tanks. A treated water storage tank sized to meet the MDD could serve the customers by creating a new pressure zone, the Upper Buckeye Zone. The MDD

with a ten percent growth factor would be about 4,200 gallons therefore, a 5,000-gallon tank would be adequate.

The Hotel Tank appears to be in good condition because the walls were reinforced with the concrete wrap previously installed. However, it does not have sloshing freeboard or meet the required residential fire protection volume. The Hotel tank site is at about elevation 320 which is lower in the system and limits the customers that the tank can serve.

It appears the Luther Tank was developed because there were difficulties reliably supplying the customers within the Luther Zone during high usage periods using small diameter distribution piping over a long distance. The Luther Tank site has geotechnical issues. One corner of the Luther Tank is undermined due to an apparent landslide. The undermining puts stress on the tank and could cause further damage to the tank. Further failure of the slope could cause catastrophic failure. Should the tank catastrophically fail, a house approximately 50 feet downhill from the tank is at significant risk of damage. The position of the house relative to the tank is shown in Photo 13. The Luther Tank does not have the required freeboard and is not large enough to provide residential fire protection storage. Therefore, the distribution system will need to either provide the fire protection in this zone or at least supplement it.

Photo 13: Failing Luther Tank in relation to house located downhill.



5.4.1 Storage Improvements

The Buckeye Tank needs to be rehabilitated or a new code compliant tank needs to be constructed. Rehabilitation would be designed to current codes. Rehabilitation of the existing Buckeye Tank would consist of removal of the existing roof, wrapping the existing tank with new concrete walls extending above the existing walls, replacing the roof on top of the new higher walls, and lining the tank with a geotextile fabric rated for potable water use. The wall extension would provide freeboard protecting the roof from seismically induced waves to maintain the integrity of the tank during a seismic event. Alternately, a new tank could be constructed. Constructing a new tank would consist

of preparing a pad at an elevation that would allow the operational water surface to match or exceed the existing tank levels. Constructing a tank pad for a new tank at the existing site would require a retaining wall. A new tank would also allow increased storage volume at the Buckeye Tank site allowing the total system storage to be maintained even if the Luther Tank is removed from service.

At the Hotel Tank site, a new larger tank is required or water from a tank further up in the system will need to provide supply to the Hotel Zone to make up for the fire protection storage deficiency in the zone. Alternatively, the Hotel Tank could be abandoned, and the customers in the Hotel Zone could be served by the rehabilitated Buckeye Tank or new Buckeye Tank. Since the Buckeye Tank is above the Hotel Tank and has fire protection storage capacity, installing a pressure reducing valve station between the Buckeye Zone and the Hotel Zone designed to provide fire protection flow rates would satisfy the fire protection storage and flow rates in the Hotel Zone. Should the Hotel Tank be damaged, it could be removed from service and water be provided to the zone by the Buckeye Zone.

A 5,000-gallon tank on a concrete pad with seismic restraints would be more than adequate to serve the ten current customers (or 11 connections including the growth factor). The MDD for 11 connections is 4,200 gallons. If the zone doesn't have a storage tank within it, the zone booster pump flow rate would need to meet or exceed the instantaneous flows of the 11 customers rather than the MDD average flow rate.

Removal of the Luther Tank eliminates the risk to the house below the tank, the need to repair the landslide below the tank, and the need to underpin the foundation. Increasing the volume of the Buckeye Tank by 40,000 gallons would maintain the total system storage. Increasing the distribution system capacity between the Buckeye Tank and the Luther Zone would provide fire protection and domestic flows.

5.4.2 Recommended Storage Improvements

It is recommended that the Buckeye Tank be replaced with a bolted steel storage tank. It is recommended that the new tank have a capacity of 130,000 gallons to provide the required residential fire protection of 60,000 gallons and the required MDD storage of 66,000 gallons, which includes an approximately ten percent growth factor, cumulatively.

It is recommended that the Hotel Tank be removed from service or used as is and provisions be made within the distribution system to supply fire protection flows and volumes from the Buckeye Zone to the Hotel Zone. See the distribution system discussion regarding the changes that would be made if the Hotel Tank is removed from service.

It is recommended that the Luther Tank be removed from the system eliminating the risk of damage and collateral due to failure. Removal of the Luther Tank from the system must be coupled with an upsized distribution system backbone to provide residential fire protection in addition to domestic service to the Luther Zone from the Buckeye Tank.

It is recommended that a new 5,000-gallon treated water tank on a slab foundation with seismic restraints be installed at the existing Transmission Tank site to provide service to those customers above the Buckeye Tank site.

The storage recommendations would result in a total system storage capacity of 130,000 gallons, 30,000 gallons less than the existing total. However, 40,000 gallons of storage would be moved from low in the system to the highest site in the system allowing the water to be used in the entire service area rather than a small portion, resulting in storage that exceeds the storage capacity that could be

used in any zone before improvement. This is beneficial during long-term power outages and should an emergency require large quantities of water.

5.5 CONTROLS AND MONITORING

The controls for the Cazadero Water System are manual, requiring frequent monitoring and leads to a lack of understanding of system response to operational changes between site visits. The supply controls for the Buckeye Source, Bei Source and the Hotel Spring are manually adjusted valves at the inlets to the tanks. The operator reviews the tank level and estimates how much water is needed and then adjusts the inlet valve to only allow the required amount of water into the tanks. The vertical well pumps are controlled by manually adjusted timers. The operator again estimates the amount of time the wells need to operate to maintain full tanks based on the tank level and predicts the quantity of water that will be used until the next day. The controls for moving water from one zone to the next lower zone are manually adjusted valves. Again, the operator must predict how much water is going to be used and adjust valves to ensure the tanks don't empty or overflow.

5.5.1 Controls and Monitoring Improvements

A state-of-the-art control system would control valves and pumps based on tank level or pressure. The system would prevent tanks from overflowing or emptying between site visits. Adding a system that is connected to the cloud would allow the operators to also monitor and control the system remotely to be proactive rather than reactive, further reducing the number of visits that need to be made and enhancing system reliability.

The levels of the tanks should be monitored to provide the control system with the necessary data to start and stop pumps and turn automatic valves on and off as necessary to maintain tank levels. The treatment system monitoring is described in the treatment section above.

5.5.2 Controls and Monitoring Recommendations

It is recommended that the manual controls be replaced with automatic controls. The automatic controls for the sources would use control valves for gravity supplies and electronic controls for the vertical wells based on tank level to ensure the tanks are operating between prescribed levels. Disinfection system controls should be retrofitted with automatic controls to allow the chlorine injection to be based on the flow entering the treatment facility. The distribution controls should be placed in central locations, such as at the tanks, with remote electronic controls operated via cellular signal or radio signals, or level controls operated by hydraulically operated control valves, so the tank levels are maintained without operator interaction. The system should be connected to the internet via a cloud service to allow the operators to monitor and make operational changes remotely.

5.6 DISTRIBUTION SYSTEM

Most of the distribution system is undersized. The largest pipe size diameter is 2-inch and the smallest size diameter is 1.25-inch. The distribution system piping is aging, the oldest of which was installed in the 1940s. Throughout the years, pipe repairs have become more common due to degradation over time. The delivery capacity of the small pipes only marginally meets the domestic demands and does not meet fire protection flow rates. As discussed in the storage section, if the small diameter pipe is too long it will not provide domestic flow rates during high demand times due to increased headlosses.

Regulations require a minimum of 4-inch water main without a waiver. SB 552 also requires that, when funding is available, the distribution system be designed for fire protection flows in addition to domestic flows. Modern piping that meets regulations will have a higher capacity, a lower unaccounted for water loss, and minimal repair requirements.

The residential fire protection flow requirement is 1,000 gpm for homes 3,600 square feet or less without automatic sprinklers. Any new home will require automatic sprinklers which reduces the fire flow requirement for a typical new home to 500 gpm. The piping necessary for 1,000 gpm is a minimum of 8-inch for a single pipe and 6-inch for areas of the system that are looped.

The largest known commercial building is approximately 13,000 square feet and fire resistive construction methods were most likely not used at the time of construction; therefore, the fire flow requirement is estimated at 3,000 gpm. Oversizing the distribution system can cause water quality problems due to the increased age of the water. There needs to be a balance between the maximum required fire protection flow and the domestic flow. In this case, the recommended compromise is to provide fire protection that meets the residential fire protection requirements.

Where zone storage does not meet residential fire protection requirements, automatic valving that allows water from a higher zone to flow into the lower zone could be installed to eliminate the fire protection deficiencies. This technique could be used to supplement capacity in the Hotel Zone and provide service in the Luther Zone without having excessive pressures in the zone that require increased pressure ratings.

Approximately ten customers served by the transmission storage tank farm currently receive untreated water. The existing distribution system does not have piping or adequate pressure to serve these customers.

5.6.1 Distribution System Improvements

Provision of fire protection flows, adequate pressures, and a reliable supply will require the distribution system piping be replaced with a minimum of 6-inch water mains where fire protection flows are being provided by looped piping and 8-inch in areas where fire protection is being provided a single pipe. The short dead-end mains beyond the last hydrant could be reduced in size thereby reducing the volume of water in the pipe and water quality issues. Replacing the aging water mains with modern piping materials would reduce unaccounted-for water losses and the number of repairs necessary due to leaks and increase the distribution system's water delivery capacity.

Reducing the leaks requiring repair would reduce health hazards due to the drop in pressure or dewatering mains. While freezing is not a huge concern, installing dry barrel hydrants rather than wet barrel hydrants would ensure that the water in the hydrants will not freeze and damage the hydrants.

Eliminating the Hotel Tank simplifies the system by eliminating a pressure zone. This also eliminates portions of the system that will require dual piping, a pressure reducing valve station and increases the areas that can be looped. Increased looping increases the resiliency of the system.

Adding an additional pumped zone (Upper Buckeye Zone) to the system would allow those customers in the Upper Buckeye Zone, served by the untreated Transmission Tank site storage, to be provided with treated water. The zone could be a pressure zone or a gravity zone. The pressure zone consists of a booster pump that operates on demand to provide the instantaneous water volume demanded by the customers at any time. The gravity zone consists of a tank installed at an elevation that will provide adequate pressure to all customers and a booster pump that fills the tank. The tank supplies instantaneous demand and the booster pump sized to meet the MDD fills the

tank. As an alternative to providing pumps that could provide fire protection flows in the Upper Buckeye Zone, two hydrants, one on the Buckeye Zone distribution system and one on the Upper Buckeye zone, could be provided for the fire department to use a pumper truck to get fire protection flows in the Upper Buckeye Zone when needed.

Elimination of the Luther Tank requires adding the existing customers in the Luther Zone to the existing Buckeye Zone which may create pressures that are higher than allowed at the services. There are two primary methods to reduce service pressures to acceptable levels. The first is to install a mainline pressure reducing valve (PRV), the second is to install pressure reducing valves on each service. The mainline pressure reducing valve requires maintenance and should it fail, all of the customers downstream will experience high pressure which may damage private piping. Should CWC decide to install individual PRV's generally they are installed as part of the project because the pressure is being adjusted by the change in the system and they become the property owners to maintain. A failure of one PRV will only affect one customer, significantly reducing the potential for damage resulting from one failure.

5.6.2 Distribution System Improvement Recommendations

It is recommended that the entire distribution system be replaced with a new distribution system sized to provide fire and domestic flows, as shown in Figures 4 or 6. Figure 4 shows the Hotel Tank being removed from the system which eliminates the need of a pressure reducing valve to move water from the Buckeye Zone to the Hotel Zone and dual piping areas. The resulting distribution system includes additional looping which results in a more resilient system. Figure 6 shows the system retaining the Hotel Tank, including a pressure reducing valve station to supply water from the Buckeye Zone to Hotel Zone and dual piping as necessary. In the existing Luther Zone, each service should include a PRV to control pressure and reduce the damage caused by a potential failure.

It is recommended that an Upper Buckeye Zone be created to provide potable water at appropriate pressures to the ten customers currently served by the transmission tanks. The Upper Buckeye Zone should be a gravity zone to reduce the required booster pump size (6gpm vs 55gpm). It is recommended that Siamese hydrants be provided at the Buckeye Tank Site to allow the fire department to provide additional boosted flows within the Upper Buckeye Zone should emergency flows be required within the zone.

5.7 SUMMARY OF DEFICIENCIES AND RECOMMENDED IMPROVEMENTS.

The following is a summary of the identified deficiencies and recommended improvements to resolve identified deficiencies that would result in CWD meeting required codes and regulations and provide safe and reliable water service to its customers.

Sources

- Deficiency: Supply system does not include redundancy
- Recommendation: Drill new well on existing Well Site
- Deficiency: Existing Hotel Well surface seal has a gap under it
- Recommendation: Remove Hotel Well well house, replace the well seal, install deepened edges on the well seal, install well protection cage

- Deficiency: Existing Buckeye Well building is leaning
- Recommendation: Remove building, replace with well protection cage and install controls and electrical equipment in the existing storage shed after rehabilitation
- Deficiency: Wells do not have water level monitoring or flow measurement devices
- Recommendation: Install submersible level transducers in wells and flow meters on discharge piping.

Treatment

- Deficiency: Water treatment does not meet surface water treatment rules as required to treat water classified as GWUDI
- Recommendation: Install treatment that meets surface water treatment rules
- Deficiency: Lead and Copper testing results exceed the action levels
- Recommendation: Complete corrosion control study and implement optimum corrosion control treatment
- Deficiency: Disinfection system operates on the slug method
- Recommendation: Install new continuous feed disinfection system

Storage

- Deficiency: The Buckeye Tank walls are cracked, and the tank does not include freeboard
- Recommendation: Construct tank pad and new 130,000-gallon code compliant tank at the site (preferred) or rehabilitate existing tank by wrapping the existing tank with new taller walls in compliance with current codes
- Deficiency: The Luther Tank foundation is undermined, and the tank is on a potentially unstable pad
- Recommendation: Remove the Luther Tank from the system and install a distribution system from the Buckeye Tank that will provide both domestic and fire protection needs

Controls

- Deficiency: Controls are manually adjusted valves or timers
- Recommendation: Install automatic pressure and/or level-based control system and SCADA (or similar)

Distribution

- Deficiency: Distribution system does not meet minimum pipe sizes, is needing increasing number of repairs and does not allow for fire protection flows
- Recommendation: Replace the distribution system pipe with appropriately sized new pipe for domestic and fire protection flow rates, provide fire hydrants consistent with local fire code

- Deficiency: Ten customers are supplied untreated water
- Recommendation: Install booster pump station and storage tank to serve the ten customers in the Upper Buckeye Zone(preferred) or install pressure booster pump station to serve the customers in the Upper Buckeye Zone.

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6. ALTERNATIVE PROJECT ANALYSIS

A description of two alternative projects that would correct the water system deficiencies and budgets for each project is provided in this section. The third alternative evaluates the feasibility of consolidation with another water system. Alternatives 1 and 2 have been broken into two phases, the first phase addresses supply, treatment, and storage deficiencies. The second phase addresses the remaining distribution system deficiencies.

6.1 ALTERNATIVE 1 – TREATMENT AT WELL SITE

Alternative 1 generally includes well improvements, a single new treatment system at the Well Site, new tank at the Buckeye Site, creation of a new pressure zone the Upper Buckeye Zone served by a booster station at the Buckeye Site and a small storage tank at the Transmission Storage site, distribution system improvements to the Upper Buckeye Zone, distribution system improvements to allow the Luther and Hotel Tanks to be removed, and remaining distribution system improvements. Figure 3 shows the proposed schematic design for Alternative 1. Figure 4 shows the general facilities layout for Alternative 1. Alternative 1 includes the following improvements.

6.1.1 Alternative 1, Phase 1

1. Modifications to the transmission system to allow water from all sources to be moved to the Well Site.
2. Existing well improvements
 - Construct new Hotel Well surface seal with deepened footings on edges
 - Install protective well head cages
 - Rehabilitation of existing storage shed
 - Install new electrical distribution and controls equipment
3. New treatment system at the Well Site. Improvements include:
 - Provision of membrane filtration system with a 52 gpm capacity
 - Provision of turbidity monitoring
 - Provision of backwash recovery system
 - Provision of disinfection system
 - Provision of Sodium Hypochlorite injection
 - Provision of chlorine contact chamber consisting of a 5,000-gallon tank and 45-feet of 12-inch piping.
 - Provision of chlorine residual monitoring
 - Provision of corrosion control treatment
4. Buckeye Tank Site
 - Site improvements including grading and new retaining wall
 - Construct new 130,000-gallon bolted steel tank
5. Distribution system improvements (sized for fire protection)
 - Construct new booster pump station to serve customers in the Upper Buckeye Zone
 - Construct new 6- inch and 4-inch piping to serve the customers in the Upper Buckeye Zone

- New 5,000-gallon treated water tank at the Transmission Tank site to serve properties in the Upper Buckeye Zone
- Provide power
 - Provide new commercial power service
 - Provide backup generator
- Replacement piping from the Buckeye Tank to the supply point of the Luther Zone with 8-inch and 6-inch piping.
- Construct new pressure reducing valve station (Buckeye Zone to Luther Zone)

6.1.2 Alternative 1, Phase 2

1. Distribution system improvements (sized for fire protection)
 - Replacement of the remaining distribution system with 8-inch, 6-inch, 4-inch, and 2-inch piping
2. Supply System Improvements
 - Drill additional well at Well Site with an 8-inch casing and an 18-inch borehole

6.1.3 Alternative 1 Environmental

This alternative does not appear to present any insurmountable environmental challenges. It is expected that the CEQA process will result in a mitigated negative declaration. In addition to the standard construction-related mitigation measures, it is expected that there will be biological mitigation measures due to the rural forested location being an ideal area for birds. The Well Site is near the creek and will require flood elevation considerations. The current owner has not seen the well site flood in the 75 years he has been involved with the system.

Undisturbed areas that would be disturbed by this alternative will be minimal at the Well Site and the Hotel Tank Site but will be more extensive at the Buckeye Tank Site due to the development of a new tank pad and construction of a new tank and a new booster station. The disturbance at the Transmission Tank Site will be limited to area already used for access.

6.1.4 Alternative 1 Land Requirements

The water system has been owned by ancestors of the current owner since 1888. The water system and the underlying lands appear to have historically been under common ownership. When the ownership of the land and the water system was separated, the water system did not retain rights (easement, fee or lease) to the land that water system facilities occupied. In 2021, a ten year lease with a ten year extension for the land underlying the water system facilities at the Well Site was executed. The remaining facilities do not appear to have any documented rights.

This alternative proposes to retain or improve the following existing facilities that do not appear to have documented land rights to the land they occupy:

- Buckeye Tank Site including the new Buckeye Tank, the new booster pump station, generator, distribution pipelines onsite, and a location for a temporary tank to be used during times when the Buckeye Tank needs to be removed from service
- Buckeye Source and the pipelines leading to the Buckeye Tank Site
- Bei Source and the pipelines leading to the Buckeye Tank Site

- Raw water pipelines between the wells and Hotel and Buckeye Tanks
- Hotel Spring and the pipelines leading to the Hotel Tank
- Distribution system over Austin Creek to supply cabins across the creek from Cazadero Highway

This alternative includes the following proposed facilities which require additional rights acquisition:

- Distribution system from the end of the County owned portion of Bei Road to the new Upper Buckeye Tank at the Transmission Tank site
- Upper Buckeye Tank at the Transmission Tank site
- Water mains in the County Roads are in the County right of way and will require encroachment permits from the County of Sonoma

6.1.5 Alternative 1 Construction and Site Considerations

The water system serves an older rural community on both sides of the Austin Creek Valley that is steep and has small roads. Other than the Well Site, most of the facilities are on the side of a hill. The roads are small, resulting in tight access to most sites and steep terrain on which construction would occur. The Well Site has the best access of all the sites. The Hotel Tank Site has the worst access of all the sites. Therefore, this alternative provides the least complexity for the treatment site construction. The Buckeye Tank Site will require significant effort to create the pad for the new tank because it is in between two roads and on a descending ridgeline.

6.1.6 Alternative 1 Advantages and Disadvantages

Advantages of Alternative 1 include the following:

- Provides treatment in accordance with surface water treatment rules
- Centralized easy to access treatment resulting in the lowest O&M costs
- Easiest construction of treatment system
- Single treatment site resulting in lower initial costs and lower long term replacement costs
- Provides fire protection storage for the residences within the community
- Eliminates a pressure zone and two storage sites simplifying the system
- Increased looping for redundancy and reliability
- No dual piping
- Consolidation of storage allows all storage to be used within the majority of the system
- Requires land rights for only three sites
- Buckeye pump station requires smaller pumps

Disadvantages of Alternative 1 include the following:

- Treated hillside source water is required to be pumped into the distribution system after treatment
- Upper Buckeye System requires additional piping and easements

- Upper Buckeye System requires a tank.

6.1.7 Alternative 1 Construction Budget

Alternative 1, Phase 1				
Item No.	Description	Cost		
1	Source Piping Modification	\$20,000		
2	Well Site Improvements	\$373,000		
3	Treatment System at Well Site			
	Well Site Treatment System	\$662,500		
	Well Site Disinfection System	\$66,000		
	Well Site Backwash Recovery System	\$80,000		
	Corrosion Control Treatment	\$15,000		
	Well Site Treatment System Subtotal	\$823,500		
4	Buckeye Tank/Site Improvements	\$662,500		
5	Distribution System Improvements			
	Booster Pump Station	\$117,000		
	Power and Backup Generator	\$77,000		
	Upper Buckeye Tank	\$61,000		
	Description	Quantity	Unit	Unit Cost
	4" Piping	600	LF	150
	6" Piping	6000	LF	175
	8" Piping	3900	LF	200
	2" Valve	3	EA	1500
	4" Valve	2	EA	2000
	6" Valve	12	EA	2500
	8" Valve	6	EA	3000
	Blow Offs	11	EA	5000
	Hydrants	22	EA	12000
	Services	36	EA	9500
	ARV	5	EA	6000
	2" Connections	8	EA	8000
	Distribution System Improvements Subtotal	\$2,986,500		
Phase 1 Construction Subtotal		\$4,865,500		
Contingency		\$973,100		
Construction Administration and Observation		\$826,925		
Phase 1 Total		\$6,665,525		

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Alternative 1, Phase 2					
Item No.	Description				Cost
1	Distribution System Improvements				
	Description	Quantity	Unit	Unit Cost	
	2" Piping	1500	LF	130	\$195,000
	6" Piping	7700	LF	175	\$1,347,500
	8" Piping	6600	LF	200	\$1,320,000
	2" Valve	10	EA	1500	\$15,000
	6" Valve	6	EA	2500	\$15,000
	8" Valve	11	EA	3000	\$33,000
	Blow Offs	11	EA	5000	\$55,000
	Hydrants	33	EA	12000	\$396,000
	Services	121	EA	7500	\$907,500
	ARV	10	EA	6000	\$60,000
	Connections	11	EA	10000	\$110,000
Distribution System Improvements Subtotal					\$4,454,000
2	Supply Improvements				\$150,000
Phase 2 Construction Subtotal					\$4,604,000
Contingency					\$890,800
Construction Administration and Observation					\$668,100
Phase 2 Total					\$6,162,900
Alternative 1 Total Water System Improvements					\$12,828,425

6.2 ALTERNATIVE 2 – TREATMENT AT THE BUCKEYE AND HOTEL SITES

Alternative 2 would include two treatment facilities instead of one and maintain use of two existing storage sites. The first phase of Alternative 2 would consist of a treatment system at the Buckeye and Hotel sites including new treatment buildings, well improvements at the Well Site, rehabilitation of the existing Buckeye Tank, a booster pump station at the Buckeye Tank Site, replacement of the distribution system to customers above the Buckeye Zone, and replacement of the distribution system to Luther Zone. Phase 2 would consist of installation of a new well, installation of a pressure reducing valve between the Buckeye zone and the Hotel Zone, and replacement of the remaining distribution system. Figure 5 shows the schematic design for Alternative 2. Figure 6 shows the proposed locations of the new facilities. A list of Alternative 2 improvements follows.

6.2.1 Alternative 2, Phase 1

1. Existing source improvements
 - Construct new Hotel Well surface seal with deepened footings on edges
 - Install protective well cages
 - Rehabilitate existing storage shed for new power distribution equipment and well controls
2. Hotel Treatment System
 - Provide power service
 - Provide backup generator
 - Provision of membrane filtration system
 - Install backwash recovery system
 - Provision of turbidity monitoring
 - Provision of disinfection system
 - Provision of chlorine residual monitoring
 - Provision of corrosion control treatment
 - Provision of chlorine contact chamber
3. Buckeye Treatment system
 - Provide power service
 - Provide backup generator
 - Install membrane filtration system
 - Provision of turbidity monitoring
 - Provision of disinfection system
 - Provision of chlorine residual monitoring
 - Provision of corrosion control treatment
 - Provision of chlorine contact chamber
4. Buckeye Tank Site
 - Rehabilitation of existing Buckeye Tank
5. Distribution system improvements (sized for fire protection)
 - Construct new booster pump station to serve customers above the Buckeye Zone
 - Replacement piping to serve the customers above the Buckeye Zone
 - Replacement piping from the Buckeye Tank to the supply point of the Luther Zone

- Construct a new pressure reducing valve station (Buckeye Zone to Luther Zone)

6.2.2 Alternative 2, Phase 2

1. Distribution system improvements (sized for fire protection)
 - Replacement of the remaining distribution system
 - Construct a new pressure reducing valve station (Buckeye Zone to the Hotel Zone)
2. Supply System Improvements
 - Drill new well at Well Site

6.2.3 Alternative 2 Environmental

This alternative does not appear to present any insurmountable environmental challenges. The Hotel Treatment site location may be limited due to biological resources. It is expected that the CEQA process will result in a mitigated negative declaration as well as site limitations due to biological resources. In addition to the standard construction-related mitigation measures, it is expected that there will be biological mitigation measures due to the rural forested location being an ideal area for birds. The Well Site is near the creek and will require flood elevation considerations but the current system owner has not seen the well site flood. Undisturbed area that would be disturbed by this alternative will be minimal at the Well Site but more expansive at the Buckeye Tank Site due to the development of a new treatment building pad and booster pump station and at the Hotel Tank Site due to the development of the new treatment building pad.

6.2.4 Alternative 2 Land Requirements

Overall land ownership challenges are similar to Alternative 1. Alternative 2 would require additional space at the Buckeye Tank Site. The proposed facilities at the Well Site would generally be within the existing footprint although the current property owner would have to be consulted regarding the proposed improvements. At the Hotel Tank Site, the use would increase to include the new treatment building and system. The piping from the tank to the distribution system and the raw water supply system from the Well Site to both tank sites would continue to be used.

The Transmission Tank site improvements would occur outside of the existing improvements but will be within the area that is currently used for access. The potable water piping leading to the Transmission Tank would be in existing County right of way requiring an encroachment permit for about half the distance and across private property for which the water system does not currently have rights to install a pipeline. However, there is a road being used to access the Buckeye and Bei Sources.

The proposed distribution system will generally be installed within the county right of way requiring an encroachment permit.

6.2.5 Alternative 2 Construction and Site Considerations

Construction and site considerations are similar to Alternative 1. This alternative includes complexities at the Buckeye Site and the Hotel Site because of the additional facilities required at these sites. The Buckeye Tank Site will require effort to create the pad for the new treatment building and booster pump station because it is in between two roads and on a descending ridgeline.

The Hotel Site will be difficult because the entire site is on the side of a hill and the access is very steep. The well site is flat and presents the least amount of construction difficulties.

6.2.6 Alternative 2 Advantages and Disadvantages

The advantages of Alternative 2 are the following:

- Provides treatment in accordance with surface water treatment rules
- Provides fire protection storage for the residences within the community
- Hillside source water does not require significant pumping
- The Upper Buckeye System requires less water main and easement acquisition.

Disadvantages of Alternative 2 include:

- Access to the treatment locations is more difficult
- There are two treatment systems to operate resulting in more operations staff time and more maintenance costs
- There are two treatment systems requiring additional initial investment and equipment repair and replacement over time
- Two treatment sites require documentation of land rights for one additional site
- The Buckeye Pump Station requires much larger pumps.

6.2.7 Alternative 2 Construction Budget

Alternative 2, Phase 1					
Item No.	Description				Cost
1	Source Piping Modification				\$20,000
2	Well Site Improvements				\$373,000
3	Hotel Treatment System				
	Hotel Treatment System				\$947,000
	Hotel Disinfection System				\$56,000
	Hotel Backwash Recovery System				\$80,000
	Hotel Corrosion Control Treatment				\$15,000
	Hotel Treatment System Subtotal				\$1,098,000
3	Buckeye Treatment System				
	Buckeye Site Treatment System				\$895,000
	Buckeye Site Disinfection System				\$80,000
	Buckeye Site Backwash Recovery System				\$56,000
	Corrosion Control Treatment				\$15,000
	Buckeye Treatment System Subtotal				\$1,046,000
4	Buckeye Tank/Site Improvements				\$454,500
5	Distribution System Improvements				
	Booster Pump Station				\$242,000
	Power and Backup Generator				\$112,000
	Description	Quantity	Unit	Unit Cost	
	4" Piping	500	LF	150	\$75,000
	6" Piping	4900	LF	175	\$857,500
	8" Piping	3900	LF	200	\$780,000
	2" Valve	3	EA	1500	\$4,500
	4" Valve	1	EA	2000	\$2,000
	6" Valve	6	EA	2500	\$15,000
	8" Valve	13	EA	3000	\$39,000
	Hydrants	20	EA	12000	\$240,000
	Services	36	EA	9500	\$342,000
	ARV	5	EA	6000	\$30,000
	2" Connections	5	EA	8000	\$40,000
	Distribution System Improvements Subtotal				\$2,779,000
	Phase 1 Subtotal				\$5,770,500
Contingency				\$1,154,100	
Construction Administration and Observation				\$1,032,850	
Phase 1 Total				\$7,957,450	

Alternative 2, Phase 2					
Item No.	Description				Cost
1	Distribution System Improvements				
	Description	Quantity	Unit	Unit Cost	
	2" Piping	1900	LF	130	\$247,000
	6" Piping	3700	LF	175	\$647,500
	8" Piping	11700	LF	200	\$2,340,000
	2" Valve	12	EA	1500	\$18,000
	6" Valve	4	EA	2500	\$10,000
	8" Valve	12	EA	3000	\$36,000
	Blow Offs	13	EA	5000	\$65,000
	Hydrants	36	EA	12000	\$432,000
	Services	121	EA	7500	\$907,500
	ARV	10	EA	6000	\$60,000
	Connections	10	EA	10000	\$100,000
	PRV Station	1	EA	90000	\$90,000
	Distribution System Improvements Subtotal				
2	Supply Improvements				\$150,000
Phase 2 Subtotal					\$5,103,000
Contingency					\$1,020,600
Construction Administration and Observation					\$765,450
Phase 2 Total					\$6,889,050
Alternative 2 Total Water System Improvements					\$14,846,500

6.3 ALTERNATIVE 3 CONSOLIDATION

Consolidation of CWC with other water systems along Austin Creek was considered. CWC is the largest public water system in the Austin Creek Valley. There are seven public water systems within a three-mile radius of CWC. Two of those water systems are classified as community water systems and the remaining are non-community systems. The two community water systems serve 51 and 18 connections and are 1.9 and 2.2 miles away, respectively. While the two systems' supply capacity was not analyzed, it is unlikely that the systems would have excess supply capacity to provide CWC with water that rectifies the water quality deficiency. In addition, the cost for the piping to connect to either of these systems would be on the order of \$1,500,000. This is more than the cost of a new treatment plant at the Well Site and does not include any improvements that might need to be made to the water system that would be providing water to CWC.

Managerial consolidation would not remedy any of the identified deficiencies but might reduce some administrative costs.

Based on the elevation of the water system storage, it does not appear that consolidation would address the identified CWC storage deficiencies. Distribution system deficiencies would not be addressed by simple consolidation.

Consolidation of all water systems in the Austin Creek Valley creating a “regional” system is a constructable option. However, there are many significant obstacles such as supply and significant infrastructure requirements. Pursuing a regional water system would result in CWC continuing to supply water that does not meet surface water treatment regulations to customers until the obstacles associated with a regional system can be overcome.

For the above reasons consolidation is not deemed a viable option to solve the issues CWC currently faces in the near term.

6.4 ALTERNATIVES ANALYSIS

Alternatives 1 and 2 would include source, treatment, storage, and distribution system improvements. The primary differences are provision of one or two treatment facilities, rehabilitation or replacement of the Buckeye Tank, retention or abandonment of the Hotel Tank, and use of a pressure system or gravity system for the upper buckeye zone. Alternative 1 would include one treatment facility at the existing Well Site, replace the Buckeye Tank abandon the Hotel Tank, and use a gravity system for the Upper Buckeye Zone. Alternative 2 would include treatment facilities at the Buckeye Site and the Hotel Site, rehabilitation of the Buckeye Tank, retain the use of the Hotel Tank, and use a pressure system to serve the Upper Buckeye Zone. Alternative 2 provides a second treatment facility which reduces supply transmission changes, but increases overall project costs and ongoing O&M costs because of the second treatment system. Alternative 1 reduces the overall construction costs while increasing the reliability of the distribution system due to the increased looping and elimination of dual piping and the pressure reducing valve station. Alternative 1 reduces the overall storage in the system however it increases the storage available to be used in any part of the system by eliminating zones. Alternative 1 utilizes small booster pumps to serve the Upper Buckeye Zone by including gravity storage. Therefore, because of the increased reliability, lower, construction and operation costs, and smaller booster pumps, it is recommended that Alternative 1 be selected as the project to address the identified deficiencies.

7. COMPREHENSIVE RESPONSE TO CLIMATE CHANGE

Climate change is, primarily, addressed at the regional and larger scale. The State of California has established guidelines for local agencies to develop and implement Climate Action Plans (CAP) that include climate vulnerability assessments. The County prepared its Climate Action 2020 plan in 2016 but the plan has not been officially adopted. While not officially adopted, the CAP is useful in identifying climate vulnerabilities. The County has since prepared the Sonoma County Strategic Plan 2022 (Strategic Plan) that includes “climate action and resiliency” and “resilient infrastructure” as two of its five pillars. The Strategic Plan was adopted in 2021 to prioritize projects over five years and align short and long-term objectives⁵. It is unclear when the County will adopt a Climate Action Plan.

This section assesses the proposed project’s vulnerability to climate change, potential adaptation measures and mitigation measures to reduce those impacts. The June 2020 California Adaptation Planning Guide⁶ includes definitions of terms used in this section, as shown below:

- **Vulnerability** is the exposure of human life and property to damage from natural and human-made hazards. Climate vulnerability describes the degree to which natural, built, and human systems are at risk of exposure to climate change impacts. Differences in exposure, sensitivity, and adaptive capacity affect an individual’s or community’s vulnerability to climate change. Vulnerability can increase because of physical (built and environmental), social, political, and/or economic factor(s). Vulnerability is considered a function of exposure, sensitivity, and adaptive capacity.
- Climate change **adaptation** is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, and which moderates harm or exploits beneficial opportunities. Climate change adaptation is focused on long-term threats to human life, property, economic continuity, ecological integrity, and community function.
- **Resilience** is the “capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience.” Adaptation actions contribute to resilience, which is a desired outcome or state of being.
- **Mitigation** is an act or sustained actions to reduce, eliminate, or avoid negative impacts or effects. Hazard mitigation is a sustained action taken to reduce or eliminate the long-term risk to human life and property through actions that reduce hazard, exposure, and vulnerability. Hazard mitigation can be one component of climate change adaptation. Climate change mitigation, also referred to as greenhouse gas (GHG) mitigation or GHG reduction, refers to actions to reduce GHG emissions to reduce the severity of climate change.

7.1 VULNERABILITY

Based on County planning documents and the project location, topography and surrounding land uses, the primary vulnerabilities to the project from climate change are increase wildfire risk,

⁵ <https://socostrategicplan.org/>

⁶ <https://www.caloes.ca.gov/HazardMitigationSite/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf>

decreased fresh water supply (drought), flooding, and public health (heat risk), discussed further below. The project would not be at risk from sea level rise due to its elevation and inland location.

7.1.1 Wildfire

The County's CAP describes the increased rate of wildfire vulnerability as: "Risk of fire is likely to continue to rise due to increased dryness of vegetation, compounded by productivity of plants in the spring (which creates more fuel for dry season wildfires). By the end of this century, the chances of one or more fires during a 30-year period are projected to increase from 15-20% at present to 25-33% in the mountainous areas of the county, a fire regime akin to that experienced today in the Santa Monica Mountains of Southern California."

The County's Department of Emergency Management (formed in 2019 following the devastating 2017 fires) provides primary coordination of emergency response in unincorporated areas. Since 2017, the County has experienced four catastrophic wildfire events: the October 2017 Tubbs/Nuns fire that burned 110,000 acres; the October 2019 Kincade fire that burned 78,760 acres; the August 2020 LNU Complex (Walbridge) Fires that burned 57,570 acres; and the September 2020 Glass Fire that burned 67,000 acres. Cazadero was in the mandatory evacuation zone for the Kincade and Walbridge fires.

The project area is located within a state responsibility area and designated as a high fire hazard area by Calfire, as shown on Figure 7. Cazadero has two fire stations, one within the service area and one approximately 3.5 miles south of the service area. Wildfire could result in damage or destruction of above ground portions of the existing and reconstructed water system or the community itself. As shown on Figure 8, there have been several wildfires near the project greater than 1,000 acres since 1950.

After the 2017 Tubbs fire, which destroyed more than 5,643 structures, half of which were homes in Santa Rosa, Public Safety Power Shutoffs (PSPS) have been implemented during fire season to reduce the risk of wildfire but result in multiple-day power losses in the County.

7.1.2 Drought

The County's CAP indicates that: "Whether the North Bay region experience more or less rainfall overall, the land will likely be drier overall because warmer temperatures increase evapotranspiration (the loss of water from plants and soil into the air) even under the two [modeled] "wet" scenarios. Climatic water deficit (CWD) is a numeric measure of drought stress that quantifies the extent to which plants' need for water exceeds moisture available in the soil. Three of the four climate scenarios examined in this report indicate a rising CWD for the 21st century while the "warm/wet" scenario indicates nearly equivalent CWD to the historic period. The CWD is projected to increase over this century, producing 10 to 20% drier soil conditions in the summer months, leaving less water available for groundwater recharge or runoff into rivers and creeks, increasing irrigation needs, and causing stress to natural vegetation and water-dependent ecosystems. The greatest increases in soil dryness are projected in the south and southeastern portions of the county."

California has historic droughts and droughts are expected to be worsened by climate change. Reduced rainfall and increased temperatures are both expected to exacerbate drought conditions and durations.

The project's existing water supply consists of the existing wells and spring sources. In general, groundwater is expected to be impacted by climate change as rainfall becomes more erratic and

municipalities in the area potentially increase well water withdrawal as reservoir-stored supplies become more limited. This could lead to a reduction of water supply for the project in the future. As shown on Figure 9, the water system is in the Austin Creek watershed that drains approximately 44,733 acres via Austin Creek to the Russian River and there is not a delineated groundwater basin below the project area. The system's water supply sources are in approximately the lower third of the watershed and there are no permitted water suppliers further up the watershed. During the previous three years of drought conditions, the water sources remained productive. While continuing drought could reduce water supplies in the future, the water source appears resilient to date.

7.1.3 Flooding

The County's CAP indicates that: "The climate scenarios project increased seasonal variability of precipitation, runoff, and stream flows for Sonoma County, along with increased likelihood of "extreme" precipitation and drought events that were rare or unprecedented in the historic past. The precise risk of flood events is difficult to predict, however. Much of Sonoma County's wintertime precipitation comes in the form of "atmospheric rivers" from the Pacific Ocean. An atmospheric river is a relatively narrow ribbon of moisture in the atmosphere with ample moisture and strong winds. These atmospheric phenomena can produce very high precipitation in relatively focused areas. The amount and intensity of precipitation therefore depends greatly on where these atmospheric rivers make landfall. Under climate change projections for California, the average intensity of a typical atmospheric river does not increase, but there may be more years with more frequent storm events and occasional events that are much stronger than historical ones. Moreover, the length of the season over which storm events may occur is predicted to increase. These changes to the patterns of storm events may result in more frequent and more severe floods in Sonoma County."

Austin Creek runs through the project area. The FEMA flood plain designation is shown on Figure 10. The water service area and water facilities are primarily outside of the designated floodway. The Well Site is adjacent to the designated floodway but has not experienced flooding, according to the system manager. The flood elevation at that location is approximately 118 feet above sea level. The well facilities are at approximately 120 feet above sea level. While flooding may be exacerbated by climate change, the water facilities would not be impacted due to design (sanitary seal on wells) and location.

7.1.4 Public Health

The County's CAP describes public health risks as: "Sonoma County is expected to experience more very hot days and overall higher temperatures over a longer warm season. Average monthly maximum temperatures have already risen by 2.7 degrees Fahrenheit (°F) since 1900. Most climate change models project that temperatures will continue to rise, whether they use high or mitigated carbon emissions trends.... In the two scenarios with mitigated emissions, summer high temperatures are expected to rise by 1 to 2°F. In the scenarios with uncurbed emissions, average summer high temperatures are projected to increase by up to 9 to 11°F by 2100."

The project area would likely be subject to identified heat stress associated with climate change. While Cazadero generally experiences cooler summertime temperatures influenced by the marine layer, temperatures are still expected to increase. Increased temperatures lead to heat stress, especially during outdoor activities.

7.2 ADAPTATION

As defined by the state of California, adaptation is an action taken to make a project, entity, or population more resilient under current and future climate change scenarios. In essence, adaptation recognizes that climate change is occurring and will continue to worsen, and actions taken now should be done so with future resilience to those changes in mind.

While the project is intended to rectify the identified water system deficiencies, it also benefits the service area's climate change resilience (i.e., it is adaptive). Primary climate change threats to the community include increased wildfire risks, potential drought, flooding and public health risks. The project's potential adaptive components to the primary identified vulnerabilities that were described above are discussed below.

7.2.1 Wildfire

The project is adaptive to wildfire. Existing water main sizes are inadequate for fire flows. Replacement of water mains to provide fire flows and provision of fire hydrants to meet current fire safe standards for fire protection will increase firefighting abilities in the project area. Provision of fire hydrants in combination with replacement water mains that provide appropriate water flow and volume would provide fire protection opportunities to better safeguard the community.

Operation of facilities is also complicated by wildfire as operators may have other immediate priorities. Currently, all controls are manual and require frequent trips by operators to manage the water system. The proposed project would reduce this vulnerability through power supply redundancy (emergency generator) and provision of remote monitoring and controls during PSPS or wildfire events, allowing the system to operate with much less demands on operators.

7.2.2 Drought

Water meters would be provided to all services. This has a two-fold benefit of allowing the identification of water leaks in the system (that would subsequently be fixed) as well as generally reducing water usage. Provision of water meters and replacement of the existing leaky distribution system will result in overall lower water demands. Provision of a redundant supply well would provide additional flexibility in operating the water system.

7.2.3 Public Health

The water system currently provides untreated water to ten customers. While not climate-related, the project would rectify that condition.

The project is adaptive to climate change by ensuring clean drinking water and adequate water storage for the community. The project would ensure adequate water availability for drinking as well as for cooling showers/baths for those exposed to extreme outdoor heat during the day. This is especially important for communities where air conditioning is not always available.

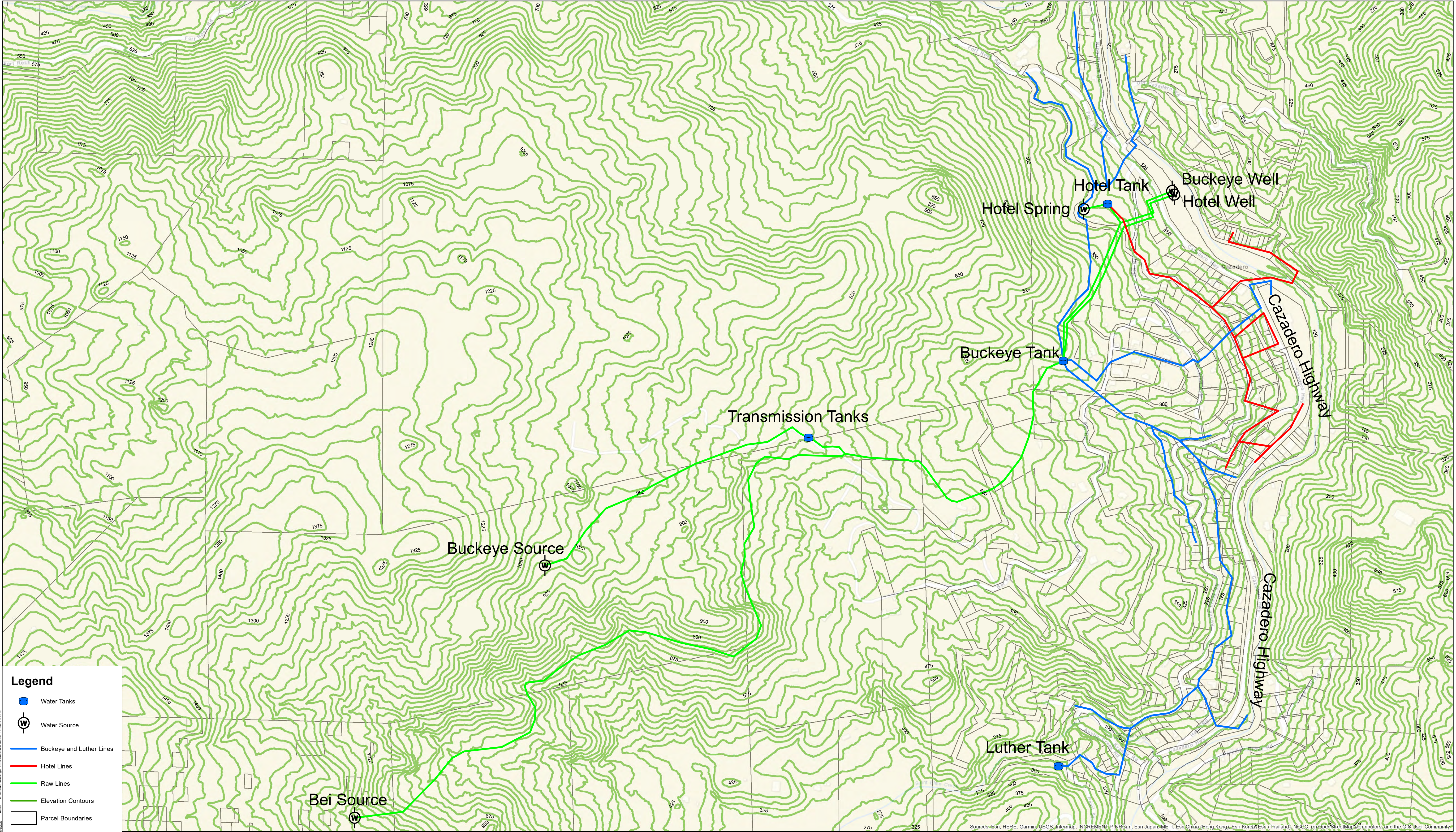
7.3 MITIGATION

Due to the limited scope of the project, mitigation measures are limited beyond those adaptive project elements already described under Adaptation, above. Appropriate system improvements to reduce overall water demands and improve system resilience are climate adaptive as well as mitigation. Several of those project elements include:

- Provision of adequate fire protection through storage, fire hydrants and adequately sized water mains directly addresses the existing and future primary threat of wildfire, to the extent it can be addressed.
- Reduction of overall water system demands through correcting existing system deficiencies (leaks) and metering would reduce overall power demands, lowering GHG emissions.
- Water meters would be installed to encourage water conservation efforts and would allow more stringent conservation measures during droughts.

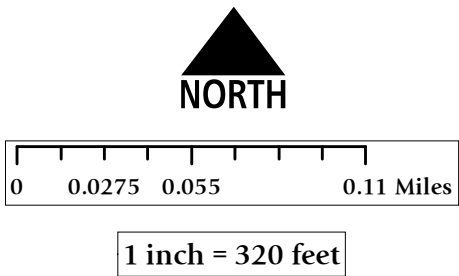
7.4 CONCLUSION

The project location is most vulnerable to wildfire, drought and public health impacts from heat, and potential flooding, conditions that will be exacerbated by climate change. The project is adaptive in nature, intending to provide the existing development with safe and reliable water service. The project would include firefighting improvements to address wildfire through provision of increased water availability, pressure, and fire hydrants. Water conservation to adapt to future water scarcity is built into the project through repairing leaks and implementation of metered water connections, both of which would reduce existing system demands and can be utilized to further restrict use, if necessary. The project is consistent with the State and County's goal of providing climate resilient infrastructure to existing development.



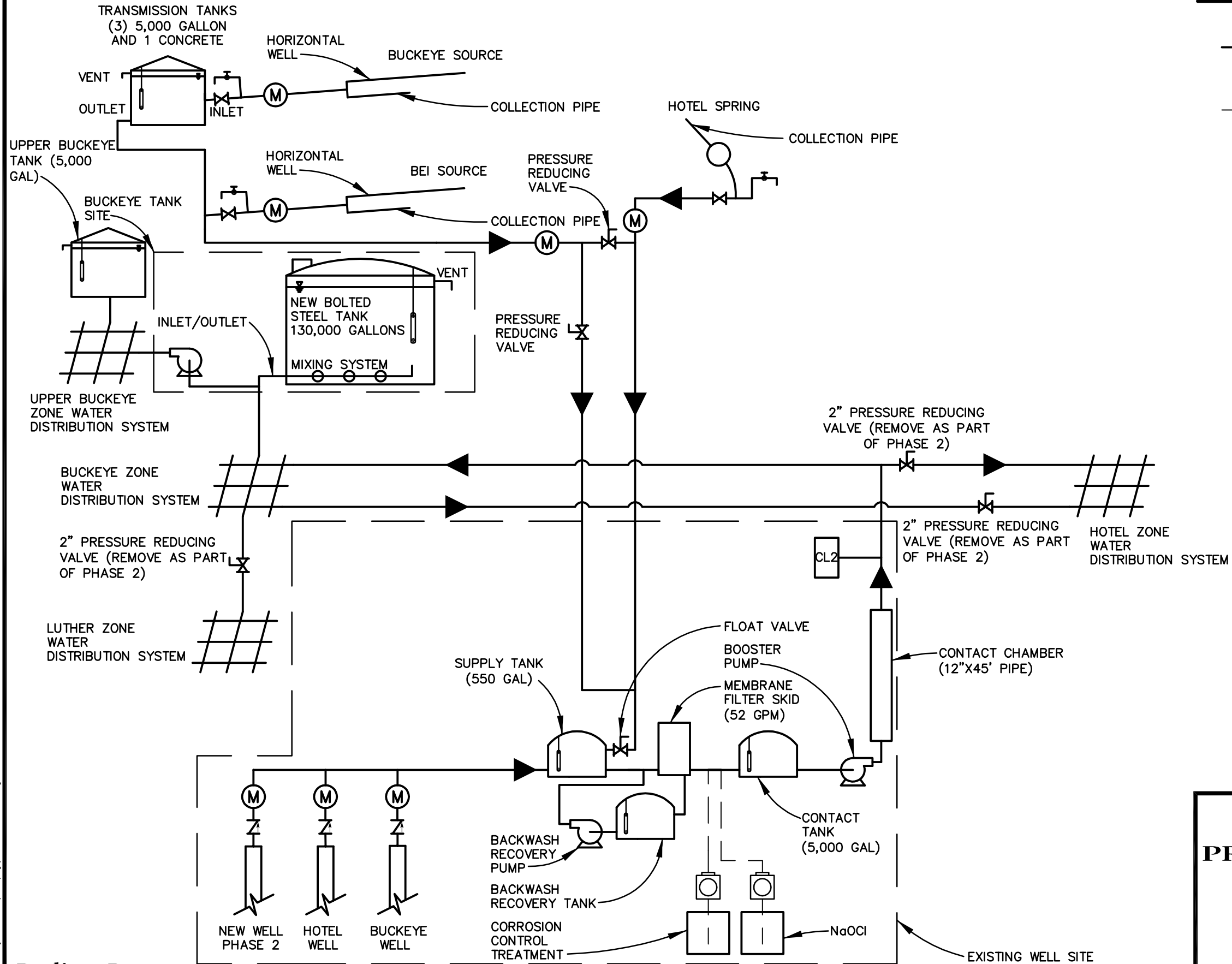
Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

Data Source Information:
Aerial Imagery: US Dept. of Agriculture, NAIP series (2016) (EXAMPLE)



PRELIMINARY
FOR STUDY PURPOSES ONLY
DATE 06/05/2023

Figure 2
Preliminary Engineering Report
Existing Facilities
Cazadero Water System
June 2023

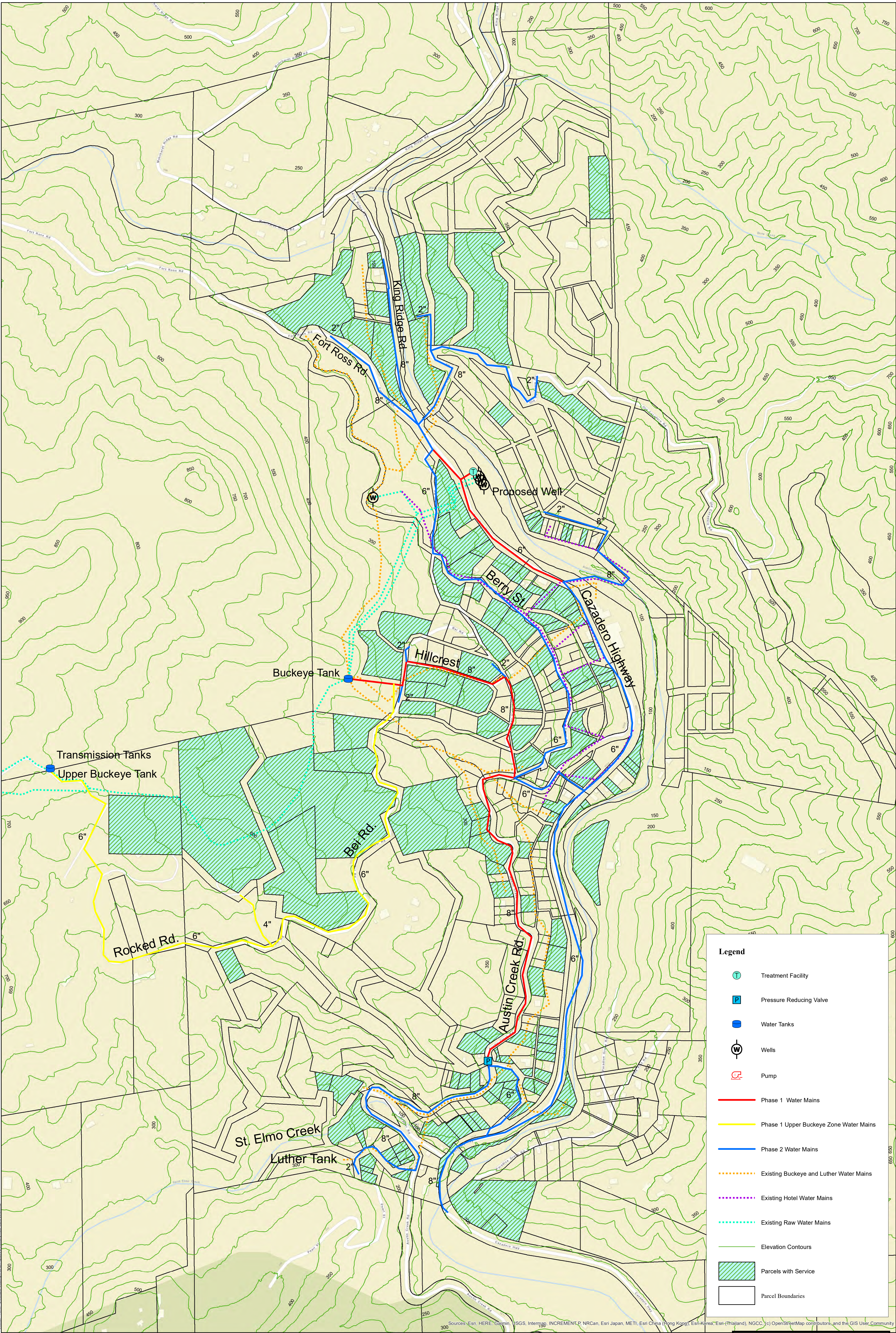


LEGEND

	WATER PIPING
	CHEMICAL/INSTRUMENT PIPE
	VALVE (NC DENOTES VALVE NORMALLY CLOSED)
	CONTROL VALVE TYPE AS NOTED
	CHECK VALVE
	SAMPLE TAP WITH BALL VALVE
	FLOW METER
	IN-LINE CENTRIFUGAL PUMP
	ON-LINE CHLORINE RESIDUAL ANALYZER
	SUBMERSIBLE LEVEL TRANSMITTER
	CHEMICAL METERING PUMP
	MOTORIZED ACTUATOR

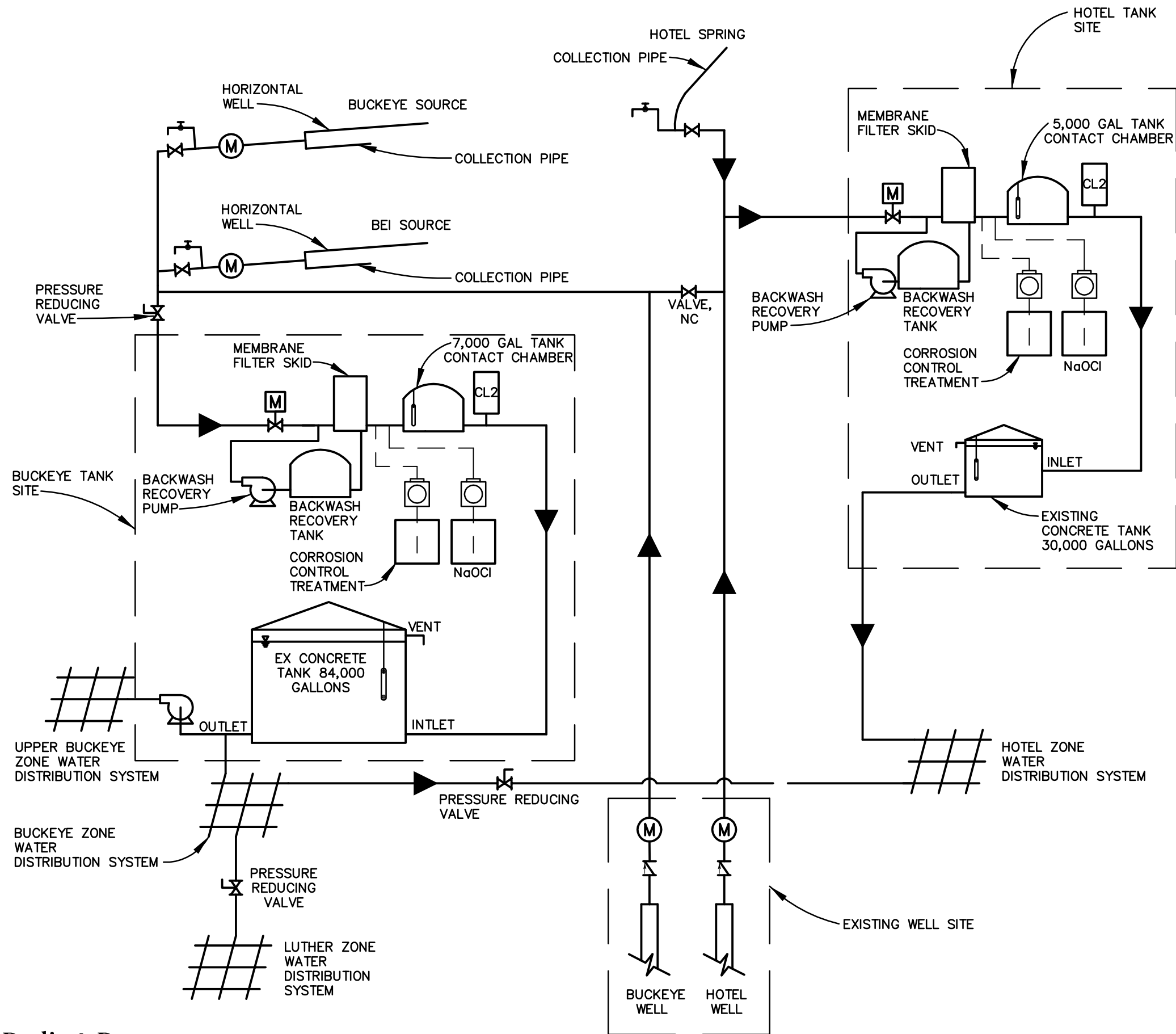
FIGURE 3
PRELIMINARY ENGINEERING
REPORT ALTERNATIVE 1
PROPOSED SCHEMATIC
CAZADERO WATER COMPANY

JUNE 2023



Coordinate System: NAD 1983 StatePlane California II FIPS 402 Feet 2011
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

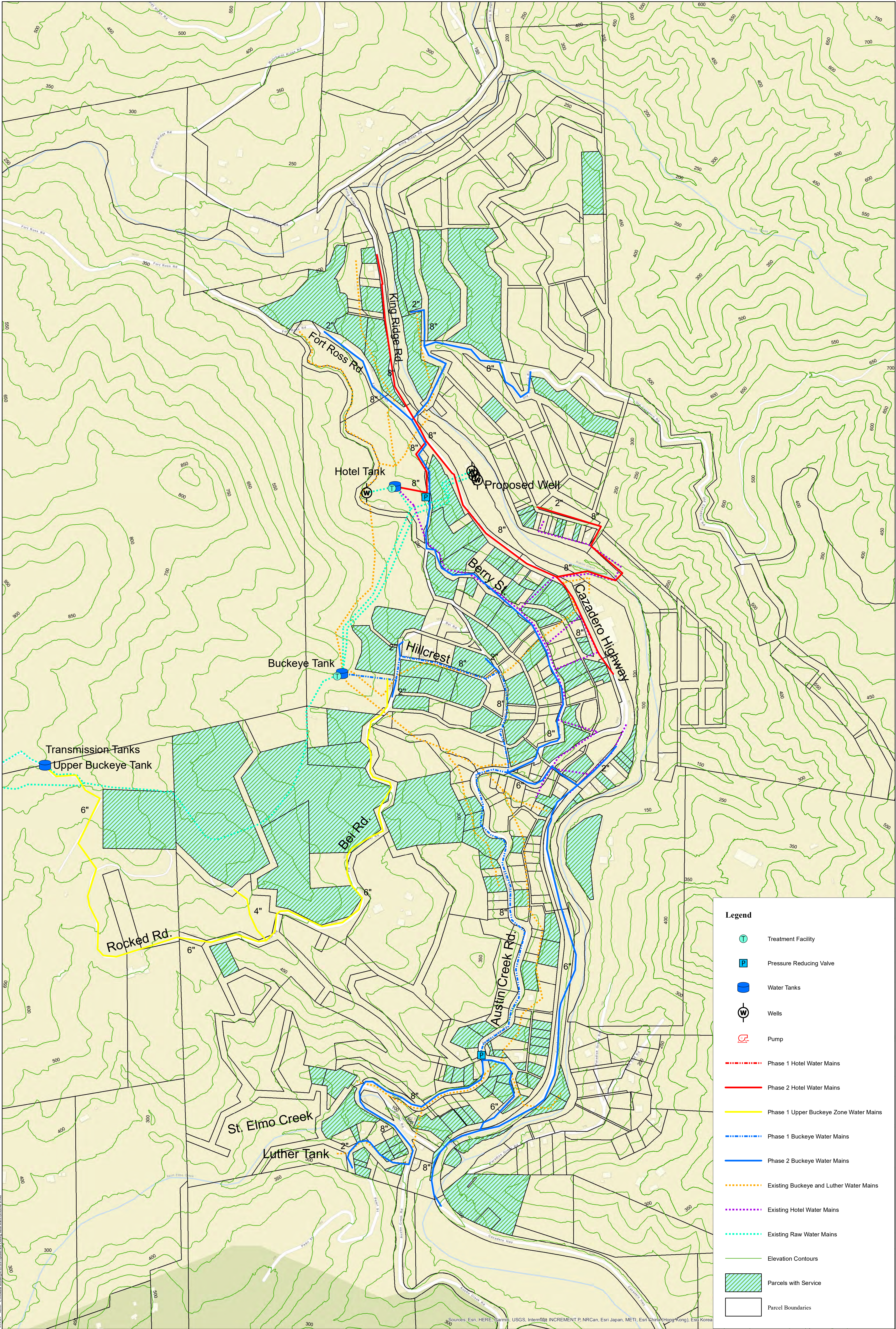


LEGEND

	WATER PIPING
	CHEMICAL/INSTRUMENT PIPE
	VALVE (NC DENOTES VALVE NORMALLY CLOSED)
	CONTROL VALVE TYPE AS NOTED
	CHECK VALVE
	SAMPLE TAP WITH BALL VALVE
	FLOW METER
	IN-LINE CENTRIFUGAL PUMP
	ON-LINE CHLORINE RESIDUAL ANALYZER
	SUBMERSIBLE LEVEL TRANSMITTER
	CHEMICAL METERING PUMP
	MOTORIZED ACTUATOR

FIGURE 5
PRELIMINARY ENGINEERING
REPORT ALTERNATIVE 2
PROPOSED SCHEMATIC
CAZADERO WATER COMPANY

JUNE 2023



Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet 2011
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

Data Source Information:
Aerial Imagery: US Dept. of Agriculture, NAIP series (2016) (EXAMPLE)

Brelje & Race
CONSULTING ENGINEERS
475 Aviation Blvd, Suite 120, Santa Rosa, CA 95403



0 0.0275 0.055 0.11 Miles

1 inch = 250 feet

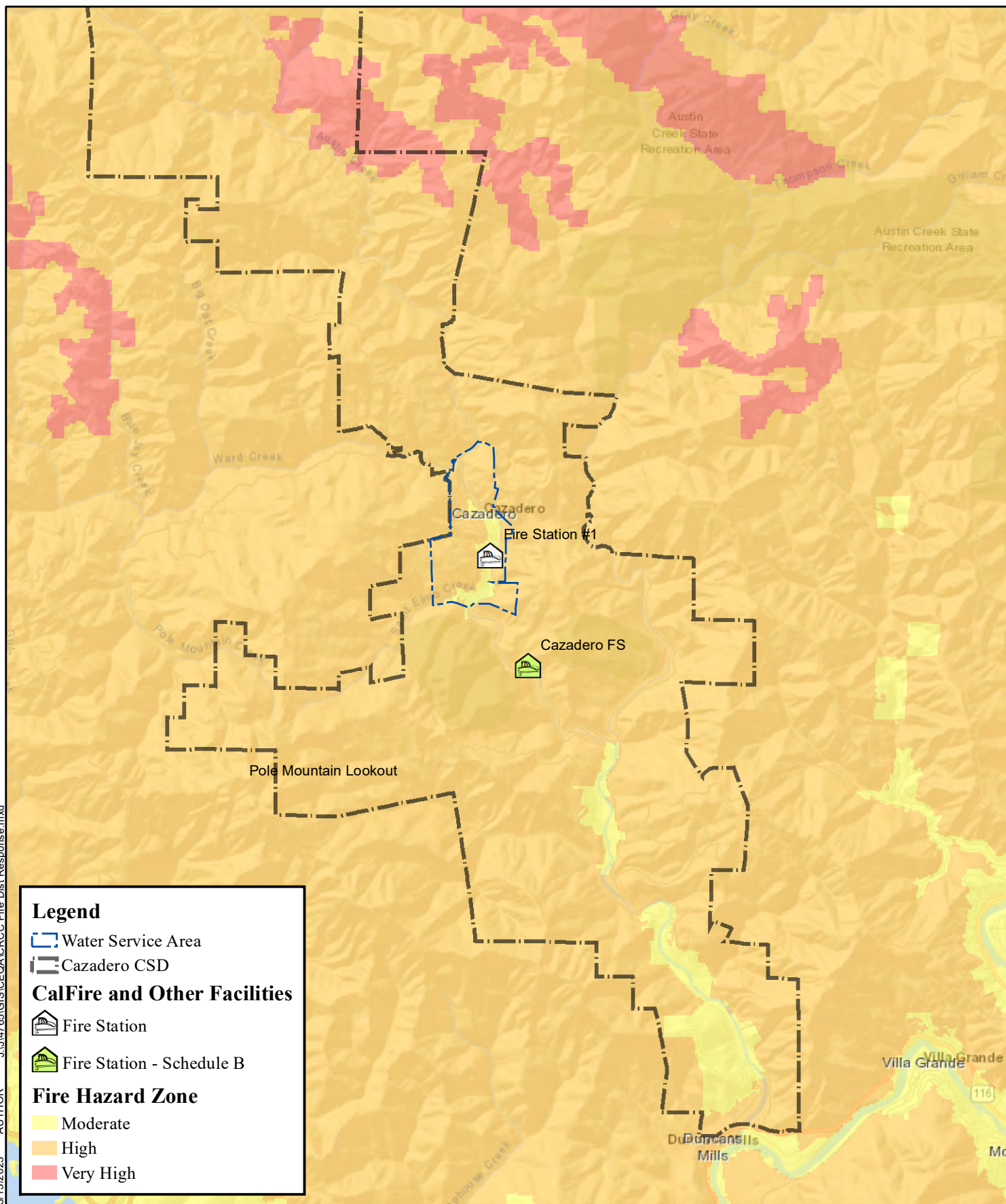
PRELIMINARY
FOR STUDY PURPOSES ONLY
DATE 06/05/2023

Legend

- Treatment Facility
- Pressure Reducing Valve
- Water Tanks
- Wells
- Pump
- Phase 1 Hotel Water Mains
- Phase 2 Hotel Water Mains
- Phase 1 Upper Buckeye Zone Water Mains
- Phase 1 Buckeye Water Mains
- Phase 2 Buckeye Water Mains
- Existing Buckeye and Luther Water Mains
- Existing Hotel Water Mains
- Existing Raw Water Mains
- Elevation Contours
- Parcels with Service
- Parcel Boundaries

Figure 6
**Alternative 2 Proposed
Water System**
Cazadero Water System
June 2023

J:\M765\GIS\CEQA CRCC Fire Dist Response.mxd
3/13/2023
AUTHOR



Legend

Water Service Area

Cazadero CSD

CalFire and Other Facilities

Fire Station

Fire Station - Schedule B

Fire Hazard Zone

Moderate

High

Very High

Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

Data Source Information:
CalFire (2019)

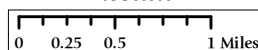
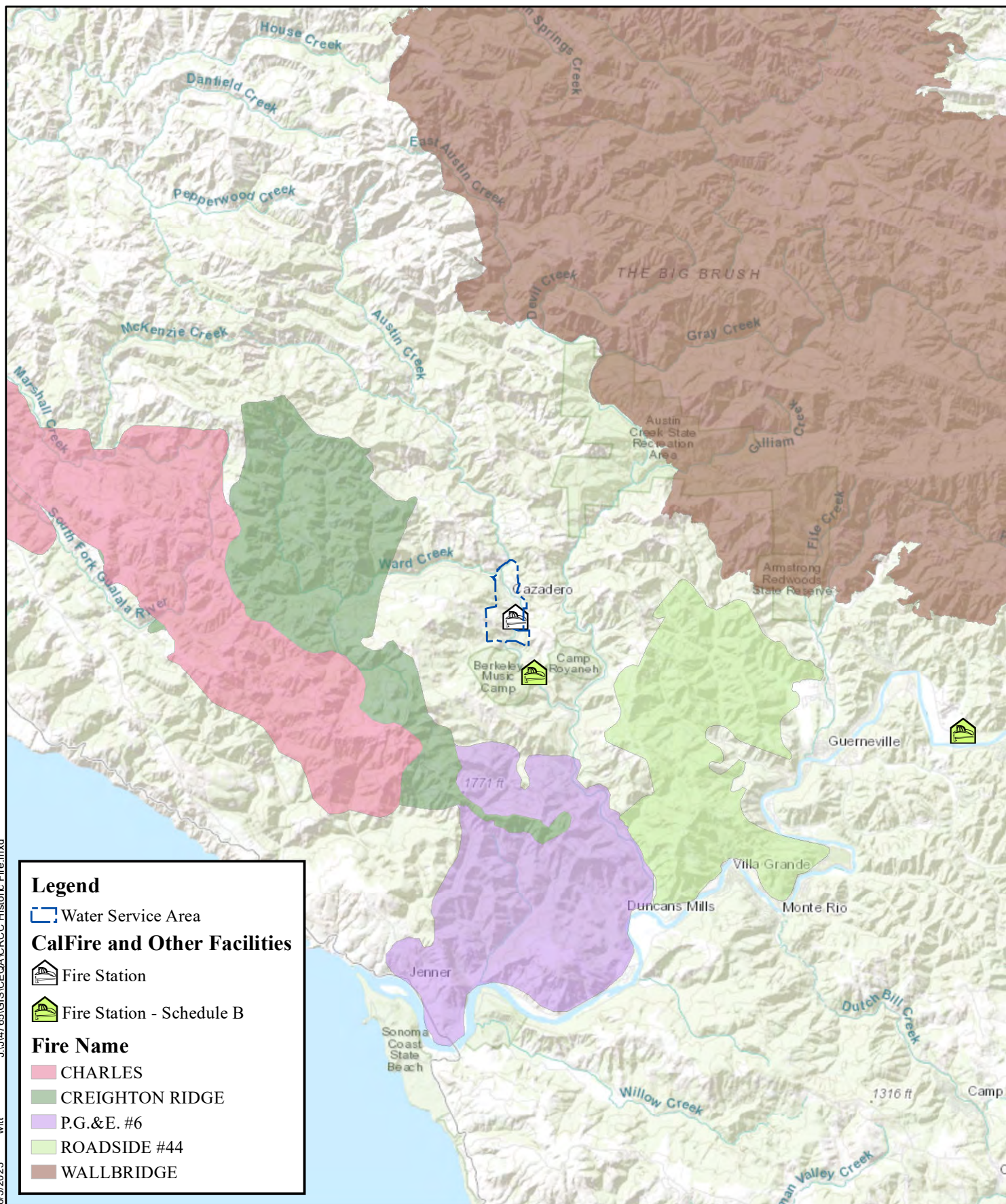


FIGURE 7
FIRE HAZARD ZONES

CAZADERO WATER SYSTEM
MARCH 2023

J:\J4765\GIS\CEQA CRCC Historic Fire.mxd
6/5/2023
witt



Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

Data Source Information:
Historic Fires: CalFire (2018)

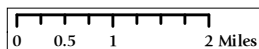
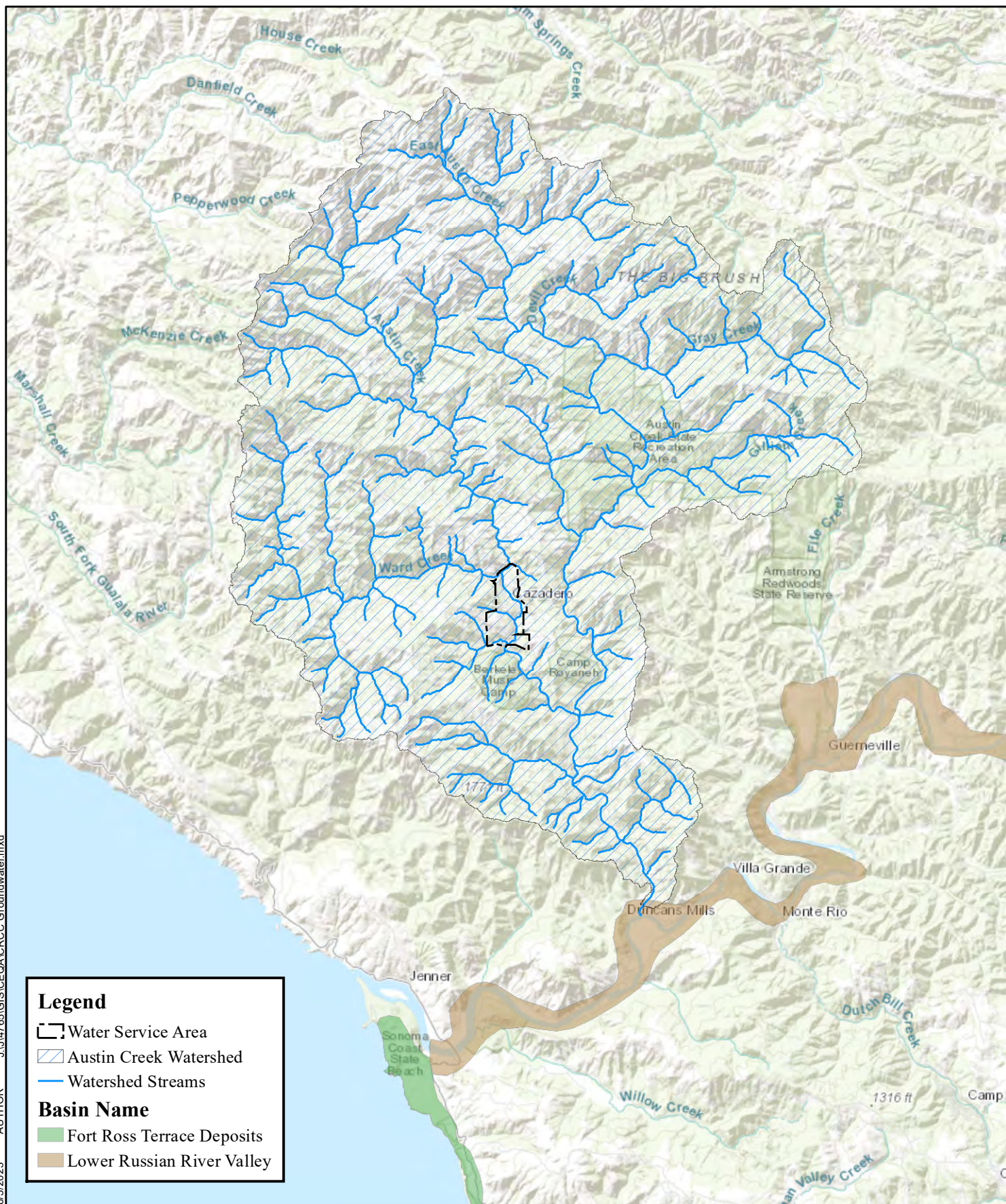


FIGURE 8
POST 1950 WILDFIRES
OVER 1,000 ACRES

CAZADERO WATER SYSTEM

MARCH 2023



Legend

Water Service Area
 Austin Creek Watershed
 Watershed Streams

Basin Name

Fort Ross Terrace Deposits
 Lower Russian River Valley

Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
 Projection: Lambert Conformal Conic
 Datum: North American 1983
 Units: Foot US

Data Source Information:
 CalFire (2019)

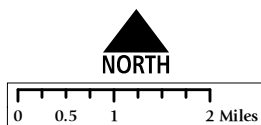
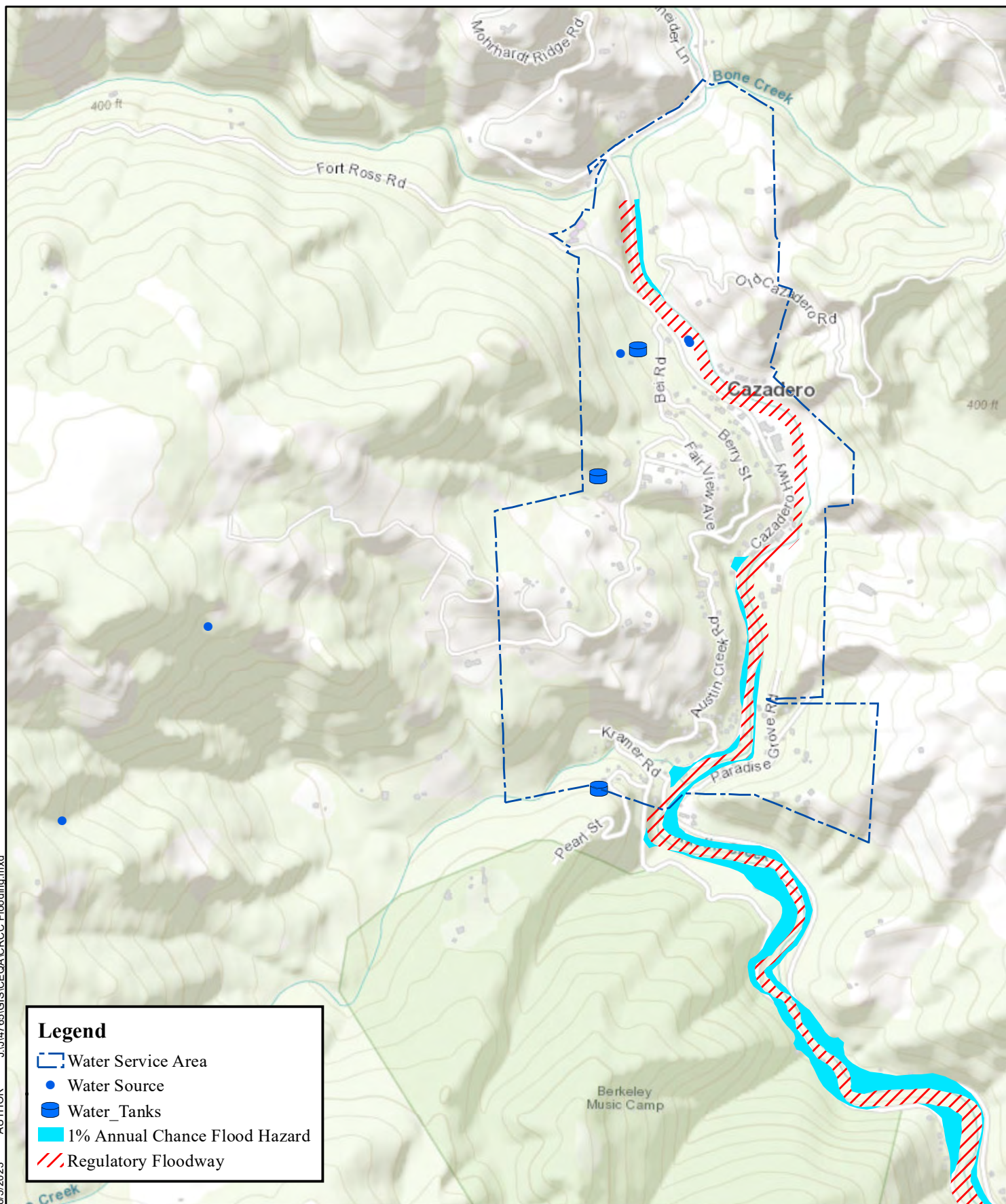


FIGURE 9
WATER RESOURCES

CAZADERO WATER SYSTEM
 MARCH 2023



Legend

- Water Service Area
- Water Source
- Water_Tanks
- 1% Annual Chance Flood Hazard
- Regulatory Floodway

Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
 Projection: Lambert Conformal Conic
 Datum: North American 1983
 Units: Foot US

Data Source Information:
 Flood Hazard: FEMA (2017)

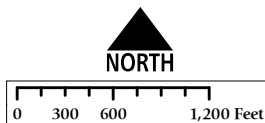


**FIGURE 10
FLOODING**

**CAZADERO WATER SYSTEM
MARCH 2023**

Appendix A - Compliance Orders and Citations

- Compliance Order No. 02_18_18R_005, issued August 14, 2018.

Required Corrosion Control Treatment due to Lead and Copper Action Level Exceedances.

- Citation No. 02_18_19C_076, issued September 6, 2019.

Issued due to failure to implement Corrosion Control Treatment.

- Compliance Order No. 02_18_20R_002, issued August 6, 2020.

Required compliance with the Surface Water Treatment Rule, CCR Sections 64650 through Section 64666.

- Citation No. 02_18_21C_012, issued February 17, 2021.

Issued for failure to submit the 2019 electronic annual report.

- Citation No. 02_18_21C_055, issued June 30, 2021.

Issued for failure to submit the 2020 electronic annual report.



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

Division of Drinking Water

August 14, 2018

Water System No. 4900508

Jim Berry
Cazadero Water Company
P.O. Box 423
Cazadero, CA 95421

COMPLIANCE ORDER NO. 02_18_18R_005 FOR CORROSION CONTROL TREATMENT

Enclosed is a compliance order issued to the Cazadero Water Company (System).

The System will be billed at the Division's hourly rate for the time spent on issuing this order since this is an enforcement action for noncompliance with state regulations. At this time, we have spent approximately one hour on enforcement activities associated with this compliance order. You will receive a bill sent from our Drinking Water Fee Branch in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a compliance order issued by the Division may file a petition with the State Water Resources Control Board (State Water Board) for reconsideration of the compliance order. Petitions must be received by the State Water Board within 30 calendar days of the issuance of the compliance order. The date of issuance is the date when the Division mails or serves a copy of the compliance order, whichever occurs first. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day. Petitions must be received by 5:00 p.m. Information regarding filing petitions may be found at: http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Marianne Watada of my staff at (707) 576-2076 or me at (707) 576-2145.

Sincerely,

Janice M. Thomas, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Enclosures: Compliance Order No. 02_18_18R_005

Certified Mail No.: 7016 0910 0001 2047 7438

C: Matt Damos, North Coast Engineering, P. O. Box 555, Cazadero, CA 95421
Leslye Choate, Sonoma County Environmental Health Department
Nathan Quarles, Sonoma County Permit and Resource Management Department
Rami Kahlon, PUC, Division of Water and Audits

FELICIA MARCUS, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

CALIFORNIA

WATER RESOURCES CONTROL BOARD

DIVISION OF DRINKING WATER

TO: CAZADERO WATER COMPANY

ATTN: JIM BERRY, PRESIDENT

P.O. Box 423

6500 Cazadero Highway

Cazadero, CA 95421

ISSUE DATE: August 14, 2018

PHYSICAL LOCATION: 6150 Cazadero Highway

CAZADERO, CA 95421

COMPLIANCE ORDER NO. 02_18_18R_005

FOR

**CORROSION CONTROL TREATMENT - LEAD AND COPPER RULE,
CALIFORNIA CODE OF REGULATIONS §64684**

CAZADERO WATER COMPANY

4900508

Section 116655 of the California Health and Safety Code (hereinafter "CHSC") authorizes the issuance of a compliance order to a public water system for violations or threatened violations of the California Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4, commencing with Section



1
2 116270) (hereinafter "California SDWA"), or any permit, regulation, or
3 standard issued or adopted thereunder.
4

5
6 The State Water Resources Control Board (hereinafter "Board"), acting by
7 and through its Division of Drinking Water (hereinafter "Division") and the
8 Deputy Director for the Division (hereinafter "Deputy Director"), hereby issues
9 a compliance order (hereinafter "Order") to the Cazadero Water Company
10 (hereinafter "the System"), requiring Corrosion Control Treatment due to Lead
11 and Copper Action Level Exceedances in accordance with California Code of
12 Regulations §64678 and §64684.
13
14

15
16 A copy of the *Applicable Statutes and Regulations* is included in Appendix 1,
17 which is attached hereto and incorporated herein by this reference.
18
19

20 **STATEMENT OF FACTS**

21

22 The System is a community public water system serving a population of
23 approximately 200 through 157 service connections. The System serves the
24 town of Cazadero, which consists of a residential area and nine commercial
25 connections including a school, bakery and stores. Approximately half of the
26 residential connections are vacation homes rather than full-time residences.
27



Lead and Copper Action Level exceedance and Corrosion Control Treatment

The System has collected 15 lead and copper sample sets going back to 1998. Out of these 15 sample sets, seven (7) have a 90th percentile of copper or lead result that exceeds the respective action levels of 1.3 milligrams/liter (mg/L) for copper and 0.015 mg/L for lead. A summary of the 90th percentile lead and copper results is provided in Appendix 2.

In a letter from the Division dated April 27, 2018, the System was directed to submit a corrosion control treatment proposal, complete a request for an amended permit application, and install corrosion control treatment. Based on the Water Quality Parameter (WQP) results, the Division suggested aeration as a method of corrosion control treatment for the system to research. The letter had a due date of June 29, 2018 to submit a corrosion control treatment proposal and a completed Request for Water Supply Permit Amendment Application. The installation of corrosion control treatment is to be completed by July 31, 2019. A copy of the April 27, 2018 letter is located in Appendix 3.

DETERMINATIONS

The Division has reviewed the lead and copper sampling results submitted by the System. Due to the persistent action level exceedance of the lead and



1
2 copper results, the Division has determined the System must install Corrosion
3 Control Treatment. Section 64678 describes the determination of Lead and
4 Copper Action Levels exceedances. Section 64684 describes Corrosion
5 Control Treatment Installation and Operation requirements.
6

7 8 **DIRECTIVES**

9
10 The System is hereby directed to take the following actions:
11

- 12
- 13 1. Submit a letter to this office by **February 14, 2019**, describing the type
14 of corrosion control treatment to be installed and submit a *completed*
15 Request a Water Supply Permit Amendment Application (Appendix 4).
16
 - 17 2. The full permit amendment application of corrosion control treatment
18 must be submitted to the Division by **August 14, 2019**. The installation
19 of corrosion control treatment must be completed by **February 14,**
20
21 **2020**.
22
 - 23 3. Collect **ten** lead and copper tap samples in **September 2018 and**
24 **March 2019**, including 18305 Hillcrest and 18015 Bei Road. After this
25 sampling period, the System must disclose the lead sample results to
26 each customer whose tap was used to complete the lead and copper
27



1
2 sampling. The System must complete and submit the Lead and
3 Copper Results Worksheet and Proof of Consumer Notification with a
4 copy of all associated laboratory reports to our office within 30 days of
5 the sampling. Worksheets and forms for lead and copper sampling are
6 available on the Sonoma District webpage at:
7

8 https://www.waterboards.ca.gov/drinking_water/programs/districts/sonoma_district.htm
9 [l#leadcopper](#)
10

11 The Division reserves the right to make such modifications to this Order as it
12 may deem necessary to protect public health and safety. Such modifications
13 may be issued as amendments to this Order and shall be deemed effective
14 upon issuance.
15

16
17
18 Nothing in this Order relieves the System of its obligation to meet the
19 requirements of the California SDWA, or any regulation, permit, standard, or
20 order issued or adopted thereunder.
21

22
23 All submittals required by this Order shall be electronically submitted to the
24 Division at the following address. The subject line for all electronic submittals
25 corresponding to this Order shall include the following information: Water
26 System name and number, compliance order number and title of the
27 document being submitted.



Janice M. Thomas, P.E., Sonoma District Engineer

dwpdist18@waterboards.ca.gov

PARTIES BOUND

This Order shall apply to and be binding upon the System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The Directives of this Order are severable, and the System shall comply with each and every provision thereof, notwithstanding the effectiveness of any provision.



FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the Board to: issue a citation with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the Board; and to petition the superior court to take various enforcement measures against a public water system that has failed to comply with an order of the Board. The Board does not waive any further enforcement action by issuance of this compliance order.



Stefan Cajina, P.E., Chief
North Coastal Section
State Water Resources Control Board
Division of Drinking Water

Aug 14, 2018

Date

Appendices (4): Applicable Statutes and Regulations
 April 27, 2018 Letter from the Division
 Historical Lead and Copper results
 Request a Water Supply Permit Amendment Application

Certified Mail No. 7016-0910-0001-2047-7438

4900508/Compliance
02_18_18R_005_4900508.docx/MFW



APPENDIX 1. APPLICABLE STATUTES AND REGULATIONS FOR COMPLIANCE ORDER NO. 02_18_18R_005

NOTE: The following language is provided for the convenience of the recipient, and cannot be relied upon as the State of California's representation of the law. The published codes are the only official representation of the law. Regulations related to drinking water are in Titles 22 and 17 of the California Code of Regulations. Statutes related to drinking water are in the Health & Safety Code, the Water Code, and other codes.

Section 116655 of the Health and Safety Code states in relevant part:

(a) Whenever the department determines that any person has violated or is violating this chapter, or any permit, regulation, or standard issued or adopted pursuant to this chapter, the director may issue an order doing any of the following:

- (1) Directing compliance forthwith.
- (2) Directing compliance in accordance with a time schedule set by the department.
- (3) Directing that appropriate preventive action be taken in the case of a threatened violation.

(b) An order issued pursuant to this section may include, but shall not be limited to, any or all of the following requirements:

- (1) That the existing plant, works, or system be repaired, altered, or added to.
- (2) That purification or treatment works be installed.
- (3) That the source of the water supply be changed.
- (4) That no additional service connection be made to the system.
- (5) That the water supply, the plant, or the system be monitored.
- (6) That a report on the condition and operation of the plant, works, system, or water supply be submitted to the department.

California Code of Regulations (CCR), Section 64673 states:

§64673. Small and Medium-size Water System Requirements.

(a) The requirements in this section are applicable to all small and medium-size water systems.

(b) Each small and medium-size system shall conduct standard tap sampling for lead and copper pursuant to section 64675 (General Requirements for Tap Sampling for Lead and Copper). Tap sampling frequency may be reduced pursuant to section 64675.5 (Tap Sampling Frequency).

(c) A small or medium-size system with an action level exceedance shall take the following steps:

(1) Monitor WQPs beginning with the first period after the exceedance, pursuant to section 64681 (Initial WQP Monitoring).

(2) Proceed with subparagraphs (A) through (E) if a corrosion control study is required by the Department based on a review of the system's water quality, distribution system, water treatment, and system features. If such a study is required, the Department will notify the system in writing within 12 months of the action level exceedance.

(A) Complete the study, pursuant to section 64683 (Corrosion Control Study Procedure), within eighteen months of being notified of the requirement; the system will be notified of the Department's designation within six months of the study's completion;

(B) Begin installation of the CCT designated by the Department, pursuant to section 64684 (CCT Installation and Operation), within twelve months of being notified of the Department's designation;

(C) Complete CCT installation and begin operation within 24 months of the designation;

(D) Complete two periods of standard tap sampling pursuant to section 64675 (General Requirements for Tap Sampling for Lead and Copper) and two periods of WQP monitoring pursuant to section 64682 (WQP Monitoring After CCT Installation) within 36 months of the designation; and

(E) Monitor WQPs and operate in compliance with the WQP levels specified by the Department pursuant to section 64684 (CCT Installation and Operation), beginning no later than within 42 months of the designation.

(3) If the Department does not require a corrosion control study, the system shall submit to the Department, within six months of the action level exceedance, a written recommendation for CCT. The Department may require the system to conduct additional WQP monitoring to assist in the review of the CCT recommendation. The Department will designate CCT and notify the system in writing within the following timeframes; the system shall then comply with paragraphs (2)(B) through (E):

(A) For medium-size systems, within 12 months of the exceedance, and

(B) For small-size systems, within 18 months of the exceedance;

(4) Monitor source waters, pursuant to article 6 (Source Water Requirements for Action Level Exceedances) of this chapter;

(d) A small or medium-size system with an action level exceedance for lead shall:

(1) Complete a lead public education program, pursuant to article 7 (Public Education Program for Lead Action Level Exceedances) of this chapter; and

(2) Replace lead service lines, pursuant to article 8 (Lead Service Line Requirements for Action Level Exceedances) of this chapter.

(e) A small or medium-size system that is required to comply with subsections (c) or (d) may cease completing the steps whenever the system does not have an action level exceedance during each of two consecutive periods. If any such system thereafter has an exceedance during any period, the system shall:

(1) Resume completion of the applicable steps, beginning with the first step that was not previously completed. The Department may require a system to repeat steps previously completed if the Department determines that this is necessary to implement the requirements of this section, based on a review of the system's data and treatment status.

(2) Resume standard tap sampling pursuant to 64675 (General Requirements for Tap Sampling for Lead and Copper).

(3) Conduct WQP monitoring during the period in which the system exceeded the action level, pursuant to section 64682, (WQP Monitoring After CCT Installation) or 64684 (CCT Installation and Operation).

California Code of Regulations (CCR), Section 64678 states in relevant part:

§64678. Determination of Exceedances of Lead and Copper Action Levels.

(d) The lead action level is exceeded if the concentration of lead in more than 10 percent of the tap water samples collected during any period is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).

(e) The copper action level is exceeded if the concentration of copper in more than 10 percent of the tap water samples collected during any period is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).

(f) The 90th percentile lead and copper levels shall be computed as follows:

(1) The results of all lead or copper samples collected during a period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(2) The number of samples taken during the period shall be multiplied by 0.9.

(3) The contaminant concentration in the numbered sample identified by the calculation in paragraph (f)(2) is the 90th percentile contaminant level.

(4) For water systems serving less than or equal to 100 people that collect 5 samples per period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(g) The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and submitted to the department for making any determinations.

California Code of Regulations (CCR), Section 64684 states in relevant part:

§64684. CCT Installation and Operation.

(a) Each system shall install and operate throughout its distribution system the CCT designated by the Department in subsection 64683(b) (Corrosion Control Studies) or paragraph 64673(c)(3) (Small and Medium-size Water System Requirements) and monitor WQPs pursuant to section 64682 (WQP Monitoring After CCT Installation). When the system completes its installation of CCT, it shall submit a letter to the Department certifying that it has done so.

(b) After the system installs CCT, the Department will review the treatment and pre- and post-treatment tap sampling and WQP monitoring data and specify WQPs in writing within 42 months of its CCT designation as follows:

(1) A minimum value or a range of values for pH measured at each entry point to the distribution system;

(2) A minimum pH value of 7.0 or greater, measured in all tap samples, unless the Department determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

(3) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Department determines is necessary to maintain a passivating film on the interior walls of the pipes of the distribution system;

(4) If alkalinity is adjusted as part of CCT, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

(5) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples; and

(6) Values for additional WQPs determined by the Department to reflect CCT for the system.

(c) After the Department specifies WQP values and ranges, each system shall monitor pursuant to section 64680 (General WQP Monitoring Requirements) and maintain WQPs as specified by the Department.

(d) A system shall be out of compliance with the WQP values and ranges specified by the Department pursuant to subsection (b) for any period during which it has excursions for more than nine days.

(1) An excursion occurs when a "daily value" at one or more sample sites for one or more WQPs in a day is below the minimum value or outside the range of Department-specified WQPs.

(2) A "daily value" for a WQP at a site is determined as follows:

(A) If sampling is more than once a day by continuous monitoring, grab sampling or both, the daily value shall be the average of all the day's results at the sampling site.

(B) If sampling is once a day, the daily value shall be the day's result.

(C) If sampling is less than once a day, the daily value shall apply to the day that the water supplier receives the result from the laboratory or the 30th day after the sample is collected, whichever comes first.

(3) When an excursion occurs, within 48 hours of being notified of the results of the initial sample(s), the system shall investigate the cause and collect a followup sample at each affected site for each WQP that did not meet the Department-specified values. The criteria in paragraphs (d)(1) and (2) shall be applied to the followup sample results to determine if another excursion has occurred.

(e) A system conducting reduced WQP tap monitoring that fails to meet the Department-specified WQPs shall resume standard WQP tap monitoring pursuant to section 64680 (General WQP Monitoring Requirements).

(f) The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and submitted to the Department for making any determinations (i.e., determining concentrations of WQPs).

(g) Upon its own initiative or in response to a request by a system, the Department may modify in writing its designation of CCT or its specified WQP values and ranges if it determines that modification is necessary to ensure that the system continues to maintain CCT. Any request shall be in writing, explain the reason for the requested modification, and include supporting documentation.

APPENDIX 2
HISTORICAL LEAD AND COPPER RESULTS

HISTORICAL LEAD AND COPPER RESULTS

Monitoring Period	Begin Sampling	End Sampling	No. Samples	Lead (mg/L)	Copper (mg/L)	Notes
6M1ST-2018	3/9/2018	3/29/2018	10	0.010	1.4	2 Exceeding Copper Action Level
YR2017	6/22/2017	9/29/2017	5	0.000	1.45	1 Exceeding Copper Action Level
YR2016	6/2/2016	9/21/2016	5	0.000	1.185	1 Exceeding Copper Action Level
YR2015	6/3/2015	9/30/2015	5	0.014	0.585	1 Exceeding Lead Action Level
6M1ST-2013	3/7/2013	3/27/2013	10	0.000	1.3	1 Exceeding Copper Action Level
6M2ND-2012	8/10/2012	9/20/2012	8	0.000	0.63	
6M1ST-2012	10/6/2011	1/24/2012	7	0.038	1.51	2 Exceeding Lead Action Level; 1 Exceeding Copper Action Level
6M1ST-2011	1/26/2011	1/26/2011	10	0.017	1.3	2 Exceeding Lead Action Level
6M1ST-2008	3/19/2008	3/19/2008	5	0.013	2	
6M2ND-2007	10/10/2007	10/10/2007	5	0.008		
3Y2004-2006	9/27/2006	9/27/2006	5	0.020	1.26	
YR2003	7/29/2003	7/29/2003	5	0.000	0.93	
YR1999	8/11/1999	8/11/1999	5	0.000	0.62	
6M2ND-1998	7/8/1998	7/8/1998	5	0.010	1.05	
6M1ST-1998	1/9/1998	1/9/1998	5	0.000	1.24	

Action Level

0.015 1.3

APPENDIX 3

APRIL 27, 2018 LETTER FROM THE DIVISION



GAVIN NEWSOM
GOVERNOR



JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

Division of Drinking Water

September 6, 2019

System No. 4900508

Jim Berry, President
Cazadero Water Company, Inc.
P.O. Box 423
6500 Cazadero Highway
Cazadero, CA 95421

**CITATION NO. 02_18_19C_076
FOR VIOLATION OF COMPLIANCE ORDER 02_18_18R_005 ISSUED AUGUST 18,
2018
CORROSION CONTROL TREATMENT**

Enclosed is Citation No. 02_18_19C_076 (hereinafter "Citation"), issued to the Cazadero Water Company (hereinafter "System"), public water system. Please note that there are legally enforceable deadlines associated with this Citation.

The System will be billed at the State Water Resources Control Board's (hereinafter "State Water Board"), hourly rate for the time spent on issuing this Citation. California Health and Safety Code, (hereinafter "CHSC"), Section 116577, provides that a public water system must reimburse the State Water Board for actual costs incurred by the State Water Board for specified enforcement actions, including but not limited to, preparing, issuing and monitoring compliance with a citation. At this time, the State Water Board has spent approximately one hour on enforcement activities associated with this violation.

The System will receive a bill sent from the State Water Board in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a citation, order or decision issued by the Deputy Director of the Division of Drinking Water under Article 8 (commencing with CHSC, Section 116625) or Article 9 (commencing with CHSC, Section 116650), of the Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4), may file a petition with the State Water Board for reconsideration of the citation, order or decision. Appendix 1 to the enclosed Citation contains the relevant statutory provisions for filing a petition for reconsideration (CHSC, Section 116701).

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

50 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov

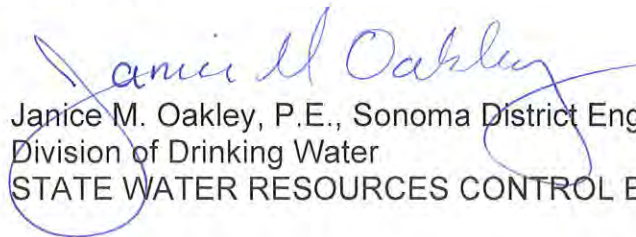
Petitions must be received by the State Water Board within 30 days of the issuance of the citation, order or decision by the Deputy Director. The date of issuance is the date when the Division of Drinking Water mails a copy of the citation, order or decision. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day by 5:00 p.m.

Information regarding filing petitions may be found at:

http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Marianne Watada of my staff at (707) 576-2076.

Sincerely,



Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

cc: Kim Gluch via email
Leslye Choate, Sonoma County Environmental Health Department
Nathan Quarles, Sonoma County Permit and Resource Management
Department
Bruce DeBerry, CPUC, Division of Water and Audits, 505 Van Ness Ave, 3rd
Floor, San Francisco, CA 94102

Enclosure: Citation No. 02_18_19C_076

Certified Mail No. 7017 0530 0000 8323 0245

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

Name of Public Water System: Cazadero Water Company

Water System No: 4900508

Attention: Jim Berry, President

P.O. Box 423

6500 Cazadero Highway

Cazadero, CA 95421

Issued: September 6, 2019

CITATION FOR VIOLATION OF COMPLIANCE ORDER 02_18_18R_005

ISSUED AUGUST 14, 2018

CORROSION CONTROL TREATMENT

The State Water Resources Control Board (hereinafter "Board"), acting by and through its Division of Drinking Water (hereinafter "Division") and the Deputy Director for the Division (hereinafter "Deputy Director"), hereby issues this citation (hereinafter "Citation") pursuant to Section 116650 of the California Health and Safety Code (hereinafter "CHSC") to Cazadero Water Company (hereinafter "Cazadero") for violation of Compliance Order 02_18_18R_005, issued on August 14, 2018.

STATEMENT OF FACTS

Cazadero is a community public water system serving a population of 250 through 157 service connections. Cazadero serves the town of Cazadero, which consists of a residential area, as well as nine commercial connections including a school, bakery, and stores.

Cazadero has been conducting lead and copper tap monitoring since 1998 in accordance with the California Code of Regulations Chapter 17.5 Lead and Copper. Out of these 17 sample sets, eight (8) have a 90th percentile of copper or lead result that exceeds the respective action levels of 1.3 milligrams/liter (mg/L) for copper and 0.015 mg/L for lead. A summary of the 90th percentile lead and copper results is provided in Appendix 1.

Cazadero was issued Compliance Order No. 02_18_18R_005 on August 14, 2018 due to the lead and copper action level exceedances. Cazadero was directed to describe the method of corrosion control treatment to be installed and submit a permit amendment application for the change in treatment.

Directive 1 of Compliance Order No. 02_18_18R_005 states the following:

1. Submit a letter to this office by February 14, 2019, describing the type of corrosion control treatment to be installed and submit a completed Request a Water Supply Permit Amendment Application (Appendix 4).

Directive 2 of Compliance Order No. 02_18_18R_005 states the following:

2. The full permit amendment application of corrosion control treatment must be submitted to the Division by August 14, 2019. The installation of corrosion control treatment must be completed by February 14, 2020.

To date Cazadero has failed to submit the following: 1) a description of the selected corrosion control treatment to be installed, 2) a complete "Request a Water Supply Permit Amendment Application" form, and 3) a complete permit amendment application for corrosion control treatment.

DETERMINATION

The Division hereby issues a citation to Cazadero for failure to comply with Directives 1 and 2 of Compliance Order No. 02_18_18R_005.

PENALTIES PURSUANT TO HEALTH AND SAFETY CODE SECTION 116650

The Division may assess a penalty in an amount not to exceed one thousand dollars (\$1,000) per day for each day that a violation of an order issued pursuant to the Safe Drinking Water Act (hereinafter "SDWA") occurred, and for each day that a violation of such an order continues to occur, and a separate penalty may be assessed for each violation.

DIRECTIVES

Cazadero is hereby directed to take the following actions:

1. By **October 31, 2019**, submit to the State Water Board, a plan and compliance schedule for improvements to the water system for corrosion control treatment to comply with the California Code of Regulations Chapter 17.5 Lead and Copper. The compliance schedule must specify that new treatment will be installed and operational by **February 14, 2020**. The plan and schedule must

1 be prepared by a Civil Engineer registered in the State of California, with at
2 least three years of experience designing drinking water related projects.

3 2. By **October 31, 2019**, submit a completed form "Request a Water Supply
4 Permit Amendment Application" (Appendix 3).

5 3. Upon receipt of the information in the "Request a Water Supply Permit
6 Amendment Application", the State Water Board will prepare a Permit
7 Amendment Application Requirements Checklist (Checklist). Cazadero must
8 submit permit amendment application requirements by the due date specified
9 on the checklist.

10
11 All submittals required by this Citation shall be electronically submitted to the State
12 Water Board at the following address. The subject line for all electronic submittals
13 corresponding to this Citation shall include the following information: Water System
14 name and number, citation number and title of the document being submitted.

15
16 Janice M. Oakley, P.E., Sonoma District Engineer

17 dwpdist18@waterboards.ca.gov

18
19 The State Water Board reserves the right to make such modifications to this Citation
20 as it may deem necessary to protect public health and safety. Such modifications may
21 be issued as amendments to this Citation and shall be effective upon issuance.

22
23 Nothing in this Citation relieves the System of its obligation to meet the requirements
24 of the California SDWA (CHSC, Division 104, Part 12, Chapter 4, commencing with
25 Section 116270, or any regulation, standard, permit or order issued or adopted
26 thereunder.

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PARTIES BOUND

This Citation shall apply to and be binding upon the System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The directives of this Citation are severable, and the System shall comply with each and every provision thereof notwithstanding the effectiveness of any provision.

FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the State Water Board to: issue a citation or order with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the State Water Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the State Water Board, and to petition the superior court to take various enforcement measures against a public water system that has failed to comply with an order of the State Water Board. The State Water Board does not waive any further enforcement action by issuance of this Citation.

Janice M. Oakley September 6, 2019
Janice M. Oakley, P.E., Sonoma District Engineer Date
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Appendices (3):

1. Historical Lead and Copper results
2. August 14, 2018 Compliance Order 02_18_18R_005
3. Request A Water Supply Permit Amendment Application (Form 7-00b)

Certified Mail No. 7017 0530 0000 8323 0245



Appendix 1
HISTORICAL LEAD AND COPPER
RESULTS

HISTORICAL LEAD AND COPPER RESULTS

Monitoring Period	Begin Sampling	End Sampling	No. Samples	90 th percentile Lead (mg/L)	90 th percentile Copper (mg/L)	Notes
6M1ST-2019	1/1/2019	6/30/2019	12	0.01	1.376	2 Exceeding Copper Action Level
6M2ND-2018	7/1/2018	12/31/2018	10	0	0.98	1 Exceeding Lead Action Level
6M1ST-2018	3/9/2018	3/29/2018	10	0.010	1.4	2 Exceeding Copper Action Level
YR2017	6/22/2017	9/29/2017	5	0.000	1.45	1 Exceeding Copper Action Level
YR2016	6/2/2016	9/21/2016	5	0.000	1.185	1 Exceeding Copper Action Level
YR2015	6/3/2015	9/30/2015	5	0.014	0.585	1 Exceeding Lead Action Level
6M1ST-2013	3/7/2013	3/27/2013	10	0.000	1.3	1 Exceeding Copper Action Level
6M2ND-2012	8/10/2012	9/20/2012	8	0.000	0.63	
6M1ST-2012	10/6/2011	1/24/2012	7	0.038	1.51	2 Exceeding Lead Action Level; 1 Exceeding Copper Action Level
6M1ST-2011	1/26/2011	1/26/2011	10	0.017	1.3	2 Exceeding Lead Action Level
6M1ST-2008	3/19/2008	3/19/2008	5	0.013	2	
6M2ND-2007	10/10/2007	10/10/2007	5	0.008		
3Y2004-2006	9/27/2006	9/27/2006	5	0.020	1.26	
YR2003	7/29/2003	7/29/2003	5	0.000	0.93	
YR1999	8/11/1999	8/11/1999	5	0.000	0.62	
6M2ND-1998	7/8/1998	7/8/1998	5	0.010	1.05	
6M1ST-1998	1/9/1998	1/9/1998	5	0.000	1.24	

Action Level

0.015

1.3

Appendix 2

August 14, 2018 Compliance Order 02_18_18R_005



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

Division of Drinking Water

August 14, 2018

Water System No. 4900508

Jim Berry
Cazadero Water Company
P.O. Box 423
Cazadero, CA 95421

COMPLIANCE ORDER NO. 02_18_18R_005 FOR CORROSION CONTROL TREATMENT

Enclosed is a compliance order issued to the Cazadero Water Company (System).

The System will be billed at the Division's hourly rate for the time spent on issuing this order since this is an enforcement action for noncompliance with state regulations. At this time, we have spent approximately one hour on enforcement activities associated with this compliance order. You will receive a bill sent from our Drinking Water Fee Branch in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a compliance order issued by the Division may file a petition with the State Water Resources Control Board (State Water Board) for reconsideration of the compliance order. Petitions must be received by the State Water Board within 30 calendar days of the issuance of the compliance order. The date of issuance is the date when the Division mails or serves a copy of the compliance order, whichever occurs first. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day. Petitions must be received by 5:00 p.m. Information regarding filing petitions may be found at: http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Marianne Watada of my staff at (707) 576-2076 or me at (707) 576-2145.

Sincerely,

A handwritten signature in blue ink, appearing to read "Janice M. Thomas".

Janice M. Thomas, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Enclosures: Compliance Order No. 02_18_18R_005

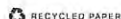
Certified Mail No.: 7016 0910 0001 2047 7438

C: Matt Damos, North Coast Engineering, P. O. Box 555, Cazadero, CA 95421
Leslye Choate, Sonoma County Environmental Health Department
Nathan Quarles, Sonoma County Permit and Resource Management Department
Rami Kahlon, PUC, Division of Water and Audits

FELICIA MARCUS, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

4900508/Enforcement
02_18_18R_005_4900508.docx/MFW

50 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov



Compliance Order No. 02_18_18R_005

CALIFORNIA
WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

TO: CAZADERO WATER COMPANY
ATTN: JIM BERRY, PRESIDENT
P.O. Box 423
6500 Cazadero Highway
Cazadero, CA 95421

ISSUE DATE: August 14, 2018

PHYSICAL LOCATION: 6150 Cazadero Highway
CAZADERO, CA 95421

COMPLIANCE ORDER NO. 02_18_18R_005

FOR

**CORROSION CONTROL TREATMENT - LEAD AND COPPER RULE,
CALIFORNIA CODE OF REGULATIONS §64684**

CAZADERO WATER COMPANY

4900508

Section 116655 of the California Health and Safety Code (hereinafter
"CHSC") authorizes the issuance of a compliance order to a public water
system for violations or threatened violations of the California Safe Drinking
Water Act (CHSC, Division 104, Part 12, Chapter 4, commencing with Section

Compliance Order No. 02_18_18R_005

116270) (hereinafter "California SDWA"), or any permit, regulation, or standard issued or adopted thereunder.

The State Water Resources Control Board (hereinafter "Board"), acting by and through its Division of Drinking Water (hereinafter "Division") and the Deputy Director for the Division (hereinafter "Deputy Director"), hereby issues a compliance order (hereinafter "Order") to the Cazadero Water Company (hereinafter "the System"), requiring Corrosion Control Treatment due to Lead and Copper Action Level Exceedances in accordance with California Code of Regulations §64678 and §64684.

A copy of the *Applicable Statutes and Regulations* is included in Appendix 1, which is attached hereto and incorporated herein by this reference.

STATEMENT OF FACTS

The System is a community public water system serving a population of approximately 200 through 157 service connections. The System serves the town of Cazadero, which consists of a residential area and nine commercial connections including a school, bakery and stores. Approximately half of the residential connections are vacation homes rather than full-time residences.

Compliance Order No. 02_18_18R_005

Lead and Copper Action Level exceedance and Corrosion Control Treatment

The System has collected 15 lead and copper sample sets going back to 1998. Out of these 15 sample sets, seven (7) have a 90th percentile of copper or lead result that exceeds the respective action levels of 1.3 milligrams/liter (mg/L) for copper and 0.015 mg/L for lead. A summary of the 90th percentile lead and copper results is provided in Appendix 2.

In a letter from the Division dated April 27, 2018, the System was directed to submit a corrosion control treatment proposal, complete a request for an amended permit application, and install corrosion control treatment. Based on the Water Quality Parameter (WQP) results, the Division suggested aeration as a method of corrosion control treatment for the system to research. The letter had a due date of June 29, 2018 to submit a corrosion control treatment proposal and a completed Request for Water Supply Permit Amendment Application. The installation of corrosion control treatment is to be completed by July 31, 2019. A copy of the April 27, 2018 letter is located in Appendix 3.

DETERMINATIONS

The Division has reviewed the lead and copper sampling results submitted by the System. Due to the persistent action level exceedance of the lead and

Compliance Order No. 02_18_18R_005

1
2 copper results, the Division has determined the System must install Corrosion
3 Control Treatment. Section 64678 describes the determination of Lead and
4 Copper Action Levels exceedances. Section 64684 describes Corrosion
5 Control Treatment Installation and Operation requirements.
6

7
8
9 **DIRECTIVES**

10 The System is hereby directed to take the following actions:
11

- 12
13 1. Submit a letter to this office by **February 14, 2019**, describing the type
14 of corrosion control treatment to be installed and submit a *completed*
15 Request a Water Supply Permit Amendment Application (Appendix 4).
16
17
18 2. The full permit amendment application of corrosion control treatment
19 must be submitted to the Division by **August 14, 2019**. The installation
20 of corrosion control treatment must be completed by **February 14,**
21 **2020**.
22
23
24 3. Collect **ten** lead and copper tap samples in **September 2018 and**
25 **March 2019**, including 18305 Hillcrest and 18015 Bei Road. After this
26 sampling period, the System must disclose the lead sample results to
27 each customer whose tap was used to complete the lead and copper

Compliance Order No. 02_18_18R_005

1
2 sampling. The System must complete and submit the Lead and
3 Copper Results Worksheet and Proof of Consumer Notification with a
4 copy of all associated laboratory reports to our office within 30 days of
5 the sampling. Worksheets and forms for lead and copper sampling are
6 available on the Sonoma District webpage at:

7
8 https://www.waterboards.ca.gov/drinking_water/programs/districts/sonoma_district.htm
9 [I#leadcopper](#)

10
11 The Division reserves the right to make such modifications to this Order as it
12 may deem necessary to protect public health and safety. Such modifications
13 may be issued as amendments to this Order and shall be deemed effective
14 upon issuance.
15

16
17
18 Nothing in this Order relieves the System of its obligation to meet the
19 requirements of the California SDWA, or any regulation, permit, standard, or
20 order issued or adopted thereunder.
21

22
23 All submittals required by this Order shall be electronically submitted to the
24 Division at the following address. The subject line for all electronic submittals
25 corresponding to this Order shall include the following information: Water
26 System name and number, compliance order number and title of the
27 document being submitted.

Compliance Order No. 02_18_18R_005

Janice M. Thomas, P.E., Sonoma District Engineer

dwpdist18@waterboards.ca.gov

PARTIES BOUND

This Order shall apply to and be binding upon the System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

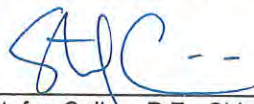
SEVERABILITY

The Directives of this Order are severable, and the System shall comply with each and every provision thereof, notwithstanding the effectiveness of any provision.

Compliance Order No. 02_18_18R_005

FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the Board to: issue a citation with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the Board; and to petition the superior court to take various enforcement measures against a public water system that has failed to comply with an order of the Board. The Board does not waive any further enforcement action by issuance of this compliance order.



Stefan Cajina, P.E., Chief
North Coastal Section
State Water Resources Control Board
Division of Drinking Water

Aug 14, 2018
Date

Appendices (4): Applicable Statutes and Regulations
 April 27, 2018 Letter from the Division
 Historical Lead and Copper results
 Request a Water Supply Permit Amendment Application

Certified Mail No. 7016-0910-0001-2047-7438

4900508/Compliance
02_18_18R_005_4900508.docx/MFW



APPENDIX 1. APPLICABLE STATUTES AND REGULATIONS FOR COMPLIANCE ORDER NO. 02_18_18R_005

NOTE: The following language is provided for the convenience of the recipient, and cannot be relied upon as the State of California's representation of the law. The published codes are the only official representation of the law. Regulations related to drinking water are in Titles 22 and 17 of the California Code of Regulations. Statutes related to drinking water are in the Health & Safety Code, the Water Code, and other codes.

Section 116655 of the Health and Safety Code states in relevant part:

(a) Whenever the department determines that any person has violated or is violating this chapter, or any permit, regulation, or standard issued or adopted pursuant to this chapter, the director may issue an order doing any of the following:

- (1) Directing compliance forthwith.
- (2) Directing compliance in accordance with a time schedule set by the department.
- (3) Directing that appropriate preventive action be taken in the case of a threatened violation.

(b) An order issued pursuant to this section may include, but shall not be limited to, any or all of the following requirements:

- (1) That the existing plant, works, or system be repaired, altered, or added to.
- (2) That purification or treatment works be installed.
- (3) That the source of the water supply be changed.
- (4) That no additional service connection be made to the system.
- (5) That the water supply, the plant, or the system be monitored.
- (6) That a report on the condition and operation of the plant, works, system, or water supply be submitted to the department.

California Code of Regulations (CCR), Section 64673 states:

§64673. Small and Medium-size Water System Requirements.

(a) The requirements in this section are applicable to all small and medium-size water systems.

(b) Each small and medium-size system shall conduct standard tap sampling for lead and copper pursuant to section 64675 (General Requirements for Tap Sampling for Lead and Copper). Tap sampling frequency may be reduced pursuant to section 64675.5 (Tap Sampling Frequency).

(c) A small or medium-size system with an action level exceedance shall take the following steps:

- (1) Monitor WQPs beginning with the first period after the exceedance, pursuant to section 64681 (Initial WQP Monitoring).
- (2) Proceed with subparagraphs (A) through (E) if a corrosion control study is required by the Department based on a review of the system's water quality, distribution system, water treatment, and system features. If such a study is required, the Department will notify the system in writing within 12 months of the action level exceedance.

Compliance Order No. 02_18_18R_005
Appendix 1

(A) Complete the study, pursuant to section 64683 (Corrosion Control Study Procedure), within eighteen months of being notified of the requirement; the system will be notified of the Department's designation within six months of the study's completion;

(B) Begin installation of the CCT designated by the Department, pursuant to section 64684 (CCT Installation and Operation), within twelve months of being notified of the Department's designation;

(C) Complete CCT installation and begin operation within 24 months of the designation;

(D) Complete two periods of standard tap sampling pursuant to section 64675 (General Requirements for Tap Sampling for Lead and Copper) and two periods of WQP monitoring pursuant to section 64682 (WQP Monitoring After CCT Installation) within 36 months of the designation; and

(E) Monitor WQPs and operate in compliance with the WQP levels specified by the Department pursuant to section 64684 (CCT Installation and Operation), beginning no later than within 42 months of the designation.

(3) If the Department does not require a corrosion control study, the system shall submit to the Department, within six months of the action level exceedance, a written recommendation for CCT. The Department may require the system to conduct additional WQP monitoring to assist in the review of the CCT recommendation. The Department will designate CCT and notify the system in writing within the following timeframes; the system shall then comply with paragraphs (2)(B) through (E):

(A) For medium-size systems, within 12 months of the exceedance, and

(B) For small-size systems, within 18 months of the exceedance;

(4) Monitor source waters, pursuant to article 6 (Source Water Requirements for Action Level Exceedances) of this chapter;

(d) A small or medium-size system with an action level exceedance for lead shall:

(1) Complete a lead public education program, pursuant to article 7 (Public Education Program for Lead Action Level Exceedances) of this chapter; and

(2) Replace lead service lines, pursuant to article 6 (Lead Service Line Requirements for Action Level Exceedances) of this chapter.

(e) A small or medium-size system that is required to comply with subsections (c) or (d) may cease completing the steps whenever the system does not have an action level exceedance during each of two consecutive periods. If any such system thereafter has an exceedance during any period, the system shall:

(1) Resume completion of the applicable steps, beginning with the first step that was not previously completed. The Department may require a system to repeat steps previously completed if the Department determines that this is necessary to implement the requirements of this section, based on a review of the system's data and treatment status.

(2) Resume standard tap sampling pursuant to 64675 (General Requirements for Tap Sampling for Lead and Copper).

(3) Conduct WQP monitoring during the period in which the system exceeded the action level, pursuant to section 64682, (WQP Monitoring After CCT Installation) or 64684 (CCT Installation and Operation).

California Code of Regulations (CCR), Section 64678 states in relevant part:

§64678. Determination of Exceedances of Lead and Copper Action Levels.

(c) The lead action level is exceeded if the concentration of lead in more than 10 percent of the tap water samples collected during any period is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).

Compliance Order No. 02_18_18R_005
Appendix 1

(e) The copper action level is exceeded if the concentration of copper in more than 10 percent of the tap water samples collected during any period is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).

(f) The 90th percentile lead and copper levels shall be computed as follows:

(1) The results of all lead or copper samples collected during a period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(2) The number of samples taken during the period shall be multiplied by 0.9.

(3) The contaminant concentration in the numbered sample identified by the calculation in paragraph (f)(2) is the 90th percentile contaminant level.

(4) For water systems serving less than or equal to 100 people that collect 5 samples per period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(g) The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and submitted to the department for making any determinations.

California Code of Regulations (CCR), Section 64684 states in relevant part:

§64684. CCT Installation and Operation.

(a) Each system shall install and operate throughout its distribution system the CCT designated by the Department in subsection 64683(b) (Corrosion Control Studies) or paragraph 64673(c)(3) (Small and Medium-size Water System Requirements) and monitor WQPs pursuant to section 64682 (WQP Monitoring After CCT Installation). When the system completes its installation of CCT, it shall submit a letter to the Department certifying that it has done so.

(b) After the system installs CCT, the Department will review the treatment and pre- and post-treatment tap sampling and WQP monitoring data and specify WQPs in writing within 42 months of its CCT designation as follows:

(1) A minimum value or a range of values for pH measured at each entry point to the distribution system;

(2) A minimum pH value of 7.0 or greater, measured in all tap samples, unless the Department determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

(3) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Department determines is necessary to maintain a passivating film on the interior walls of the pipes of the distribution system;

(4) If alkalinity is adjusted as part of CCT, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

(5) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples; and

(6) Values for additional WQPs determined by the Department to reflect CCT for the system.

Compliance Order No. 02_18_18R_005
Appendix 1

(c) After the Department specifies WQP values and ranges, each system shall monitor pursuant to section 64680 (General WQP Monitoring Requirements) and maintain WQPs as specified by the Department.

(d) A system shall be out of compliance with the WQP values and ranges specified by the Department pursuant to subsection (b) for any period during which it has excursions for more than nine days.

(1) An excursion occurs when a "daily value" at one or more sample sites for one or more WQPs in a day is below the minimum value or outside the range of Department-specified WQPs.

(2) A "daily value" for a WQP at a site is determined as follows:

(A) If sampling is more than once a day by continuous monitoring, grab sampling or both, the daily value shall be the average of all the day's results at the sampling site.

(B) If sampling is once a day, the daily value shall be the day's result.

(C) If sampling is less than once a day, the daily value shall apply to the day that the water supplier receives the result from the laboratory or the 30th day after the sample is collected, whichever comes first.

(3) When an excursion occurs, within 48 hours of being notified of the results of the initial sample(s), the system shall investigate the cause and collect a followup sample at each affected site for each WQP that did not meet the Department-specified values. The criteria in paragraphs (d)(1) and (2) shall be applied to the followup sample results to determine if another excursion has occurred.

(e) A system conducting reduced WQP tap monitoring that fails to meet the Department-specified WQPs shall resume standard WQP tap monitoring pursuant to section 64680 (General WQP Monitoring Requirements).

(f) The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and submitted to the Department for making any determinations (i.e., determining concentrations of WQPs).

(g) Upon its own initiative or in response to a request by a system, the Department may modify in writing its designation of CCT or its specified WQP values and ranges if it determines that modification is necessary to ensure that the system continues to maintain CCT. Any request shall be in writing, explain the reason for the requested modification, and include supporting documentation.

Citation No. 02_18_19C_076
Appendix 2

Compliance Order No. 02_18_18R_005
Appendix 3

APPENDIX 2
HISTORICAL LEAD AND COPPER RESULTS

HISTORICAL LEAD AND COPPER RESULTS

Monitoring Period	Begin Sampling	End Sampling	No. Samples	Lead (mg/L)	Copper (mg/L)	Notes
6M1ST-2018	3/9/2018	3/29/2018	10	0.010	1.4	2 Exceeding Copper Action Level
YR2017	6/22/2017	9/29/2017	5	0.000	1.45	1 Exceeding Copper Action Level
YR2016	6/2/2016	9/21/2016	5	0.000	1.185	1 Exceeding Copper Action Level
YR2015	6/3/2015	9/30/2015	5	0.014	0.585	1 Exceeding Lead Action Level
6M1ST-2013	3/7/2013	3/27/2013	10	0.000	1.3	1 Exceeding Copper Action Level
6M2ND-2012	8/10/2012	9/20/2012	8	0.000	0.63	
6M1ST-2012	10/6/2011	1/24/2012	7	0.038	1.51	2 Exceeding Lead Action Level; 1 Exceeding Copper Action Level
6M1ST-2011	1/26/2011	1/26/2011	10	0.017	1.3	2 Exceeding Lead Action Level
6M1ST-2008	3/19/2008	3/19/2008	5	0.013	2	
6M2ND-2007	10/10/2007	10/10/2007	5	0.008		
3Y2004-2006	9/27/2006	9/27/2006	5	0.020	1.26	
YR2003	7/29/2003	7/29/2003	5	0.000	0.93	
YR1999	8/11/1999	8/11/1999	5	0.000	0.62	
6M2ND-1998	7/8/1998	7/8/1998	5	0.010	1.05	
6M1ST-1998	1/9/1998	1/9/1998	5	0.000	1.24	

Action Level

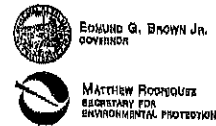
0.015 1.3

Citation No. 02_18_19C_076
Appendix 2

Compliance Order No. 02_18_18R_006
Appendix 3

APPENDIX 3

APRIL 27, 2018 LETTER FROM THE DIVISION



State Water Resources Control Board
Division of Drinking Water

April 27, 2018

Water System No. 4900508

Jim Berry
Cazadero Water Company
P.O. Box 423
Cazadero, CA 95421

**LEAD AND COPPER MONITORING / CITATION No. 02_18_18C_021 DIRECTIVE 1
DEADLINE EXTENSION**

The State Water Resources Control Board Division of Drinking Water (Division) has reviewed the March 2018 lead and copper sample results submitted for the Cazadero Water Company water system (System). The 90th percentile of the lead results did not exceed the action level; however, the 90th percentile of the copper results exceeded the action level of copper at 1.3 milligrams per liter (mg/L). The System also had lead and/or copper action level exceedances in 2006, 2008, 2011, 2012, and 2017.

Based on the monitoring results noted above and the Lead and Copper Rule Section 64673 of the California Code of Regulations, installation of corrosion control treatment is required.

The System must submit a proposal for the installation of corrosion control treatment. Based on a review of water quality parameters submitted to date, this office would suggest *aeration* as a method of corrosion control to research. The System must submit a letter to the Division by **June 29, 2018**, describing the type of treatment to be installed and requesting an amended permit application. The installation of corrosion control treatment must be completed by **July 31, 2019**.

Due to the addition of the corrosion control treatment, the deadline for submitting a plan and compliance schedule for improvements to comply with the Surface Water Treatment Rule as specified in Directive number 1 of the Citation No. 02_18_18C_021 is extended **June 29, 2018**.

Water Quality Parameter and Lead and Copper Tap Monitoring

As directed in the letter dated January 30, 2018, the System must conduct the second quarter's water quality parameter (WQP) monitoring at the entry point to the distribution system by **May 31, 2018**. The monitoring must consist of (1) field pH (2) alkalinity (3) calcium (4) conductivity, (5) field temperature, and (6) total dissolved solids.

FELICIA MARCUS, CHAIR | EILEEN SOBEEK, EXECUTIVE DIRECTOR

80 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov



Jim Berry

- 2 -

April 27, 2018

Please submit the monitoring results with a completed *Initial Water Quality Parameter Monitoring and Entry Point Lead and Copper Sample Data Sheet (Form 58)* to the Division **within 30 days of sampling**. The form can be found at:
http://www.waterboards.ca.gov/drinking_water/programs/districts/sonoma_district.shtml

The System must continue lead and copper tap monitoring by collecting **TEN** lead and copper tap samples during **September 2018** and **March 2019**, including **18305 Hillcrest** and **18015 Bel Road**. The System must collect first draw samples from interior taps where the water has stood motionless in the plumbing system for six to 12 hours. After this sampling period, the System must submit a completed *Lead and Copper Results Worksheet (Form 52L)*, a completed *Proof of Consumer Notification (Form 53a)*, and a laboratory report of all sample results to the Division **within 30 days of the sampling**. Also, please ask your laboratory to submit the lead and copper monitoring results electronically through the Lab-To-State (LTS) Portal.

As a reminder, the water system shall disclose the sample results to each customer whose tap was used to complete the lead and copper sampling. The notification template and the forms can be found at:
http://www.waterboards.ca.gov/drinking_water/programs/districts/sonoma_district.shtml

If you have any questions regarding this letter, please contact George Chien at (707) 576-2971.

Sincerely,



Janice M. Thomas, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

C: Matt Damos, North Coast Engineering, P. O. Box 555, Cazadero, CA 95421

APPENDIX 4

**REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION
(Form 7-00b)**

THIS FORM CAN ALSO BE DOWNLOADED AT:

http://www.waterboards.ca.gov/drinking_water/programs/districts/sonoma_district.shtml

State Water Resources Control Board
Division of Drinking Water
50 D Street, Suite 200
Santa Rosa, CA 95404-3752
(707) 576-2145 Fax: (707) 576-2722

7-00b

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION

Water System Name:	System No.:
Site Address:	
Water System Owner (Property Owner):	
Address:	
Phone No.:	Email:
Person Completing This Form:	
Title:	
Address:	
Phone No.:	Email:

What is the general purpose for your permit application request? Check all that apply:	
☐ Change of ownership	☐ Addition of storage tank >100,000 gallons
☐ Change in source of supply:	☐ Distribution system increase by >20%
☐ Add (Submit State of California Well Completion Report(s), if applicable)	☐ Change in treatment (describe below):
☐ Remove	☐ Add
☐ Status change	☐ Remove
	☐ Other change
Please describe the <i>existing</i> water system facilities (source[s], treatment [including purpose], storage, service area):	
Please describe the <i>proposed</i> water system facilities (source[s], treatment [including purpose], storage, service area):	
Are CEQA or NEPA documents required? ☐ Yes ☐ No ☐ Unk. Are CEQA or NEPA documents available? ☐ Yes ☐ No	
If proposing new water system facilities, please describe the <i>reason</i> for such facilities:	
Consolidation Potential: Is your system located within one (1) mile of a public water system? If yes, list the system name(s) and approximate distance?	

☐ Attach any County permitting documents (Use/Planning Permit application and Conditions of Approval)

Compliance Order No. 02_18_18R_005
Appendix 4

Please describe the project timeline: Construction start date: Construction completion date: Comments:

Section 116626 (a) of the California Health and Safety code: No person shall operate a public water system unless he or she first submits an application to the department and receives a permit as provided in this chapter. A change in ownership of a public water system shall require the submission of a new application.

Section 116660 (a) of the California Health and Safety code: No person operating a public water system shall modify, add to or change his or her source of supply or method of treatment of, or change his or her distribution system as authorized by a valid existing permit issued to him or her by the department unless the person first submits an application to the department and receives an amended permit as provided in this chapter authorizing the modification, addition, or change in his or her source of supply or method of treatment.

For Division Use Only

Date Stamp Below

☐ For new well amended permit copy RWQCB staff when emailing checklist to applicant

APPENDIX 3

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION (Form 7-00b)

THIS FORM CAN ALSO BE DOWNLOADED AT:

https://www.waterboards.ca.gov/drinking_water/programs/districts/docs/sonoma/permit_forms/7_00b_amended_permit_application_request_form.docx

State Water Resources Control Board
Division of Drinking Water
50 D Street, Suite 200
Santa Rosa, CA 95404-3752
(707) 576-2145 Fax: (707) 576-2722

7-00b

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION

Water System Name: Site Address:	System No.:		
Water System Owner (Property Owner): Address: Phone No.: Email:			
Person Completing This Form: Title: Address: Phone No.: Email:			
What is the general purpose for your permit application request? Check all that apply: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> ☐ Change of ownership ☐ Change in source of supply: ☐ Add (Submit State of California Well Completion Report(s), if applicable) ☐ Remove ☐ Status change </td> <td style="width: 50%; vertical-align: top;"> ☐ Addition of storage tank >100,000 gallons ☐ Distribution system increase by >20% ☐ Change in treatment (describe below): ☐ Add ☐ Remove ☐ Other change </td> </tr> </table>		☐ Change of ownership ☐ Change in source of supply: ☐ Add (Submit State of California Well Completion Report(s), if applicable) ☐ Remove ☐ Status change	☐ Addition of storage tank >100,000 gallons ☐ Distribution system increase by >20% ☐ Change in treatment (describe below): ☐ Add ☐ Remove ☐ Other change
☐ Change of ownership ☐ Change in source of supply: ☐ Add (Submit State of California Well Completion Report(s), if applicable) ☐ Remove ☐ Status change	☐ Addition of storage tank >100,000 gallons ☐ Distribution system increase by >20% ☐ Change in treatment (describe below): ☐ Add ☐ Remove ☐ Other change		
Please describe the <i>existing</i> water system facilities (source[s], treatment [including purpose], storage, service area): 			
Please describe the <i>proposed</i> water system facilities (source[s], treatment [including purpose], storage, service area): 			
Are CEQA or NEPA documents required? ☐ Yes ☐ No ☐ Unk. Are CEQA or NEPA documents available? ☐ Yes ☐ No			
☐	Attach CEQA documentation. Include if applicable: - Notice of Exemption (NOE) - Notice of Determination (NOD) - If project is non-exempt provide the final conditions of either the Negative Declaration (ND), Mitigated Negative Declaration (MND), or Environmental Impact Report (EIR)		
If proposing new water system facilities, please describe the <i>reason</i> for such facilities: 			

Consolidation Potential: Is your system located within one (1) mile of a public water system?
If yes, list the system name(s) and approximate distance?

☐ Attach any County permitting documents (Use/Planning Permit application and Conditions of Approval)

Please describe the project timeline:

Construction start date:

Construction completion date:

Comments:

Section 116525 (a) of the California Health and Safety code: No person shall operate a public water system unless he or she first submits an application to the department and receives a permit as provided in this chapter. A change in ownership of a public water system shall require the submission of a new application.
Section 116550 (a) of the California Health and Safety code: No person operating a public water system shall modify, add to or change his or her source of supply or method of treatment of, or change his or her distribution system as authorized by a valid existing permit issued to him or her by the department unless the person first submits an application to the department and receives an amended permit as provided in this chapter authorizing the modification, addition, or change in his or her source of supply or method of treatment.

For Division Use Only

Date Stamp Below

☐ For new well amended permit copy RWQCB staff when emailing checklist to applicant

Division of Drinking Water

August 6, 2020

System No. 4900508

Jim Berry
Cazadero Water Company, Inc.
P.O. Box 423
Cazadero, CA 95421

**COMPLIANCE ORDER NO. 02_18_20R_002
FOR VIOLATION OF: SURFACE WATER TREATMENT RULE, CALIFORNIA CODE
OF REGULATIONS SECTION 64650 THROUGH SECTION 64666**

Enclosed is Compliance Order No. 02_18_20R_002 (hereinafter "Order"), issued to the Cazadero Water Company, Inc. (hereinafter "System") public water system. Please note that there are legally enforceable deadlines associated with this Order.

The System will be billed at the State Water Resources Control Board's (hereinafter "State Water Board") hourly rate for the time spent on issuing this Order. California Health and Safety Code (hereinafter "CHSC") Section 116577 provides that a public water system must reimburse the State Water Board for actual costs incurred by the State Water Board for specified enforcement actions, including preparing, issuing and monitoring compliance with an order. At this time, the State Water Board has spent approximately one hour on enforcement activities associated with this violation.

The System will receive a bill sent from the State Water Board in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a citation, order or decision issued under authority delegated to an officer or employee of the State Water Board under Article 8 (commencing with CHSC, Section 116625) or Article 9 (commencing with CHSC, Section 116650), of the Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4), may file a petition with the State Water Board for reconsideration of the citation, order or decision.

Petitions must be received by the State Water Board within 30 days of the issuance of the citation, order or decision by the officer or employee of the State Water Board. The date of issuance is the date when the Division of Drinking Water mails a copy of the citation, order or decision. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day by 5:00 p.m.

Information regarding filing petitions may be found at:

http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Marianne Watada of my staff at marianne.watada@waterboards.ca.gov or me at 707-576-2145.

Sincerely,

Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Enclosure: Compliance Order No. 02_18_20R_002

Certified Mail No. 7017 3040 0000 9802 4184

cc: Kim Gluch, Cazadero, via email
Leslye Choate, Sonoma County Environmental Health Department, via email
Nathan Quarles, Sonoma County PRMD, via email
Bruce DeBerry, CPUC via email
James Booth, CPUC via email
Moises Chavez, CPUC via email
Richard Rauschmeier, CPUC via email
PAO Water Branch, CPUC via email

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

Name of Public Water System: Cazadero Water Company, Inc.

Water System No: 4900508

Attention: Jim Berry, Owner and Operator
P.O. Box 423
Cazadero, CA 95421

Issued: August 6, 2020

COMPLIANCE ORDER FOR NONCOMPLIANCE
CALIFORNIA HEALTH AND SAFETY CODE, SECTION 116555 AND
CALIFORNIA CODE OF REGULATIONS
SECTION 64650 THROUGH SECTION 64666,
SURFACE WATER TREATMENT RULE

The California Health and Safety Code (hereinafter "CHSC"), Section 116655 authorizes the State Water Resources Control Board (hereinafter "State Water Board"), to issue a Compliance Order to a public water system when the State Water Board determines that the public water system has violated or is violating the California Safe Drinking Water Act (hereinafter "California SDWA"), (CHSC, Division 104, Part 12, Chapter 4, commencing with Section 116270), or any regulation, standard, permit, or order issued or adopted thereunder.

The State Water Board, acting by and through its Division of Drinking Water (hereinafter “Division”), and the Deputy Director for the Division, hereby issues Compliance Order No. 02_18_20R_002 (hereinafter “Order”), pursuant to Section 116655 of the CHSC to the Cazadero Water Company, Inc. (hereinafter “System”), for violation of CHSC, Section 116555 and California Code of Regulations (hereinafter “CCR”), Surface Water Treatment Rule Section 64650 through Section 64666.

STATEMENT OF FACTS

The System is classified as a community public water system with a population of 250, served by 157 service connections. The System operates under Domestic Water Supply Permit No. 02-18-10P-4900508 issued by the State Water Board (formerly California Department of Public Health) on November 22, 2010. The 2010 Permit is in Appendix 1. The System is using wells that are under the direct influence of surface water to supply potable water to the distribution system.

CHSC, Section 116555 requires all public water systems to comply with primary drinking water standards as defined in CHSC, Section 116275(c). Primary drinking water standards include maximum levels of contaminants, specific treatment standards, and monitoring and reporting requirements as specified in regulations adopted by the State Water Board.

The System uses five water sources. Since 1997, two of the wells, Well 01 - Buckeye Well, Source Code 4900508 – 001, and Well 02 - Hotel Well, Source Code 4900508 – 002, have been considered groundwater under the direct influence of surface water

1 during winter months and the use of these two wells is restricted to the time period
2 between May 15 and September 15.

3 The System has indicated that it needs to use Well 01 - Buckeye Well and Well 02 -
4 Hotel Well outside the permitted time period. Compliance Order 02_18_18R_009,
5 issued November 19, 2018, requires that the System notify the Division and conduct
6 public notification when it plans to use the sources outside the permitted time period.
7 Compliance Order 02_18_18R_009 is attached in Appendix 2.

8
9 The three other sources are Buckeye Horizontal Well, (Source Code 4900508 – 005),
10 Bei Horizontal Well, (Source Code 4900508 – 006), and Hotel Spring, (Source Code
11 4900508 – 011). The Buckeye Horizontal Well, and Bei Horizontal Well were
12 constructed in 1999. The Bei Horizontal Well consists of a 150-foot length of 1 ½-inch
13 diameter PVC pipe extending into the hill. The Buckeye Horizontal Well consists of a
14 75-foot length of 1 ½-inch diameter PVC pipe that extends into the hill. The surface of
15 each well is sealed with twenty feet of bentonite that was pumped along the outside of
16 the PVC pipe.

17
18 When the Buckeye and Bei horizontal wells were first constructed, the System
19 conducted 6 months to one year of monthly bacteriological sampling. Total coliform and
20 *E. coli* were not present at that time. The System resumed bacteriological sampling in
21 2018. Since that time, total coliform results from the Buckeye Horizontal Well have
22 ranged from <1.0 to >2,419.0 Most Probable Number (MPN). There have been no
23 detections of *E. coli* from the Buckeye Horizontal Well. Total coliform results from the
24 Bei Horizontal Well have ranged from <1.0 to 1,986.3 MPN. There have been no
25 detections of *E. coli* from the Bei Horizontal Well.

1 The Hotel Spring is not a permitted water source. Total coliform results from the Hotel
2 Spring have ranged from <1.0 – 365.4 MPN. *E. coli* was detected in 5 out of 46
3 samples ranging from 1 - 2 MPN. Results of raw bacteriological samples from these
4 sources is attached in Appendix 3.

5
6 The treatment of the sources consists solely of sodium hypochlorite disinfection. For
7 Well 01 - Buckeye Well and Well 02 - Hotel Well, the System has demonstrated that the
8 disinfection treatment provides a minimum of 4-log virus inactivation through disinfection
9 before the first customer.

10
11 **DETERMINATION**

12 Due to the construction features and the high total coliform results in Buckeye
13 Horizontal Well and Bei Horizontal Well, the wells are considered groundwater under
14 the direct influence of surface water.

15
16 Due to the total coliform and *E. coli* detected in Hotel Spring, the well is considered
17 groundwater under the direct influence of surface water. Since the Hotel Spring is not a
18 permitted source, the System must cease use of the Hotel Spring in the potable water
19 system.

20
21 The State Water Board has determined that the System has failed to comply with the
22 California Code of Regulations Section 64650 through Section 64666, Surface Water
23 Treatment Rule.

DIRECTIVES

The System is hereby directed to take the following actions:

1. By **DECEMBER 31, 2021**, comply with CHSC, Section 116555 and California Code of Regulations, Surface Water Treatment Rule Section 64650 through Section 64666.
2. Cease use of the Hotel Spring in the potable water system.
3. By **SEPTEMBER 30, 2020**, demonstrate to the Division that all sources are provided with disinfection to meet 4-log virus inactivation.
4. By **DECEMBER 31, 2020**, submit to the Division for review and approval, a plan and compliance schedule for improvements to the water system, including but not limited to disinfection and filtration treatment and monitoring equipment, to comply with the Surface Water Treatment Rule (Section 64650 through Section 64666, Title 22, CCR, inclusive) for all sources. The compliance schedule must specify that new treatment and monitoring equipment will be installed and operational, and in compliance with all sections of the Surface Water Treatment Rule by **DECEMBER 31, 2021**. The plan and schedule must be prepared by a Civil Engineer registered in the State of California, with at least three years of experience designing drinking water related projects.
5. By **DECEMBER 31, 2020**, submit to the Division a completed Request a Water Supply Permit Amendment Application form (Appendix 4) for Change of Treatment.

6. Once a completed Request a Water Supply Permit Amendment Application form is submitted, the Division will prepare a Checklist with Due Dates of items that must be submitted to complete the Permit Amendment Application. The Permit Amendment Application must be submitted to the Division by the stated due dates.

7. By **DECEMBER 30, 2021**, complete installation of new treatment and monitoring equipment that is operational, and in compliance with all sections of the Surface Water Treatment Rule.

8. By **AUGUST 31, 2020**, notify all persons served by the System of the violation of California Code of Regulations Section 64650 through Section 64666, Surface Water Treatment Rule, in conformance with Section 64463.4 and Section 64465.

Public notification to the persons served by the System must continue every three months until the State Water Board determines that the California Code of Regulations Section 64650 through Section 64666, Surface Water Treatment Rule violation is resolved. Appendix 5: Notification Template must be used to fulfill this directive, unless otherwise approved by the State Water Board. The contents of the public notice must be approved by the State Water Board prior to issuance. **The System must edit the wording of the public notice as necessary.** The public notice must be completed in accordance with the following:

- By mail or direct delivery of the public notice to each customer served by the water system and;
- By one of the following secondary methods to reach persons not likely to be reached by mail or direct delivery;

- By publication in a local newspaper
- by delivery to community organizations or by posting in conspicuous public places served by the water system or on the internet. The notice must remain posted in place for as long as the violation or occurrence continues, but for no less than seven consecutive days.

9. By **SEPTEMBER 18, 2020**, complete Appendix 6: Certification of Completion of Public Notification Form. Submit it together with a copy of the public notice required by Directive 6 to the State Water Board within 10 days following each public notification.

10. By **SEPTEMBER 4, 2020** complete and return to the State Water Board the “Notification of Receipt” form attached to this Order as Appendix 7. Completion of this form confirms that the System has received this Order and understands that it contains legally enforceable directives with due dates.

All submittals required by this Order, unless otherwise specified in the directives above, must be electronically submitted to the State Water Board at the following address. The subject line for all electronic submittals corresponding to this Order must include the following information: Water System name and number, compliance order number and title of the document being submitted.

Janice M. Oakley, P.E., Sonoma District Engineer
dwpdist18@waterboards.ca.gov

1 The State Water Board reserves the right to make modifications to this Order as it may
2 deem necessary to protect public health and safety. Such modifications may be issued
3 as amendments to this Order and shall be effective upon issuance.

4
5 Nothing in this Order relieves the System of its obligation to meet the requirements of
6 the California SDWA (CHSC, Division 104, Part 12, Chapter 4, commencing with
7 Section 116270), or any regulation, standard, permit or order issued or adopted
8 thereunder.

9
10 **PARTIES BOUND**

11 This Order shall apply to and be binding upon the System, its owners, shareholders,
12 officers, directors, agents, employees, contractors, successors, and assignees.

13
14 **SEVERABILITY**

15 The directives of this Order are severable, and the System shall comply with each and
16 every provision thereof notwithstanding the effectiveness of any provision.

17
18 **FURTHER ENFORCEMENT ACTION**

19 The California SDWA authorizes the State Water Board to: issue a citation or order with
20 assessment of administrative penalties to a public water system for violation or
21 continued violation of the requirements of the California SDWA or any regulation,
22 permit, standard, citation, or order issued or adopted thereunder including, but not
23 limited to, failure to correct a violation identified in a citation or compliance order. The
24 California SDWA also authorizes the State Water Board to take action to suspend or
25 revoke a permit that has been issued to a public water system if the public water system
26 has violated applicable law or regulations or has failed to comply with an order of the
27 State Water Board, and to petition the superior court to take various enforcement

measures against a public water system that has failed to comply with an order of the State Water Board. The State Water Board does not waive any further enforcement action by issuance of this Order.

Stefan Cajina, P.E., Chief
North Coastal Section
State Water Resources Control Board
Division of Drinking Water

Date

Appendices [7]:

1. 2010 Permit
2. Compliance Order 02_18_18R_009 without Appendices
3. Raw Bacteriological sample results for Buckeye Horizontal Well, Bei
Horizontal Well, and Hotel Spring
4. Request a Water Supply Permit Amendment Application (Form 7-00b)
5. Public Notification Template
6. Certification of Completion of Public Notification
7. Notification of Receipt Form

Certified Mail No. 7017 3040 0000 9802 4184

APPENDIX 1.
2010 PERMIT

STATE OF CALIFORNIA

DOMESTIC WATER SUPPLY PERMIT

Issued To

Loren Berry

Cazadero Water Company

Water System No. 4900508

By The

California Department of Public Health,

Division of Drinking Water & Environmental Management



PERMIT NUMBER 02-18-10P-4900508

DATE: November 22, 2010

WHEREAS:

1. Section 116525(c) of the California Health and Safety Code authorizes the Department of Public Health to renew, reissue, revise or amend any domestic water supply permit whenever the Department deems it to be necessary for the protection of public health whether or not an application has been filed.
2. The Cazadero Water Company public water system is located at 6150 Cazadero Highway, Cazadero, California in Sonoma County.
3. The legal owner of the Cazadero Water Company public water system is Loren Berry. Loren Berry, therefore, is responsible for compliance with all statutory and regulatory drinking water requirements and the conditions set forth in this permit.
4. The following water supply sources and associated treatment are approved for use in the Cazadero Water Company public water system:

Active Water Supply Sources

Well 01-Buckeye Well
Well 02-Hotel Well
Buckeye Horizontal Well
Bei Horizontal Well

Associated Treatment

Hypochlorination
Hypochlorination
Hypochlorination
Hypochlorination

Compliance Order No. 02_18_20R_002
Appendix 1

Domestic Water Supply Permit No. 02-18-10P-4900508
Cazadero Water Company

5. The service area of the Cazadero Water Company public water system is generally the town of Cazadero along the west side of Austin Creek.

And WHEREAS:

1. The California Department of Public Health has evaluated all of the pertinent information about the Cazadero Water Company public water system and has conducted a physical investigation of the Cazadero Water Company public water system.
2. The Cazadero Water Company public water system was in existence prior to January 1, 1998.
3. The California Department of Public Health has the authority to renew, reissue, revise, or amend any domestic water supply permits pursuant to Health and Safety Code Section 116525.

THEREFORE: The California Department of Public Health has determined the following:

1. The Cazadero Water Company public water system meets the criteria for and is hereby classified as a community water system.
2. Provided the following conditions are complied with, the Cazadero Water Company public water system should be capable of providing water to consumers that is pure, wholesome, and potable and in compliance with statutory and regulatory drinking water requirements at all times.

LOREN BERRY IS HEREBY ISSUED THIS DOMESTIC WATER SUPPLY PERMIT TO OPERATE THE CAZADERO WATER COMPANY WATER SYSTEM.

The Cazadero Water Company public water system shall comply with the following permit conditions:

1. Cazadero Water Company public water system shall comply with all State laws applicable to public water systems, including, but not limited to, the California Safe Drinking Water Act as contained in Division 104 of the CHSC, and any regulations or standards adopted thereunder.
2. Cazadero Water Company public water system shall not make any change in the source of water for the water system, any modification of the method of treatment as described

Compliance Order No. 02_18_20R_002
Appendix 1

Domestic Water Supply Permit No. 02-18-10P-4900508
Cazadero Water Company

in this Permit, or any addition of distribution system storage reservoirs unless an application to amend this public water supply permit is submitted to the California Department of Public Health and an amended permit has been issued for the proposed changes.

3. A State certified treatment and/or distribution operator shall be responsible for operation of Cazadero Water Company public water system in accordance with Sections 63650.85, 63765, 63770, 64413.5, and 64413.7, Title 22 of the California Code of Regulations.
4. Well 01-Buckeye Well and Well 02-Hotel Well may only be used during the time period of May 15 to September 15 of each year. If the System needs to use the wells outside that time period, it must notify the Department of Public Health.
5. The Cazadero Water Company is typically deficient in source capacity between September 16 until at least November. Cazadero must evaluate its source capacity and demand and specify a plan to address the deficiencies.
6. The Cazadero Water Company must provide a minimum of 4-log virus inactivation through disinfection of the water from Well 01-Buckeye Well and Well 02-Hotel Well. The Cazadero Water Company must submit a monthly compliance summary demonstrating that it has met the 4-log virus inactivation every day that the wells were in use. The summary must be submitted by the 10th day of the following month.
7. The Cazadero Water Company must perform source and distribution system monitoring in accordance with schedules sent by the Department.
8. Cazadero Water Company must require its laboratory to notify water system personnel within 24 hours; whenever the presence of total coliforms, fecal coliforms or *E. coli* is demonstrated in a distribution system sample or a sample is invalidated due to interference problems, and shall ensure that a contact person is available to receive these analytical results 24-hours a day. Cazadero Water Company shall also require the laboratory to immediately notify the California Department of Public Health of any positive bacteriological results if the laboratory cannot make direct contact with the designated contact person within 24 hours.
9. Cazadero Water Company shall require its laboratory to notify water system personnel within 24 hours whenever the level of nitrate in a single sample exceeds the Maximum Contaminant Level (MCL), and shall ensure that a contact person is available to receive such analytical results 24-hours a day. Cazadero Water Company shall also require the laboratory to immediately notify the California Department of Public Health of any acute nitrate MCL exceedance if the laboratory cannot make direct contact with the designated contact person with 24 hours.
10. Pursuant to § 64590, Title 22, of the California Code of Regulations (CCR), no chemical or product shall be added to drinking water by a water supplier unless the chemical or product is certified as meeting the specifications of NSF International/American National Standard Institute (NSF/ANSI) 60-2005 (Drinking Water Treatment Chemicals-Health Effects) or a more recent version of NSF/ANSI 60.

Compliance Order No. 02_18_20R_002
Appendix 1

Domestic Water Supply Permit No. 02-18-10P-4900508
Cazadero Water Company

11. Pursuant to § 64591, Title 22, of the California Code of Regulations (CCR), a water system shall not use any chemical, material, lubricant, or product that may come into contact with the drinking water that has not been tested and certified as meeting the specifications of NSF International/American National Standard Institute (NSF/ANSI) 61-2005 / Addendum 1.0-2005 or a more recent version of NSF/ANSI 61. This includes process media (carbon, sand), protective materials (coatings, linings, liners), joining and sealing products (pipes, tanks, fittings), and mechanical devices used in the production, treatment or distribution of drinking water and treatment/transmission/distribution systems (valves, chlorinators, separation membranes).
12. An annual report on the status of the Cazadero Water Company water system shall be submitted as directed by the Department.

This permit supersedes all previous domestic water supply permits issued for this public water system and shall remain in effect unless and until it is amended, revised, reissued, or declared to be null and void by the California Department of Public Health. This permit is non-transferable. Should the Cazadero Water Company public water system undergo a change of ownership, the new owner must apply for and receive a new domestic water supply permit.

This permit shall be effective as of the date shown below.

FOR THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH



Janice M. Oakley
Janice M. Oakley
Sonoma District Engineer

Dated: November 22, 2010

APPENDIX 2.

COMPLIANCE ORDER 02_18_18R_009 without Appendices



State Water Resources Control Board
Division of Drinking Water

November 29, 2018

Water System No. 4900508

Jim Berry
Cazadero Water Company, Inc.
P.O. Box 423
Cazadero, CA 95421

**COMPLIANCE ORDER NO. 02_18_18R_009 for PUBLIC NOTIFICATION WHEN
WELL 01 - BUCKEYE WELL OR WELL 02 - HOTEL WELL ARE USED OUTSIDE OF
PERMITTED PERIOD**

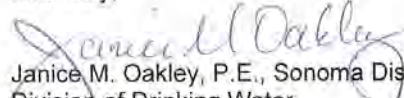
Enclosed is a compliance order issued to the Cazadero Water Company, Inc. water system (System).

The System will be billed at the Division's hourly rate for the time spent on issuing this order since this is an enforcement action for noncompliance with state regulations. At this time, we have spent approximately one hour on enforcement activities associated with this violation. You will receive a bill sent from our Drinking Water Fee Branch in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a compliance order issued by the Division may file a petition with the State Water Resources Control Board (State Water Board) for reconsideration of the compliance order. Petitions must be received by the State Water Board within 30 calendar days of the issuance of the compliance order. The date of issuance is the date when the Division mails or serves a copy of the compliance order, whichever occurs first. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day. Petitions must be received by 5:00 p.m. Information regarding filing petitions may be found at:
http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml.

If you have any questions regarding this matter, please contact Marianne Watada of my staff at (707) 576-2076 or me at (707) 576-2145.

Sincerely,


Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

FELICIA MARCUS, CHAIR | EILEEN SOBIECK, EXECUTIVE DIRECTOR

500 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov

RECYCLED PAPER

Compliance Order No. 02_18_20R_002
Appendix 2

Jim Berry

- 2 -

November 29, 2018

cc: Kim Gluch
Leslye Choate, Sonoma County Environmental Health Department
Nathan Quarles, Sonoma County Permit and Resource Management
Department
Rami Kahlon, CPUC, Division of Water and Audits, 505 Van Ness Ave, 3rd Floor,
San Francisco, CA 94102

Enclosure: Compliance Order No. 02_18_18R_009

Compliance Order No. 02_18_18R_009

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

COMPLIANCE ORDER NO. 02_18_18R_009

FOR VIOLATION OF:

SURFACE WATER TREATMENT RULE, CALIFORNIA CODE OF REGULATIONS

§64650 THROUGH 64666,

AND WATER SUPPLY PERMIT NUMBER 02-18-10P-4900508

CAZADERO WATER COMPANY, INC.

4900508

Section 116655 of the California Health and Safety Code (hereinafter "CHSC") authorizes the issuance of a compliance order to a public water system for violations or threatened violations of the California Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4, (commencing with Section 116270) (hereinafter "California SDWA"), or any permit, regulation, or standard issued or adopted thereunder.

The State Water Resources Control Board (hereinafter "Board"), acting by and through its Division of Drinking Water (hereinafter "Division") and the Deputy Director for the Division (hereinafter "Deputy Director"), hereby issues a compliance order (hereinafter "Order") to the Cazadero Water Company, Inc. (hereinafter "the System"), for failure to comply with California Code of Regulations (hereinafter "CCR") Sections 64650 through 64666.

Compliance Order No. 02_18_18R_009

1 A copy of the *Applicable Statutes and Regulations* is located in Appendix 1, which is
2 attached hereto and incorporated herein by this reference.

3
4 **STATEMENT OF FACTS**

5 The System is a community public water system serving a population of 250 through
6 157 service connections. The System serves the town of Cazadero, which consists
7 of a residential area, as well as nine commercial connections including a school,
8 bakery and stores. Approximately half of the residential connections are vacation
9 homes rather than full-time residences.

10
11 The System has five active water sources. There are two shallow wells that are only
12 34 feet deep. They are Well 01 - Buckeye Well, Source Code 4900508 - 001
13 (hereinafter "Buckeye Well") and Well 02 - Hotel Well, Source Code 4900508 - 002
14 (hereinafter "Hotel Well"). There are no Well Drillers logs for these wells. The wells
15 are located along the banks of Austin Creek.

16
17 *E. coli* was detected in Hotel Well in October, November, and December 2010, and in
18 Buckeye Well in August, September, October, and November 2010. The System
19 discontinued monthly raw source sampling in May 2011 and resumed sampling in
20 September 2018. Historical raw bacteriological results for Well 01 - Buckeye Well and
21 Well 02 - Hotel Well are located in Appendix 2.

22
23 In 1997, the Division determined that Buckeye Well and Hotel Well were groundwater
24 under the direct influence of surface water during rainy winter months and the use of
25 the wells was restricted to the period of May 15 to September 15. This was
26 communicated in a letter dated October 20, 1997 and Water Supply Permit 02-03-
27 99P49039 issued November 19, 1999. The System's current Water Supply Permit
28 Number 02-18-10P-4900508 (Permit) was issued November 22, 2010 and limits the

Compliance Order No. 02_18_18R_009

1 use of Buckeye Well and Hotel Well to May 15 to September 15. A copy of Water
2 Supply Permit Number 02-18-10P-4900508 is located in Appendix 3.

3

4 The System has stated that it needs to use Buckeye Well and Hotel Well outside of
5 the May 15 to September 15 time period. The System's Permit required that the
6 Division be notified whenever the System needed to use Buckeye Well or Hotel Well
7 outside the permitted time period. In addition, the Permit required that the System
8 provide 4-log virus inactivation whenever the wells are in use. The System has been
9 complying with the 4-log virus inactivation requirement through sodium hypochlorite
10 disinfection.

11

12 CCR Sections 64650 through 64666 require that sources that are surface water or
13 groundwater under the direct influence of surface water provide multibarrier treatment
14 to protect users from the adverse health effects of microbiological contaminants.
15 Systems must provide a combination of filtration and disinfection that meets a total of
16 3-log reduction of *Giardia lamblia* cysts, 4-log reduction of viruses, and 2-log removal
17 of *Cryptosporidium*.

18

19 On July 7, 2017, the Division issued Compliance Order 02_18_17R_011 to the
20 System with a directive to install surface water treatment by July 31, 2019. A copy of
21 the compliance order is located in Appendix 4.

22

23 The System intends to use the wells year-round, and the wells have been in use since
24 May 28, 2018.

25

Compliance Order No. 02_18_18R_009

DETERMINATIONS

Buckeye Well and Hotel Well are considered to be groundwater under the direct influence of surface water during rainy winter months and the System's Permit restricts the use of the wells to the time period of May 15 to September 15..

The System provides 4-log virus inactivation through disinfection, but does not provide filtration; therefore, by operating the wells outside the May 15 to September 15 time period, the System violates CCR Sections 64650 through 64666 and the conditions of Permit Number 02-18-10P-4900508.

DIRECTIVES

The System is hereby directed to take the following actions whenever the System uses Buckeye Well or Hotel Well outside the May 15 to September 15 time period specified in the System's Permit:

1. Send a written request to the Division for use of the wells.
2. Provide public notification to all customers within 30 days of operating Buckeye Well and Hotel Well. Unless otherwise approved by the Division, provide this notification using the *Notification Template for Tier 2 Surface Water Treatment Rule Failure to Filter*. A copy of this template is located in Appendix 5.

The Division reserves the right to make such modifications to this Order as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Order and shall be deemed effective upon issuance.

Compliance Order No. 02_18_18R_009

1 Nothing in this Order relieves the System of its obligation to meet the requirements of
2 the California SDWA, or any regulation, permit, standard, or order issued or adopted
3 thereunder.

4
5 All submittals required by this Order shall be electronically submitted to the Division
6 at the following address.

7
8 Janice M. Oakley, P.E., Sonoma District Engineer

9 dwpdist18@waterboards.ca.gov

10 The subject line for all electronic submittals corresponding to this Order shall include
11 the following information: Water System name and number, compliance order number
12 and title of the document being submitted.

13 **PARTIES BOUND**

14 This Order shall apply to and be binding upon the System, its owners, shareholders,
15 officers, directors, agents, employees, contractors, successors, and assignees.

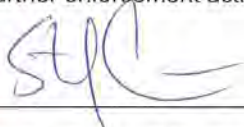
16
17 **SEVERABILITY**

18 The Directives of this Order are severable, and the System shall comply with each
19 and every provision thereof, notwithstanding the effectiveness of any provision.

Compliance Order No. 02_18_18R_009

FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the Board to: issue a citation with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the Board; and to petition the superior court to take various enforcement measures against a public water system that has failed to comply with an order of the Board. The Board does not waive any further enforcement action by issuance of this compliance order.



Nov. 29, 2018

Stefan Cajina, P.E., Chief
North Coastal Section
State Water Resources Control Board
Division of Drinking Water

Date

Appendices (5):

Applicable Statutes and Regulations
Historical Raw Bacteriological Results For Well 01 - Buckeye Well and Well
02 - Hotel Well
Water Supply Permit Number 02-18-10P-4900508 issued November 22, 2010
Compliance Order 02_18_17R_011
Notification Template for Tier 2 Surface Water Treatment Rule Failure to Filter

Certified Mail No. 7016 0910 0001 2050 0273

4900508/Compliance
02_18_18R_009_4900508.docx/MFW



APPENDIX 3.

**Raw Bacteriological Sample Results for
Buckeye Horizontal Well (4900508-005),
Bei Horizontal Well (4900508-006), and
Hotel Spring (4900508-011)**

Raw Buckeye Horizontal Well
Source Code 4900508 – 005
Raw Bacteriological Results
in Most Probable Number per 100 milliliters

Sample Date	Total coliform	<i>E. coli</i>
March 21, 2019	6.3	<1.0
March 8, 2019	49.6	<1.0
February 19, 2019	12.0	<1.0
February 8, 2019	4.1	<1.0
January 25, 2019	3.1	<1.0
January 10, 2019	22.8	<1.0
December 27, 2018	14.5	<1.0
December 13, 2018	7.5	<1.0
November 26, 2018	12.1	<1.0
November 8, 2018	2.2	<1.1
October 11, 2018	2.0	<1.0
September 20, 2018	12.0	<1.0
September 6, 2018	4.1	<1.0
August 23, 2018	165.8	<1.0
August 8, 2018	>2,419.0	<1.0
July 26, 2018	3.1	<1.0
July 13, 2018	23.3	<1.0
June 28, 2018	21.1	<1.0
June 14, 2018	6.3	<1.0
May 31, 2018	<1.0	<1.0
May 17, 2018	2.0	<1.0
May 3, 2018	<1.0	<1.0
April 19, 2018	2.0	<1.0
April 4, 2018	20.1	<1.0
March 22, 2018	12.1	<1.0
March 9, 2018	<1.0	<1.0
January 13, 2011	3.1	<1.0
July 12, 2000	<1.1	<1.1
June 8, 2000	<1.1	<1.1
March 9, 2000	<1.1	<1.1
February 9, 2000	A	A
January 12, 2000	A	A
October 20, 1999	A	A

Raw Bei Horizontal Well
Source Code 4900508 – 006
Bacteriological Results
in Most Probable Number per 100 milliliters

Sample Date	Total coliform	<i>E. coli</i>
March 21, 2019	209.8	<1.0
March 8, 2019	21.6	<1.0
February 19, 2019	95.9	<1.0
February 8, 2019	64.4	<1.0
January 25, 2019	6.3	<1.0
January 10, 2019	31.3	<1.0
December 27, 2018	29.2	<1.0
December 13, 2018	8.6	<1.0
November 26, 2018	143.9	<1.0
November 8, 2018	2.2	<1.1
October 25, 2018	<1.0	<1.0
October 11, 2018	1.0	<1.0
September 20, 2018	7.5	<1.0
September 6, 2018	12.1	<1.0
August 23, 2018	2.0	<1.0
August 8, 2018	5.2	<1.0
July 26, 2018	12.3	<1.0
July 13, 2018	1,986.3	<1.0
June 28, 2018	76.7	<1.0
June 14, 2018	37.3	<1.0
May 31, 2018	42.0	<1.0
May 17, 2018	55.6	<1.0
May 3, 2018	86.2	<1.0
April 19, 2018	53.8	<1.0
April 4, 2018	73.8	<1.0
March 22, 2018	224.7	<1.0
March 9, 2018	50.6	<1.0
January 13, 2011	22.8	<1.0
December 6, 2000	<1.1	<1.1
November 8, 2000	<1.1	<1.1
October 11, 2000	<1.1	<1.1
September 6, 2000	<1.1	<1.1
August 9, 2000	<1.1	<1.1
July 12, 2000	<1.1	<1.1
June 8, 2000	<1.1	<1.1
April 5, 2000	<1.1	<1.1
March 9, 2000	<1.1	<1.1
February 9, 2000	A	A
January 12, 2000	A	A
October 20, 1999	A	A

Hotel Spring
Source Code 4900508 – 011
Raw Bacteriological Results
in Most Probable Number per 100 milliliters

Sample Date	Total coliform	<i>E. coli</i>
March 21, 2019	93.3	<1.0
March 8, 2019	33.6	<1.0
February 19, 2019	42.0	<1.0
February 8, 2019	56.5	<1.0
January 25, 2019	145.0	1.0
January 10, 2019	78.5	2.0
December 27, 2018	45.9	<1.0
December 13, 2018	62.0	<1.0
November 26, 2018	131.4	1.0
November 8, 2018	9.2	<1.1
October 25, 2018	5.2	<1.0
October 11, 2018	11.0	<1.0
September 20, 2018	5.2	<1.0
September 6, 2018	5.2	<1.0
August 23, 2018	1.0	<1.0
August 8, 2018	18.3	<1.0
July 26, 2018	4.1	<1.0
July 13, 2018	214.3	<1.0
June 28, 2018	<1.0	<1.0
June 14, 2018	72.7	<1.0
May 31, 2018	51.2	<1.0
May 17, 2018	275.5	<1.0
May 3, 2018	34.1	<1.0
April 19, 2018	37.3	<1.0
April 4, 2018	35.9	<1.0
March 22, 2018	248.9	<1.0
March 9, 2018	214.3	1.0
February 21, 2018	93.3	<1.0
February 12, 2018	52.0	<1.0
January 26, 2018	206.4	<1.0
January 11, 2018	109.1	<1.0
December 27, 2017	47.9	<1.0
December 13, 2017	45.7	<1.0
November 29, 2017	98.8	<1.0
November 17, 2017	79.4	1.0
November 1, 2017	4.1	<1.0
October 18, 2017	82.0	<1.0
October 5, 2017	52.0	<1.0
September 13, 2017	24.8	<1.0
August 10, 2017	365.4	<1.0
June 29, 2017	90.5	<1.0

APPENDIX 4.

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION (Form 7-00b)

The “Request a Water Supply Permit Amendment Application (Form 7-00b)”
can be downloaded here:

https://www.waterboards.ca.gov/drinking_water/programs/districts/docs/sonoma/permit_forms/7_00b_amended_permit_application_request_form_fillable.pdf

State Water Resources Control Board
Division of Drinking Water
50 D Street, Suite 200
Santa Rosa, CA 95404-3752
(707) 576-2145 Fax: (707) 576-2722

7-00b

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION

Water System Name:

System No.:

Site Address:

Water System Owner (Property Owner):

Address:

Phone No.:

Email:

Person Completing This Form:

Title:

Address:

Phone No.:

Email:

What is the general purpose for your permit application request? Check all that apply.

- | | |
|--|--|
| ☐ Change of ownership | ☐ Addition of storage tank >100,000 gallons |
| ☐ Change in source of supply: | ☐ Distribution system increase by >20% |
| ☐ Add (Submit State of California Well Completion Report(s), if applicable) | ☐ Change in treatment (describe below): |
| ☐ Remove | ☐ Add |
| ☐ Status change | ☐ Remove |
| | ☐ Other change |

Are CEQA or NEPA documents required? ☐ Yes ☐ No ☐ Unknown

Are CEQA or NEPA documents available? ☐ Yes ☐ No

- ☐ Attach CEQA documentation. Include if applicable:
- Notice of Exemption (NOE)
 - Notice of Determination (NOD)
 - If project is non-exempt provide the final conditions of either the Negative Declaration (ND), Mitigated Negative Declaration (MND), or Environmental Impact Report (EIR)

If proposing new water system facilities, please describe the *reason* for such facilities:

Please describe the *proposed* water system facilities (source[s], treatment [including purpose], storage, service area):

Will the *proposed* changes to the water system components and/or infrastructure require changes to the existing building footprint(s) or increased capacity? ☐ Yes ☐ No If yes, please describe:
(e.g. construction of a new treatment shed, expansion of service area to newly constructed facilities):

Will the proposed changes to the water system components and/or infrastructure require any ground disturbing actions? ☐ Yes ☐ No If yes, please describe:

Will there be increased or new discharges from the proposed changes to the water system?
☐ Yes ☐ No If yes, please describe:
(e.g. increased backwash discharge, new treatment with backwashing, disposal of brine)

Consolidation Potential: Is your system located within one (1) mile of a public water system?
If yes, list the system name(s) and approximate distance?

☐ Attach any County permitting documents (Use/Planning Permit application and Conditions of Approval)

Please describe the project timeline:

Construction start date:

Construction completion date:

Comments:

Section 116525 (a) of the California Health and Safety code: No person shall operate a public water system unless he or she first submits an application to the department and receives a permit as provided in this chapter. A change in ownership of a public water system shall require the submission of a new application.

Section 116550 (a) of the California Health and Safety code: No person operating a public water system shall modify, add to or change his or her source of supply or method of treatment of, or change his or her distribution system as authorized by a valid existing permit issued to him or her by the department unless the person first submits an application to the department and receives an amended permit as provided in this chapter authorizing the modification, addition, or change in his or her source of supply or method of treatment.

For Division Use Only

Date Stamp Below

☐ For new well amended permit copy RWQCB staff when emailing checklist to applicant

R:\DDW\SantaRosa\SRData\Staff\0 Common Links\All Tech Handouts ORIGINAL\7_00b_amended_permit_application_request_form_fillable.pdf

**APPENDIX 5: NOTIFICATION TEMPLATE FOR TIER 2 SURFACE WATER
TREATMENT RULE FAILURE TO FILTER**

The template can be downloaded at:

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/notices/tier2notice_swtr_failfilter.doc

Instructions for Tier 2 SWTR Failure to Filter Notice Template

Template Attached

Since surface water treatment technique violations are included in Tier 2, you must provide public notice to persons served as soon as practical but within 30 days after you learn of the violation [California Code of Regulations, Title 22, Chapter 15, Section 64463.4(b)]. **Each water system required to give public notice must submit the notice to the State Water Resources Control Board, Division of Drinking Water (DDW) for approval prior to distribution or posting, unless otherwise directed by the DDW [64463(b)].**

Notification Methods

You must use the methods summarized in the table below to deliver the notice to consumers. If you mail, post, or hand deliver, print your notice on letterhead, if available.

<i>If You Are a...</i>	<i>You Must Notify Consumers by...</i>	<i>...and By One or More of the Following Methods to Reach Persons Not Likely to be Reached by the Previous Method...</i>
Community Water System [64463.4(c)(1)]	Mail or direct delivery ^(a)	Publication in a local newspaper
		Posting ^(b) in conspicuous public places served by the water system or on the Internet
		Delivery to community organizations
Non-Community Water System [64463.4(c)(2)]	Posting in conspicuous locations throughout the area served by the water system ^(b)	Publication in a local newspaper or newsletter distributed to customers
		Email message to employees or students
		Posting ^(b) on the Internet or intranet
		Direct delivery to each customer

(a) Notice must be distributed to each customer receiving a bill including those that provide their drinking water to others (e.g., schools or school systems, apartment building owners, or large private employers), and other service connections to which water is delivered by the water system.

(b) Notice must be posted in place for as long as the violation or occurrence continues, but in no case less than seven days.

The notice attached is appropriate for the methods described above. However, you may wish to modify it before using it for posting. If you do, you must still include all the required elements and leave the health effects and notification language in italics unchanged. This language is mandatory [64465].

Multilingual Requirement

The notice must (1) be provided in English, Spanish, and the language spoken by any non-English-speaking group exceeding 10 percent of the persons served by the water

system and (2) include a telephone number or address where such individuals may contact the water system for assistance.

If any non-English-speaking group exceeds 1,000 persons served by the water system, but does not exceed 10 percent served, the notice must (1) include information in the appropriate language(s) regarding the importance of the notice and (2) contain the telephone number or address where such individuals may contact the water system to obtain a translated copy of the notice from the water system or assistance in the appropriate language.

Population Served

Make sure it is clear who is served by your water system -- you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with surface water treatment technique violations. Use one or more of the following actions, if appropriate, or develop your own:

- "Our filtration system needs upgrades to meet the requirements."
- "We are installing filtration. We expect that the filtration system will be operational by [month, year]."
- "We are monitoring for turbidity (cloudiness), disinfectant levels, and the presence of bacteria. We continue to meet the standards for these measurements."

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met all the public notice requirements to the DDW within ten days after you issue the notice [64469(d)]. You should also issue a follow-up notice in addition to meeting any repeat notice requirements the DDW sets.

It is recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately.

It is a good idea to issue a "problem corrected" notice when the violation is resolved.

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Este informe contiene información muy importante sobre su agua potable.
Tradúzcalo o hable con alguien que lo entienda bien.

[System]

Does Not Meet Treatment Requirement (Filtration)

Our water system recently violated a drinking water standard. Although this is not an emergency, as our customers, you have a right to know what you should do, what happened, and what we are doing to correct this situation.

On [date], the State Water Resources Control Board, Division of Drinking Water (DDW) ordered us to filter the water in addition to disinfecting. We are required to install this filtration because we do not have an adequate watershed control program in place. However, we have not yet installed a filtration system.

What should I do?

- **You do not need to boil your water or take other actions.**
- This is not an emergency. If it had been, you would have been notified immediately. We do not know of any cases of contamination. However, until improvements are made, there is an increased chance that disease-causing organisms could contaminate the water supply.
- *Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. These symptoms, however, are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.*
- A home filter will not necessarily solve the problem, because not all home filters protect against parasites. For information on appropriate filters, call NSF International at 1(800) 673-6275, the Water Quality Association at (630) 505-0160, or the State Water Resources Control Board's, Residential Water Treatment Device Registration Unit at (916) 323-0372 or visit the State Board's website at www.swrcb.ca.gov.
- People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from U.S. EPA's Safe Drinking Water Hotline at 1(800) 426-4791.
- If you have other health issues concerning the consumption of the water, you may wish to consult your doctor.

What happened? What is being done?

Filtration is the best method for removing these organisms. [Describe corrective action]. We anticipate resolving the problem within [estimated time frame]. Until filtration is installed, you will receive a notice similar to this every three months.

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this public notice in a public place or distributing copies by hand or mail.

Secondary Notification Requirements

Upon receipt of notification from a person operating a public water system, the following notification must be given within 10 days [Health and Safety Code Section 116450(g)]:

- SCHOOLS: Must notify school employees, students, and parents (if the students are minors).
- RESIDENTIAL RENTAL PROPERTY OWNERS OR MANAGERS (including nursing homes and care facilities): Must notify tenants.
- BUSINESS PROPERTY OWNERS, MANAGERS, OR OPERATORS: Must notify employees of businesses located on the property.

This notice is being sent to you by [system].

State Water System ID#: _____ Date distributed: _____

**APPENDIX 6
CERTIFICATION OF COMPLETION OF PUBLIC NOTIFICATION**

Compliance Order Number: 02_18_20R_002

Name of Water System: Cazadero Water Company, Inc.

System Number: 4900508

Attach a copy of the public notice distributed to the water system's customers.

This form, when completed and sent to dwpdist18@waterboards.ca.gov for the Division of Drinking Water, Sonoma District, 50 D Street, Suite 200, Santa Rosa, CA 95404, certifies that public notification to water users was completed as required by Title 22, California Code of Regulations, Sections 64463-64465.

Public notification for failure to comply with the California Code of Regulations, Surface Water Treatment Rule Section 64650 through 64666 was conducted on:

Notification was made on _____
(date).

For the month, year of _____, _____.

To summarize report delivery used and good-faith efforts taken, please check all items below that apply and fill-in where appropriate:

For Community and non-transient non-community public water systems

☐ The notice was distributed by mail or direct delivery to each customer on: _____

One or more of the following methods were used to reach persons not likely to be reached by a mailing or direct delivery or persons served by a transient public water system (renters, nursing home patients, prison inmates, etc.):

☐ Posted the notice at the following conspicuous locations served by the water system. (If needed, please attach a list of locations). _____

☐ Publication of the notice in a local newspaper or newsletter of general circulation (attach a copy of the published notice, including name of newspaper and date published).

☐ Posted the notice on the Internet at www._____

☐ Other method used to notify customers. _____

I hereby certify that the above information is factual.

Certified by: Printed Name _____ Title _____

Signature _____

Date _____

Disclosure: Be advised that the California Health and Safety Code, Sections 116725 and 116730 state that any person who knowingly makes any false statement on any report or document submitted for the purpose of compliance with the Safe Drinking Water Act may be liable for, respectively, a civil penalty not to exceed five thousand dollars (\$5,000) for each separate violation or, for continuing violations, for each day that violation continues, or be punished by a fine of not more than \$25,000 for each day of violation, or by imprisonment in the county jail not to exceed one year, or by both the fine and imprisonment.

APPENDIX 7: Notification of Receipt

Compliance Order Number: 02_18_20R_002

Name of Water System: Cazadero Water Company, Inc.

System Number: 4900508

Certification

I certify that I am an authorized representative of the Cazadero Water Company, Inc. and that Compliance Order No. 02_18_20R_002 was received on _____.

Further I certify that the Order has been reviewed by the appropriate management staff of the Cazadero Water Company, Inc. and it is clearly understood that Compliance Order No. 02_18_20R_002 contains legally enforceable directives with specific due dates.

Signature of Water System Representative

Date

**THIS FORM MUST BE COMPLETED AND RETURNED TO THE STATE WATER
BOARD,
DIVISION OF DRINKING WATER, NO LATER THAN SEPTEMBER 4, 2020**

Disclosure: Be advised that the California Health and Safety Code, Sections 116725 and 116730 state that any person who knowingly makes any false statement on any report or document submitted for the purpose of compliance with the Safe Drinking Water Act may be liable for, respectively, a civil penalty not to exceed five thousand dollars (\$5,000) for each separate violation or, for continuing violations, for each day that violation continues, or be punished by a fine of not more than \$25,000 for each day of violation, or by imprisonment in the county jail not to exceed one year, or by both the fine and imprisonment.



State Water Resources Control Board

Division of Drinking Water

February 17, 2021

System No. 4900508

Jim Berry, President
Cazadero Water Company, Inc.
P.O. Box 423
Cazadero, CA 95421

CITATION NO. 02_18_21C_012
FAILURE TO SUBMIT THE ELECTRONIC ANNUAL REPORT
FOR 2019

Enclosed is Citation No. 02_18_21C_012 (hereinafter "Citation"), issued to the Cazadero Water Company, Inc. (hereinafter "System") public water system. Please note that there are legally enforceable deadlines associated with this Citation.

The System will be billed at the State Water Resources Control Board's (hereinafter "State Water Board") hourly rate for the time spent on issuing this Citation. California Health and Safety Code (hereinafter "CHSC") Section 116577, provides that a public water system must reimburse the State Water Board for actual costs incurred by the State Water Board for specified enforcement actions, including preparing, issuing and monitoring compliance with a citation. At this time, the State Water Board has spent approximately one hour on enforcement activities associated with this violation.

The System will receive a bill sent from the State Water Board in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a citation, order or decision issued under authority delegated to an officer or employee of the State Water Board under Article 8 (commencing with CHSC, Section 116625) or Article 9 (commencing with CHSC, Section 116650), of the Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4), may file a petition with the State Water Board for reconsideration of the citation, order or decision.

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

50 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov

Petitions must be received by the State Water Board within 30 days of the issuance of the citation, order or decision by the officer or employee of the State Water Board. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day by 5:00 p.m.

Information regarding filing petitions may be found at:

http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Lyz Solorzano of my staff at elizabeth.solorzano@waterboards.ca.gov.

General inquiries to our office can be made by emailing dwpdist18@waterboards.ca.gov or by calling (707) 576-2145.

Sincerely,

Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Enclosures

Certified Mail No. 7017 3040 0000 9798 1006

4900508/Compliance
02_18_21C_012_4900508_05\$/EMS

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

Name of Public Water System: Cazadero Water Company, Inc.

Water System No: 4900508

Attention: Jim Berry

P.O. Box 423

Cazadero, CA 95421

Physical Address: 6150 Cazadero Highway, Cazadero, CA 95421

Issued: February 17, 2021

CITATION FOR NONCOMPLIANCE
CALIFORNIA HEALTH AND SAFETY CODE, DIVISION 104, PART 12
CHAPTER 4, ARTICLE 7, SECTION 116530

FAILURE TO SUBMIT 2019 ANNUAL REPORT VIOLATION

The California Health and Safety Code (hereinafter "CHSC"), Section 116650 authorizes the State Water Resources Control Board (hereinafter "State Water Board"), to issue a citation to a public water system when the State Water Board determines that the public water system has violated or is violating the California Safe Drinking Water Act (hereinafter "California SDWA"), (CHSC, Division 104, Part 12, Chapter 4, commencing

with Section 116270), or any regulation, standard, permit, or order issued or adopted thereunder.

The State Water Board, acting by and through its Division of Drinking Water (hereinafter "Division"), and the Deputy Director for the Division, hereby issues Citation No. 02_18_21C_012 (hereinafter "Citation"), pursuant to Section 116650 of the CHSC to the Cazadero Water Company, Inc. (hereinafter "System"), for violation of CHSC, Division 104, Part 12, Chapter 4, Article 7, Section 116530 – *Technical Report*.

STATEMENT OF FACTS

Pursuant to Section 116530 of the CHSC, the System must submit a technical report to the State Water Board when requested. The State Water Board has established a requirement for public water system to annually submit a technical report specifying contact and operational information for the prior calendar year. On February 18, 2020, the State Water Board sent to all administrative contacts of public water systems an email notification that the Annual Report for Calendar Year 2019 was due to be submitted by April 20, 2020. This notice also included instructions on how to submit the report electronically to the State Water Board. On March 27, 2020, the State Water Board sent to all administrative contacts of public water systems an email notification that the deadline for submitting the Annual Report for Calendar Year 2019 was extended to September 1, 2020. (A copy of the February 18 and March 27, 2020 email notifications with instructions are provided in Appendix 1.) On September 15, 2020 an email was sent reminding the System that the 2019 Annual Report was due by September 1, 2020 and had not yet been submitted. On September 25, 2020, a second reminder email was sent to the System that the 2019 Annual Report had still not yet been submitted. On October 2, 2020, Citation 02_18_20C_056 was issued to the System for failure to submit the 2019 Annual Report, with a due date of November 2,

2020. (A copy of citation 02_18_20C_056 is provided in Appendix 2.) As of the date of this Citation, the State Water Board has not received the Annual Report from the System.

DETERMINATION

The State Water Board has determined that the System has failed to comply with CHSC, Division 104, Part 12, Chapter 4, Article 7, Section 116530 by failing to submit an electronic Annual Report for 2019.

PENALTY PURSUANT TO HEALTH AND SAFETY CODE SECTION 116650

The State Water Board hereby assesses upon the System an administrative penalty in the amount of \$500.00. The System is directed to pay this penalty in accordance with the requirements set forth in Directive 2 of this Citation.

DIRECTIVES

The System is hereby directed to take the following actions:

1. By **March 19, 2021**, complete an Annual Report for 2019 and submit it to the State Water Board. Instructions for completing and submitting the Annual Report may be found at <http://drinc.ca.gov/ear>.
2. Submit to the State Water Board by **March 19, 2021**, a check for the administrative penalty of \$500.00 imposed by this Citation and a copy of the form, which is attached as Appendix 3, hereto entitled "Notice of Administrative Penalty." The Citation number must be written on the check. The check must be made payable to the **State Water Resources Control Board** and submitted to:

SWRCB Accounting Office
ATTN: Drinking Water Program Fees
P.O. Box 1888
Sacramento, CA 95812-1888

All submittals required by this Citation, unless otherwise specified in the directives above, must be electronically submitted to the State Water Board at the following address. The subject line for all electronic submittals corresponding to this Citation must include the following information: Water System name and number, citation number and title of the document being submitted.

Janice M. Oakley, P.E., Sonoma District Engineer
dwpdist18@waterboards.ca.gov

The State Water Board reserves the right to make modifications to this Citation as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Citation and shall be deemed effective upon issuance.

Nothing in this Citation relieves the System of its obligation to meet the requirements of the California SDWA (CHSC, Division 104, Part 12, Chapter 4, commencing with Section 116270), or of any regulation, standard, permit or order issued or adopted thereunder.

PARTIES BOUND

This Citation shall apply to and be binding upon the System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

1 **SEVERABILITY**

2 The directives of this Citation are severable, and the System shall comply with each and
3 every provision thereof, notwithstanding the effectiveness of any other provision.
4

5 **FURTHER ENFORCEMENT ACTION**

6 The California SDWA authorizes the State Water Board to: issue a citation or order with
7 assessment of administrative penalties to a public water system for violation or continued
8 violation of the requirements of the California SDWA or any regulation, permit, standard,
9 citation, or order issued or adopted thereunder including, but not limited to, failure to
10 correct a violation identified in a citation or compliance order. The California SDWA also
11 authorizes the State Water Board to take action to suspend or revoke a permit that has
12 been issued to a public water system if the public water system has violated applicable
13 law or regulations or has failed to comply with an order of the State Water Board, and to
14 petition the superior court to take various enforcement measures against a public water
15 system that has failed to comply with an order of the State Water Board. The State Water
16 Board does not waive any further enforcement action by issuance of this Citation.
17
18

19 _____
20 Stefan Cajina, P.E., Chief
21 North Coastal Section
22 State Water Resources Control Board
23 Division of Drinking Water
24

February 17, 2021

Date

25 Appendices (3)

- 26
27 1. 2019 Annual Report Notification with Instructions
28 2. Citation 02_18_20C_056
29 3. Notice of Administrative Penalty Form
30

31 Certified Mail No. 7017 3040 0000 9798 1006

APPENDIX 1 – 2019 ANNUAL REPORT NOTIFICATION WITH INSTRUCTIONS

From: lyris@swrcb18.waterboards.ca.gov <lyris@swrcb18.waterboards.ca.gov>
Sent: Tuesday, February 18, 2020 4:23 PM
To: Crisologo, Joseph@Waterboards <Joseph.Crisologo@waterboards.ca.gov>
Subject: Electronic Annual Report (EAR) to the Division of Drinking Water



This is a message from the State Water Resources Control Board.

Hello Public Water System Representative:

The time has arrived to complete the electronic annual report (EAR) to the State Water Resources Control Board's (State Board) [Division of Drinking Water](#) (DDW) on the operation of your public water system during the past year (2019).

The 2019 electronic Annual Report to the Drinking Water Program (2019 EAR) is due to be submitted by **April 20, 2020**. Please note that if you have previously registered for access to the [EAR website](#) for the 2019 reporting year, you do not need to register again.

If you have any questions that are not addressed in the [FAQ](#) or [User Guidance Document](#), please contact your local regulatory agency or send an email to DRINC@waterboards.ca.gov.

For contact information for your local regulatory agency, please reference the links identifying [DDW District Offices](#) or [LPA county environmental health agencies](#).

Thank you for your cooperation in completing the Annual Report.

You are currently listed to drinkingwater_public_water_systems as:
Joseph.Crisologo@waterboards.ca.gov.

Division of Drinking Water Website: http://www.waterboards.ca.gov/drinking_water/

This email is being sent to you because you were identified by your agency as the Administrative Contact or Carbon Copy Contact. If you are not the Administrative Contact or Carbon Copy Contact for your agency, please contact the local Division of Drinking Water (DDW) District Office or your regulating agency.

For a map of the district offices, please go to
http://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/DDWdistrictofficesmap.pdf

From: lyris@swrcb18.waterboards.ca.gov <lyris@swrcb18.waterboards.ca.gov>
Sent: Friday, March 27, 2020 9:48 AM
To: Crisologo, Joseph@Waterboards <Joseph.Crisologo@waterboards.ca.gov>
Subject: DEADLINE EXTENSIONS: 2019 Electronic Annual Report (EAR)

EXTERNAL:



This is a message from the State Water Resources Control Board.

Hello Public Water Systems:

Due to the extenuating circumstances we are all facing during the COVID-19 crisis, the State Water Board's Division of Drinking Water (DDW) is extending the deadline for submission of the 2019 Electronic Annual Report (EAR) according to the following phased schedule. However, if your water system is able to submit the 2019 EAR prior to these new deadlines, the information you provide will assist in critical program implementation for the new Safe and Affordable Funding for Equity and Resilience (SAFER).

New EAR Deadline	Who it applies to:
July 1, 2020	Community Systems with at least 3,000 service connections
August 1, 2020	Community systems with fewer than 3,000 service connections
September 1, 2020	Noncommunity water systems (NTNC, TNC)

Any specific hardships to meet these new deadlines should be discussed with your regulator, the DDW District Engineer or county LPA representative.

Thank you

You are currently listed to drinkingwater_public_water_systems as:
Joseph.Crisologo@waterboards.ca.gov.

Division of Drinking Water Website: http://www.waterboards.ca.gov/drinking_water/

This email is being sent to you because you were identified by your agency as the eAR Contact, Administrative Contact, Operator Contact, or Carbon Copy Contact. If you are not the eAR Contact, Administrative Contact, Operator Contact, or Carbon Copy Contact for your agency, please contact the local Division of Drinking Water (DDW) District Office or your regulating agency.

For a map of the district offices, please go to
http://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/DDWdistrictofficesmap.pdf

APPENDIX 2 – CITATION 02_18_20C_056



State Water Resources Control Board Division of Drinking Water

October 2, 2020

System No. 4900508

Jim Berry President
Cazadero Water Company, Inc.
P.O. Box 423
Cazadero, CA 95421

CITATION NO. 02_18_20C_056 FAILURE TO SUBMIT THE ELECTRONIC ANNUAL REPORT CAZADERO WATER COMPANY, INC.

Enclosed is Citation No. 02_18_20C_056 (hereinafter "Citation"), issued to the Cazadero Water Company, Inc. (hereinafter "System"), public water system. Please note there are legally enforceable deadlines associated with this Citation.

The System will be billed at the State Water Resources Control Board's (hereinafter "State Water Board"), hourly rate for the time spent on issuing this Citation. California Health and Safety Code (hereinafter "CHSC"), Section 116577, provides that a public water system must reimburse the State Water Board for actual costs incurred by the State Water Board for specified enforcement actions, including but not limited to, preparing, issuing and monitoring compliance with a citation. At this time, the State Water Board has spent approximately one hour(s) on enforcement activities associated with this violation.

The System will receive a bill sent from the State Water Board in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a citation, order or decision issued by the Deputy Director of the Division of Drinking Water under Article 8 (commencing with CHSC, Section 116625) or Article 9 (commencing with CHSC, Section 116650), of the Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4), may file a petition with the State Water Board for reconsideration of the citation, order or decision. Appendix 1 to the enclosed Citation contains the relevant statutory provisions for filing a petition for reconsideration (CHSC, Section 116701).

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

50 D Street, Suite 200, Santa Rosa, CA 95404 | www.waterboards.ca.gov

APPENDIX 2 – CITATION 02_18_20C_056

Jim Berry

-2-

October 2, 2020

Petitions must be received by the State Water Board within 30 days of the issuance of the citation, order or decision by the Deputy Director. The date of issuance is the date when the Division of Drinking Water mails a copy of the citation, order or decision. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day by 5:00 p.m.

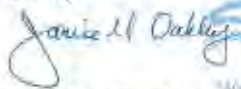
Information regarding filing petitions may be found at:

http://www.waterboards.ca.gov/drinking_water/programs/petitions/index.shtml

If you have any questions regarding this matter, please contact Elizabeth Solorzano of my staff at (707) 576-2046.

General inquiries to our office can be made by emailing dwpdist18@waterboards.ca.gov or by calling (707) 576-2145.

Sincerely,



Digitally signed by Janice M
Oakley
Date: 2020.10.02 09:28:57 -07'00'

Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Certified Mail No. 7017 0530 0000 8323 0580

4900508/Compliance
02_18_20C_056_4900508_05/EMS

E. Jacquelyn Epand/epand.j@waterboards.ca.gov | Evelyn Solorzano, ewsol@waterboards.ca.gov
U.S. District Court for the District of California, San Francisco | www.waterboards.ca.gov

PDF GENERATED BY

APPENDIX 2 – CITATION 02_18_20C_056

Citation No. 02_18_20C_056

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

Name of Public Water System: Cazadero Water Company, Inc.

Water System No: 4900508

Attention: Cazadero Water Company, Inc.

P.O. Box 423

Cazadero, CA 95421

Issued: October 2, 2020

CITATION FOR NONCOMPLIANCE
CALIFORNIA HEALTH AND SAFETY CODE, DIVISION 104, PART 12
CHAPTER 4, ARTICLE 7, SECTION 116530

FAILURE TO SUBMIT 2019 ANNUAL REPORT VIOLATION

The California Health and Safety Code (hereinafter "CHSC"), Section 116650 authorizes the State Water Resources Control Board (hereinafter "State Water Board"), to issue a citation to a public water system when the State Water Board determines that the public water system has violated or is violating the California Safe Drinking Water Act (hereinafter "California SDWA"), (CHSC, Division 104, Part 12, Chapter 4,

APPENDIX 2 – CITATION 02_18_20C_056

Citation No. 02_18_20C_056

commencing with Section 116270), or any regulation, standard, permit, or order issued or adopted thereunder.

The State Water Board, acting by and through its Division of Drinking Water (hereinafter "Division"), and the Deputy Director for the Division, hereby issues Citation No. 02_18_20C_056 (hereinafter "Citation"), pursuant to Section 116650 of the CHSC to the Cazadero Water Company, Inc. (hereinafter "System"), for violation of CHSC, Division 104, Part 12, Chapter 4, Article 7, Section 116530 – *Technical Report*.

STATEMENT OF FACTS

Pursuant to Section 116530 of the CHSC, the System must submit a technical report to the State Water Board when requested. The State Water Board has established a requirement for public water system to annually submit a technical report specifying contact and operational information for the prior calendar year. On February 18, 2020, the State Water Board sent to all administrative contacts of public water systems an email notification that the Annual Report for Calendar Year 2019 was due to be submitted by April 20, 2020. This notice also included instructions on how to submit the report electronically to the State Water Board. On March 27, 2020, the State Water Board sent to all administrative contacts of public water systems an email notification that the deadline for submitting the Annual Report for Calendar Year 2019 was extended to September 1, 2020. (A copy of the February 18 and March 27, 2020 email notifications are provided in Appendix 1.) On September 15, 2020 an email was sent reminding the System that the 2019 Annual Report was due by September 1, 2020 and had not yet been submitted. On September 25, 2020 a second reminder email was sent to the System that the 2019 Annual Report had still not yet been submitted. The System failed to submit the report by the due date. As of the date of this Citation, the State Water Board has not received the 2019 Annual Report from the System.

APPENDIX 2 – CITATION 02_18_20C_056

Citation No. 02_18_20C_056

DETERMINATION

The State Water Board has determined that the System has failed to comply with CHSC, Division 104, Part 12, Chapter 4, Article 7, Section 116530 by failing to submit an electronic Annual Report for 2019.

DIRECTIVES

The System is hereby directed to take the following actions:

1. By **November 2, 2020** complete an Annual Report for 2019 and submit it to the State Water Board. Instructions for completing and submitting the Annual Report may be found at <http://drinc.ca.gov/ear>.
2. By **October 23, 2020** complete and return to the State Water Board the "Notification of Receipt" form attached to the Citation at Appendix 2. Completion of this form confirms that the System has received this Citation and understands that it contains legally enforceable directive(s) with due dates.

All submittals required by this Citation, unless otherwise specified in the directives above, must be electronically submitted to the State Water Board at the following address. The subject line for all electronic submittals corresponding to this Citation must include the following information: Water System name and number, citation number and title of the document being submitted.

Janice M. Oakley, P.E., Sonoma District Engineer
dwpdist18@waterboards.ca.gov

APPENDIX 2 – CITATION 02_18_20C_056

Citation No. 02_18_20C_056

1 The State Water Board reserves the right to make such modifications to this Citation as
2 it may deem necessary to protect public health and safety. Such modifications may be
3 issued as amendments to this Citation and shall be deemed effective upon issuance.

4
5 Nothing in this Citation relieves the System of its obligation to meet the requirements of
6 the California SDWA (CHSC, Division 104, Part 12, Chapter 4, commencing with
7 Section 116270), or of any regulation, standard, permit or order issued or adopted
8 thereunder.

9 10 PARTIES BOUND

11 This Citation shall apply to and be binding upon the System, its owners, shareholders,
12 officers, directors, agents, employees, contractors, successors, and assignees.

13 14 SEVERABILITY

15 The directives of this Citation are severable, and the System shall comply with each
16 and every provision thereof, notwithstanding the effectiveness of any other provision.

17 18 FURTHER ENFORCEMENT ACTION

19 The California SDWA authorizes the State Water Board to: issue a citation or order with
20 assessment of administrative penalties to a public water system for violation or
21 continued violation of the requirements of the California SDWA or any regulation,
22 permit, standard, citation, or order issued or adopted thereunder including, but not
23 limited to, failure to correct a violation identified in a citation or compliance order. The
24 California SDWA also authorizes the State Water Board to take action to suspend or
25 revoke a permit that has been issued to a public water system if the public water system
26 has violated applicable law or regulations or has failed to comply with an order of the
27 State Water Board, and to petition the superior court to take various enforcement

APPENDIX 2 – CITATION 02_18_20C_056

Citation No. 02_18_20C_056

measures against a public water system that has failed to comply with an order of the State Water Board. The State Water Board does not waive any further enforcement action by issuance of this Citation.

Janice M Oakley



Digitally signed by Janice M Oakley
Date: 2020.10.02 09:29:58 -07'00'

Janice M. Oakley, P.E., District Engineer Date
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD



Appendices (2)

1. 2019 Annual Report Notification with instructions
2. Notification of Receipt form

Certified Mail No. 7017 0530 0000 8323 0580

Appendix 3 - NOTICE OF ADMINISTRATIVE PENALTY FORM

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

Notice of Administrative Penalty

System Name: Cazadero Water Company, Inc.

System Number: 4900508

Background

On February 10, 2021, the Division of Drinking Water issued Citation 02_18_21C_012 to Cazadero Water Company, Inc. The Citation carried a civil penalty in the amount of \$500.00.

Method of Payment

A check for the total amount of the civil penalty and a copy of this form must be submitted to the State Water Board by **March 19, 2021**. The Citation number must be written on the check, the check made payable to the **State Water Resources Control Board**, and submitted to:

SWRCB Accounting Office
ATTN: Drinking Water Program Fees
P.O. Box 1888
Sacramento, CA 95812-1888

Attach check below:



State Water Resources Control Board

Division of Drinking Water

June 30, 2021

System No. 4900508

Jim Berry, President
Cazadero Water Company, Inc.
P.O. Box 423
Cazadero, CA 95421

CITATION NO. 02_18_21C_055

FAILURE TO SUBMIT THE ANNUAL REPORT FOR 2020

Enclosed is Citation No. 02_18_21C_055 (hereinafter "Citation"), issued to the Cazadero Water Company, Inc. (hereinafter "System") public water system. Please note that there are legally enforceable deadlines associated with this Citation.

The System will be billed at the State Water Resources Control Board's (hereinafter "State Water Board") hourly rate for the time spent on issuing this Citation. California Health and Safety Code (hereinafter "CHSC") Section 116577, provides that a public water system must reimburse the State Water Board for actual costs incurred by the State Water Board for specified enforcement actions, including preparing, issuing and monitoring compliance with a citation.

The System will receive a bill sent from the State Water Board in August of the next fiscal year. This bill will contain fees for any enforcement time spent on the System for the current fiscal year.

Any person who is aggrieved by a citation, order or decision issued under authority delegated to an officer or employee of the State Water Board under Article 8 (commencing with CHSC, Section 116625) or Article 9 (commencing with CHSC, Section 116650), of the Safe Drinking Water Act (CHSC, Division 104, Part 12, Chapter 4), may file a petition with the State Water Board for reconsideration of the citation, order or decision.

Petitions must be received by the State Water Board within 30 days of the issuance of the citation, order or decision by the officer or employee of the State Water Board. If the 30th day falls on a Saturday, Sunday, or state holiday, the petition is due the following business day by 5:00 p.m.

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

464 W. 4th Street, #437, San Bernardino, CA 92401 | www.waterboards.ca.gov

Information regarding filing petitions may be found at:

[Drinking Water Petitions for Reconsideration](#)

https://www.waterboards.ca.gov/drinking_water/programs/petitions/instructions.html

If you have any questions regarding this matter, please contact Lyz Solorzano of my staff at elizabeth.solorzano@waterboards.ca.gov.

General inquiries can be made by emailing dwpdist18@waterboards.ca.gov, or by calling (707) 576-2145.

Sincerely,

Janice M. Oakley, P.E.,
Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Enclosures

Certified Mail No. 7020 1290 0000 1614 2962

**STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER**

Name of Public Water System: Cazadero Water Company, Inc.

Water System No: 4900508

Attention: Jim Berry

P.O. Box 423

Cazadero, CA 95421

Issued: June 30, 2021

**CITATION FOR NONCOMPLIANCE
CALIFORNIA HEALTH AND SAFETY CODE, SECTION 116530**

FAILURE TO SUBMIT 2020 ANNUAL REPORT VIOLATION

The California Health and Safety Code (hereinafter "CHSC"), Section 116650 authorizes the State Water Resources Control Board (hereinafter "State Water Board"), to issue a citation to a public water system when the State Water Board determines that the public water system has violated or is violating the California Safe Drinking Water Act (hereinafter "California SDWA"), (CHSC, Division 104, Part 12, Chapter 4, commencing with Section 116270), or any regulation, standard, permit, or order issued or adopted thereunder.

The State Water Board, acting by and through its Division of Drinking Water (hereinafter “Division”), and the Deputy Director for the Division, hereby issues Citation No. 02_18_21C_055 (hereinafter “Citation”), pursuant to Section 116650 of the CHSC to the Cazadero Water Company, Inc. (hereinafter “System”), for violation of CHSC, Section 116530.

STATEMENT OF FACTS

Pursuant to Section 116530 of the CHSC, the System must submit a technical report to the State Water Board when required by the State Water Board. The State Water Board has established a requirement for public water systems to annually submit a technical report specifying contact and operational information for the prior calendar year (hereinafter “Annual Report”). On April 27, 2021, the State Water Board sent an email that the 2020 Annual Report for this System was due to be submitted by May 14, 2021. The language from the notice is included in Appendix 1. As of the date of this Citation, the State Water Board has not received the 2020 Annual Report from the System.

DETERMINATION

The State Water Board has determined that the System has failed to comply with CHSC, Section 116530 by failing to submit an Annual Report for 2020.

DIRECTIVES

The System is hereby directed to take the following actions:

1. By **July 30, 2021**, complete an Annual Report for 2020 and submit it to the State Water Board. Instructions for completing and submitting the Annual Report may be found at [Water Boards Annual Report](https://ear.waterboards.ca.gov/) (<https://ear.waterboards.ca.gov/>).

All submittals required by this Citation, unless otherwise specified in the directives above, must be electronically submitted to the State Water Board at the following address. The subject line for all electronic submittals corresponding to this Citation must include the following information: Water System name and number, citation number and title of the document being submitted.

Janice M. Oakley, P.E., Sonoma District Engineer
Dwpdist18@waterboards.ca.gov

The State Water Board reserves the right to make modifications to this Citation as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Citation and shall be deemed effective upon issuance.

Nothing in this Citation relieves the System of its obligation to meet the requirements of the California SDWA (CHSC, Division 104, Part 12, Chapter 4, commencing with Section 116270), or of any regulation, standard, permit or order issued or adopted thereunder.

PARTIES BOUND

This Citation shall apply to and be binding upon the System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The directives of this Citation are severable, and the System shall comply with each and every provision thereof, notwithstanding the effectiveness of any other provision.

FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the State Water Board to: issue a citation or order with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the State Water Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the State Water Board, and to petition the superior court to take various enforcement measures against a public water system that has failed to comply with an order of the State Water Board. The State Water Board does not waive any further enforcement action by issuance of this Citation.

Janice M. Oakley, P.E., Sonoma District Engineer
Division of Drinking Water
STATE WATER RESOURCES CONTROL BOARD

Date

Appendices:

1. 2020 Annual Report Notification

Certified Mail No. 7020 1290 0000 1614 2962

APPENDIX 1 – 2020 ANNUAL REPORT NOTIFICATION

From: lyris@swrcb18.waterboards.ca.gov
To:
Subject: 2020 EAR deadline reminder
Date: Tuesday, April 27, 2021 4:02:50 PM

EXTERNAL

 **This is a message from the State Water Resources Control Board.**

Hello Public Water System Representative:

We have reached the midpoint of the statewide effort to submit the electronic annual report (EAR) to the State Water Resources Control Board's (State Board) Division of Drinking Water (DDW) on the operation of your public water system during the past calendar year (2020).

You are receiving this email because your water system has been identified as one that has not yet started their EAR and has until **May 14, 2021** to be submitted. EARs not submitted by this deadline will be considered late and may be subject to enforcement.

You may access the [EAR Portal](https://ear.waterboards.ca.gov/) using the following link: <https://ear.waterboards.ca.gov/>.
Note: the previous EAR portal under drinc.waterboards.ca.gov can not be used to submit your 2020 EAR.

Please go to the [EAR Assistance website](#) if you have any questions. You will find links to helpful documents such as the [EAR FAQ](#), [User Guidance Document](#), and [Help Tips](#), along with information on how to seek technical assistance if there is a specific section of the 2020 EAR that you are having difficulty completing. You may also contact your local regulatory agency or send an email to DRINC@waterboards.ca.gov.

For contact information for your local regulatory agency, please reference the links identifying [DDW District Offices](#) or [LPA county environmental health agencies](#).

Thank you for your cooperation in completing the Electronic Annual Report.

[Division of Drinking Water](#)

You are currently listed to [drinkingwater_public_water_systems](#) as:
Dan.Wang@waterboards.ca.gov.

Division of Drinking Water Website: http://www.waterboards.ca.gov/drinking_water/

This email is being sent to you because you were identified by your agency Contact Person. If you are not the Contact Person for your agency, please contact the local Division of Drinking

Appendix B - Filterability Analysis Results

DRAFT

Source: Hotel Spring

Turbidity, NTU: 0.68

Filter: None

UVT (%): 99.1

UVA (1/cm): 0.003

Size, um	Particles (cnts/mL)
2 - 3	351
3 - 5	231
5 - 7	119
7 - 10	84
10 - 15	86
15 - 25	55
25 - 50	22
>50	0

Total Counts Per mL

950

Source: Hotel Spring

Filter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	0.10
0.6 um	-
0.4 um	-
0.2 um	-

Source: Hotel Spring

Turbidity, NTU: 0.14

Filter: Harmsco LT2 1.0 um Absolute

UVT (%):

UVA (1/cm):

Size, um	Particles (cnts/mL)
2 - 3	2
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

3

Log Reduction: 2.50

Source:

Turbidity, NTU:

Filter:

UVT (%):

UVA (1/cm):

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Source: Buckeye WellTurbidity, NTU: 1.14Filter: NoneUVT (%): 97.5UVA (1/cm): 0.010

Size, um	Particles (cnts/mL)
2 - 3	194
3 - 5	109
5 - 7	58
7 - 10	33
10 - 15	26
15 - 25	7
25 - 50	1
>50	0

Total Counts Per mL

428

Source: Buckeye WellFilter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	0.41
0.6 um	0.30
0.4 um	0.14
0.2 um	0.05

Source: Buckeye WellTurbidity, NTU: 0.65Filter: Harmsco LT2 1.0 um AbsoluteUVT (%): 97.5UVA (1/cm): 0.010

Size, um	Particles (cnts/mL)
2 - 3	3
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

4

Log Reduction: 2.03

Source: _____

Turbidity, NTU: _____

Filter: _____

UVT (%): _____

UVA (1/cm): _____

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Source: Buckeye/Bei WellTurbidity, NTU: 3.29Filter: NoneUVT (%): 93.4UVA (1/cm): 0.029

Size, um	Particles (cnts/mL)
2 - 3	442
3 - 5	284
5 - 7	149
7 - 10	99
10 - 15	83
15 - 25	36
25 - 50	8
>50	0

Total Counts Per mL

1,102Source: Buckeye/Bei WellFilter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	0.81
0.6 um	0.50
0.4 um	0.18
0.2 um	0.10

Source: Buckeye/Bei WellTurbidity, NTU: 1.68Filter: Harmsco LT2 1.0 um AbsoluteUVT (%): UVA (1/cm):

Size, um	Particles (cnts/mL)
2 - 3	1
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

2Log Reduction: **2.74**Source: Turbidity, NTU: Filter: UVT (%): UVA (1/cm):

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Source: Buckeye WellTurbidity, NTU: 5.06Filter: NoneUVT (%): 91.5UVA (1/cm): 0.038

Size, um	Particles (cnts/mL)
2 - 3	509
3 - 5	231
5 - 7	76
7 - 10	32
10 - 15	16
15 - 25	4
25 - 50	1
>50	0

Total Counts Per mL

869

Source: _____

Filter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	-
0.6 um	-
0.4 um	-
0.2 um	-

Source: Buckeye WellTurbidity, NTU: 3.61Filter: Harmsco LT2 1.0 um AbsoluteUVT (%): 92.9UVA (1/cm): 0.031

Size, um	Particles (cnts/mL)
2 - 3	3
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

4

Log Reduction: 2.34

Source: _____

Turbidity, NTU: _____

Filter: _____

UVT (%): _____

UVA (1/cm): _____

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Source: Hotel WellTurbidity, NTU: 4.86Filter: NoneUVT (%): 92.1UVA (1/cm): 0.035

Size, um	Particles (cnts/mL)
2 - 3	2,365
3 - 5	1,256
5 - 7	452
7 - 10	197
10 - 15	101
15 - 25	22
25 - 50	1
>50	0

Total Counts Per mL

4,394

Source: _____

Filter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	-
0.6 um	-
0.4 um	-
0.2 um	-

Source: Hotel WellTurbidity, NTU: 3.20Filter: Harmsco LT2 1.0 um AbsoluteUVT (%): 93.2UVA (1/cm): 0.03

Size, um	Particles (cnts/mL)
2 - 3	2
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

3Log Reduction: **3.17**

Source: _____

Turbidity, NTU: _____

Filter: _____

UVT (%): _____

UVA (1/cm): _____

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Source: Buckeye source Turbidity, NTU: 3.62
Filter: None UVT (%): 96.6
UVA (1/cm): 0.015

Size, um	Particles (cnts/mL)
2 - 3	3,839
3 - 5	2,812
5 - 7	1,126
7 - 10	413
10 - 15	156
15 - 25	26
25 - 50	3
>50	0

Total Counts Per mL

8,375

Source: _____
Filter: Syringe/membrane filter

Membrane Size	NTU
0.8 um	-
0.6 um	-
0.4 um	-
0.2 um	-

Source: Buckeye Source Turbidity, NTU: 0.95
Filter: Harmsco LT2 1.0 um Absolute UVT (%): 97.7
UVA (1/cm): 0.010

Size, um	Particles (cnts/mL)
2 - 3	2
3 - 5	1
5 - 7	0
7 - 10	0
10 - 15	0
15 - 25	0
25 - 50	0
>50	0

Total Counts Per mL

3Log Reduction: **3.45**

Source: _____ Turbidity, NTU: _____
Filter: _____ UVT (%): _____
UVA (1/cm): _____

Size, um	Particles (cnts/mL)
2 - 3	
3 - 5	
5 - 7	
7 - 10	
10 - 15	
15 - 25	
25 - 50	
>50	

Total Counts Per mL

Appendix C - PJC Geotechnical Report

DRAFT



PJC & Associates, Inc.

Consulting Engineers & Geologists

June 23, 2020

Job No. 9766.01

Cazadero Water Company
Attention: Jim Berry
P.O. Box 423
Cazadero, CA 95421
Jim@cazaderowaterco.com

Subject: Geotechnical Investigation
Proposed Water Tank Stabilization Project
Luther Tank
Pearl Avenue
Cazadero, California

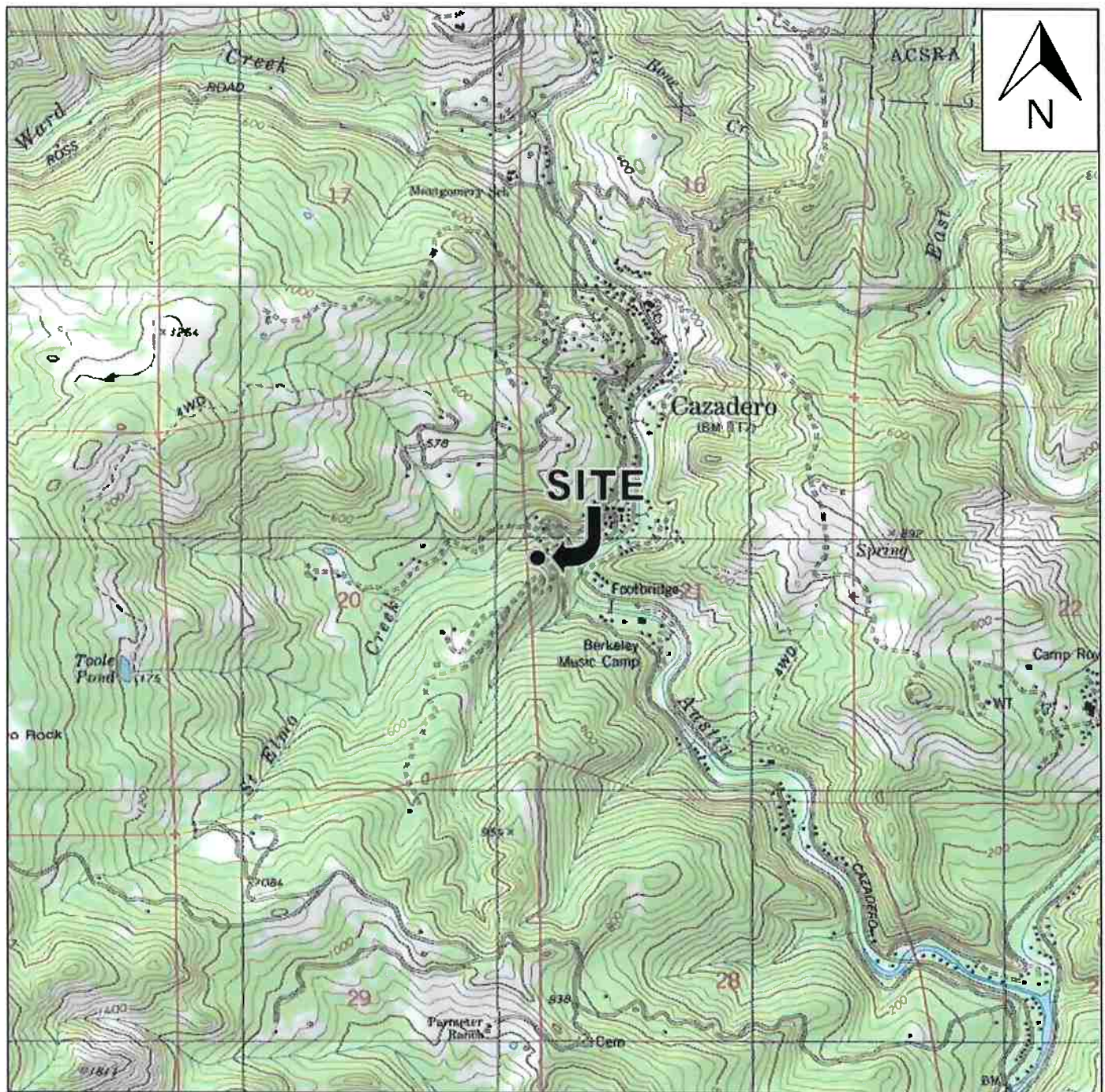
Dear Jim:

PJC & Associates, Inc. (PJC) is pleased to submit this report presenting the results of our geotechnical investigation for the distressed water tank located off of Pearl Avenue in Cazadero, California. The approximate location of the site is shown on the Site Location Map, Plate 1. The site geographic latitudinal and longitudinal coordinates are 38.5256 °N and 123.0911°W, based on GPS measurements performed at the site. Our services were completed in accordance with our proposal for geotechnical engineering services, dated April 1, 2020, and your authorization to proceed with the work dated April 8, 2020. The purpose of our work was to explore the surface and subsurface conditions at the site and to provide geotechnical recommendations to stabilize the water tank which is being actively undermined by a landslide. Based on the results of our investigation, we judge that the project is feasible from a geotechnical engineering standpoint provided the recommendations and criteria presented in this report are incorporated in design and carried out through construction.

1. PROJECT DESCRIPTION

Project plans were unavailable at the time of this report. Based on information provided by you and our field observations, it appears that the existing concrete water tank at the site is being undermined by an active landslide. The project will consist of stabilizing the water tank as well as repairing the active landslide to mitigate future slope failures.

Structural loading information was not available at the time of this investigation. For our analysis, we anticipate that structural foundation loads will be light with dead plus live continuous wall loads less than two kips per lineal foot (plf) and dead plus live isolated column loads less than 50 kips. If these assumed loads vary significantly from the actual loads, we should be consulted to review the actual loading conditions and, if necessary, revise the recommendations of this report.



SCALE: 1:24,000

REFERENCE: USGS CAZADERO 7.5 MINUTE
QUADRANGLE, DATED 2002.



PJC & Associates, Inc.
Consulting Engineers & Geologists

SITE LOCATION MAP
PROPOSED WATER TANK STABILIZATION
PEARL AVENUE
CAZADERO, CALIFORNIA

PLATE

1

Proj. No: 9766.01

Date: 6/20

App'd by: PJC

Grading and drainage plans were unavailable at the time of this report. Based on site topography and our subsurface findings, we anticipate cuts and fills of approximately 10 to 20 feet to stabilize the landslide, underpin the water tank, and provide adequate drainage.

2. SCOPE OF SERVICES

The purpose of this investigation was to evaluate the subsurface conditions at the site and develop geotechnical criteria for design and construction of the proposed project. Specifically, the scope of our services consisted of the following:

- a. Excavating two exploratory test pits to depths of 5.5 and 12.0 feet below the existing ground surface to observe the soil, bedrock, and groundwater conditions around the water tank. Our certified engineering geologist was on site to log the materials encountered in the test pits and to obtain representative samples for visual classification and laboratory testing.
- b. Performing laboratory tests on selected samples to assist in the evaluation of the index and engineering properties of the subsurface soils and bedrock at the site.
- c. Reviewing seismological and geologic literature on the site area, discussing site geology and seismicity, and evaluating slope stability
- d. Perform engineering analyses to develop geotechnical recommendations for site preparation and earthwork, foundation type(s) and design criteria, lateral earth pressures, settlement, surface and subsurface drainage control and construction considerations.
- e. Preparation of this formal report summarizing our work on the project.

3. SITE CONDITIONS

- a. General. The project site is located in a rural forested and residential area approximately 330 feet southwest of the intersection of Kramer Road and Austin Creek Road. The site is occupied by the existing distressed water tank, locally known as the "Luther Tank". The rectangular water tank is approximately 20 feet wide by 37 feet long and consists of a concrete structure with a metal roof. It is our understanding that the tank has a capacity of approximately 36,000 gallons. The southern margin of the tank is partially buried below the adjacent grades. We also noted that the tank had previous remediation repairs and currently has approximately 20-inch-thick concrete walls. The active landslide undermines the northwestern corner of the tank.

- b. Topography and Drainage. The project site is situated on a generally northeast facing hillside above St. Elmo Creek. Our interpretation of surface features and our subsurface findings indicate that the water tank was originally constructed on a cut and fill pad, with adjacent relatively steep sloping terrain. The crown of the landslide consists of an approximately three foot tall nearly vertical scarp which intersects and underlies the northwestern corner of the concrete water tank. Site drainage generally consists of surface infiltration and sheet flow that extends to the north to St. Elmo Creek and east to Austin Creek. We observed that the metal roof has installed roof gutters with downspouts that daylight on the steep slope below the water tank.

4. GEOLOGIC SETTING

The site is located in the Coast Ranges Geomorphic Province of California. This province is characterized by northwest trending topographic and geologic features, and includes many separate ranges, coalescing mountain masses and several major structural valleys. The province is bounded on the east by the Great Valley and on the west by the Pacific Ocean. It extends north into Oregon and south to the Transverse Ranges in Ventura County.

The structure of the northern Coast Ranges region is extremely complex due to continuous tectonic deformation imposed over a long period of time. The initial tectonic episode in the northern Coast Ranges was a result of plate convergence, which is believed to have begun during the late Jurassic period. This process involved eastward thrusting of oceanic crust beneath the continental crust (Klamath Mountains and Sierra Nevada) and the scraping off of materials that are now accreted to the continent (northern Coast Ranges). East-dipping thrust and reverse faults were believed to be the dominant structures formed.

Right lateral, strike slip deformation was superimposed on the earlier structures beginning mid-Cenozoic time, and has progressed northward to the vicinity of Cape Mendocino in Southern Humboldt County. Thus, the principal structures south of Cape Mendocino are northwest trending, nearly vertical faults of the San Andreas system.

According to published geologic literature prepared by the U.S. Geologic Survey (USGS), the site has been mapped to be underlain by greywacke and a mélange of bedrock units of the Jurassic-Cretaceous Franciscan Complex (KJfs). This portion of the Franciscan Complex generally consists of bedrock units comprised of greywacke, sheared shale, and sandstone that contain resistant masses of chert, blueschist, eclogite, and typically weak serpentinite bedrock. These rocks were initially formed in the Jurassic Period during the initial plate convergence and accretion. As a result of deep and large-scale tectonic processes, the bedrock units tend to be highly sheared, fractured, and pervasively shattered. Consequently, often the strength, degree of weathering and therefore the

engineering characteristics of Franciscan Complex bedrock units can vary drastically over relatively short distances. Based on our site reconnaissance, schist and sheared shale Franciscan Complex bedrock were encountered in our exploratory test pit at the upper south margin of the water tank. Fill and landslide deposits (Q_{ls}) overlying residual soil strata and friable serpentinite bedrock were encountered in our exploratory test pit at the lower northwestern margin of the water tank. A detailed description of the subsurface conditions encountered in our subsurface investigation is explained in Section 7 of this report.

5. FAULTING

Geologic structures in the region are primarily controlled by northwest-trending dextral faults. The site is not located within the current Alquist-Priolo Earthquake Fault Zone boundaries. According to the USGS National Seismic Hazard Map (2008), the closest known active faults to the site are the San Andreas, the Rodgers Creek, and the Maacama. The San Andreas is located 5.9 miles to the west, the Rodgers Creek is located 16.7 miles to the east, and the Maacama is located 18.7 miles to the northeast of the site. Table 1 outlines the nearest known active faults and their associated maximum magnitudes.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance From Site (Miles)	Maximum Earthquakes (Moment Magnitude)
San Andreas	5.9	7.9
Rodgers Creek	16.7	7.3
Maacama	18.7	7.4

Reference – USGS 2008 National Seismic Hazard Maps

6. SEISMICITY

The site is located within a zone of high seismic activity related to the active faults that transverse through the surrounding region. Future damaging earthquakes could occur on any of these fault systems during the lifetime of the proposed project. In general, the intensity of ground shaking at the site will depend upon the distance to the causative earthquake epicenter, the magnitude of the shock, the response characteristics of the underlying earth materials, and the quality of construction. Seismic considerations and hazards are discussed in the following subsections of this report.

7. SUBSURFACE CONDITIONS

- a. Soils and Bedrock. The subsurface conditions at the project site were investigated by excavating two exploratory test pits around the project site. The test pits were excavated to depths of 5.5 and 12.0 feet below the existing ground surface. The approximate test pit locations are shown on

the Test Pit Location Plan, Plate 2. The test pits were excavated to observe the soil, bedrock, and groundwater conditions at the site, and to collect samples of the underlying soils and bedrock for visual examination and laboratory testing. Detailed descriptions of the subsurface conditions encountered during the investigation are presented on the Test Pit Logs, Plates 3 and 4. The excavation, sampling procedures and laboratory procedures are included in Appendices A and B, respectively.

TP-1, excavated at the south margin of the water tank encountered schist bedrock underlain by sheared shale of the Franciscan Complex (KJfs). The schist extended to 2.5 feet below the existing ground surface and appeared soft, friable, and highly weathered. The underlying sheared shale extended to the maximum depth explored (5.5 feet) and appeared weak, slightly hard, and highly weathered.

TP-2, excavated off the northwest corner of the water tank, generally encountered landslide deposits consisting of sandy clays overlying sandy clay residual soil and friable serpentinite bedrock of the Franciscan Complex. The landslide deposit extended approximately 6.0 feet below the existing ground surface and appeared moist to wet, soft to medium stiff, and exhibited medium plasticity characteristics. Underlying the landslide deposit, residual soil strata was encountered and extended 10.5 feet below the existing ground surface. The residual soil strata appeared very moist, medium stiff to stiff, and exhibited medium to high plasticity characteristics. The underlying serpentinite bedrock extended to the maximum depth explored and appeared soft, friable, and highly weathered.

- b. Groundwater. Groundwater was not encountered at the time of our subsurface exploration on May 6, 2020. No obvious indications of spring activity or surface seepage were observed at the project site during our field investigation. Subsurface seepage or perched groundwater zones could develop during and following prolonged rainfall. We recommend that control of surface and subsurface drainage be incorporated into design and construction of the project.

8. SLOPE STABILITY

- a. Global Slope Stability. Based on our review of the California Division of Mines and Geology Special Report 120, the site is located in an area of relatively unstable rock and soil units on slopes greater than 15 percent (Category C). This area generally contains abundant landslides. Several landslides have been mapped in the surrounding region of the project site.
- b. Local Slope Stability. The landslide at the northwestern corner of the water tank appears to consist of a rotational slump failure which subsequently developed into an earth flow. Based on our field estimations, the landslide zone of depletion was on the order of 60 to 70 feet long and approximately

20 to 30 feet wide. Movement is generally in a northerly direction. At the crown, the vertical height of the landslide headscarp was about three feet high. The depth of the landslide rupture plane is estimated to range from approximately 6 to 15 feet below the surface. Our site reconnaissance and subsurface exploration revealed that the landslide likely occurred due to a combination of unfavorable geologic units, poor surface and subsurface drainage features, unkeyed and undrained fill deposits, and potentially surcharging conditions. Due to the surface and subsurface conditions, it is likely that the landslide will further impact the water tank if left unrepaired. Therefore, we recommend that the landslide be repaired and that the water tank be underpinned with drilled piers.

9. CONCLUSIONS

Based on the results of our study, we judge that there is a high risk of continued headward and lateral advancement and enlargement if the active landslide is not repaired. Therefore, we recommend that the landslide be stabilized by removing the entire landslide mass to down to stable unruptured material and reconstructing the hillside as a compacted earth fill buttress with internal subdrainage.

In addition to repairing the landslide we recommend that the water tank should be underpinned with drilled cast-in-place concrete piers extending at least 20 feet below the existing ground surface. The drilled piers should be designed to withstand soil creep forces. The cavity below the water tank should be filled in with lean-slurry concrete. If any retaining walls will be constructed for the project, they should also be supported by drilled cast-in-place concrete piers.

The following sections provide geotechnical recommendations and criteria for design and construction of landslide mitigation.

10. LANDSLIDE REPAIR - COMPACTED EARTH FILL BUTTRESS

The landslide can be repaired as a compacted earth fill buttress as described in the previous section. A schematic detail of the buttress fill is presented on Plate 1A.

- a. Stripping. The areas to be graded should be stripped of surface vegetation, and the upper few inches of soil containing organic matter. The strippings should be removed from these areas and stockpiled for reuse as topsoil for finished graded slopes.
- b. Benching and Keying. Following site stripping, a keyway approximately 10 to 15 feet wide should be excavated at the toe of the fill buttresses as located by the geotechnical engineer in the field during grading. The depth of the keyway should extend at least five feet below the slide plane and into firm bedrock, as measured from the downhill side. The depth of the keyway could extend to depths of 10 to 15 feet or greater. The actual depth should be determined by the geotechnical engineer in the field during construction.

The bottom of the keyway should be scarified to a depth of eight inches, moisture conditioned to within two percent of optimum moisture content and compacted to at least 90 percent of the maximum dry density of the materials, as determined by the ASTM D1557-12e1 laboratory compaction test procedure. A subdrain consisting of a four-inch, heavy walled, perforated pipe with Class II permeable drain rock should be placed at the uphill side of the keyway. The pipe should consist of SDR 35 or equivalent. The Class II permeable material should extend at least three feet above the base of the keyway. The perforated pipe should outlet into a solid line that discharges into erosion resistant area down slope from the fill slope.

- c. Excavation and Compaction. The excavated materials generated during keying and benching may be used as compacted engineered fill. Fill material should be spread in eight inch thick loose lifts, moisture conditioned to within two percent of optimum and compacted to at least 90 percent relative compaction. As the fill continues upslope, additional keyways and subdrains will be required. Plate 1A provides a schematic detail of the buttress fill.

Imported fill, if necessary, should have a liquid limit of 40 or less and a plasticity index of 15 or less. The imported fill material should be no more than four inches in size and free of vegetation. Provided that reasonably dry conditions prevail during grading, we anticipate that temporary excavation slopes will remain stable at inclinations of 1H:1V. Flatter temporary slopes may be necessary.

- d. Cut and Fill Slopes. Cut and fill slopes should be graded to an inclination no steeper than 2H:1V. Steeper slopes should be retained. If potentially unstable subsurface conditions such as adverse bedding, joint planes, zones of weakness, weak clay zones, or exposed seepage are encountered, it may be necessary to flatten slopes or provide other treatment. It is recommended that a geotechnical engineer observe the cut slopes and provide final recommendations for the control of adverse conditions during grading operations, if encountered. During the rainy season, the cut slopes should be checked for springs or seepage areas. The surfaces of the cut slopes should be treated as needed in order to minimize the possibility of slumping and erosion.
- e. Erosion Control. To minimize the probability of slumping and/or erosion of fill slopes, the faces of the slopes should be properly treated. The slopes should be constructed at least two feet (horizontally) beyond the planned final face plane using proper compaction equipment and be compacted to a minimum of 90 percent relative compaction. The slope face should then be trimmed back to the final face plane. This operation should expose properly compacted material on the finished face of the slope. Disturbed slopes should be planted or seeded with deep-rooted ground cover and covered

with straw matting to prevent erosion. Surface drainage should be directed away from cut and fill slopes. The exterior slopes should be protected from erosion as determined by the project civil engineer.

A representative of PJC should observe all site preparation and fill placement. It is important that during the stripping, grading and scarification processes, a representative of our firm should be present to observe whether any undesirable material is encountered in the construction area.

Generally, grading is most economically performed during the summer months when on-site soils are usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to excessive moisture in the on-site soils. Special and relatively expensive construction procedures should be anticipated if grading must be completed during the winter and early spring.

11. WATER TANK UNDERPINNING FOUNDATION: DRILLED CAST-IN-PLACE PIERS

- a. Vertical Loads. The undermined portion of the water tank and adjacent approximately five linear feet along the water tank should be underpinned with drilled, cast-in-place concrete piers with a minimum of 18 inches in diameter and spaced at least three pier diameters center to center. The piers will derive their support through peripheral friction. Piers should extend at least 20 feet below the existing ground surface, regardless of structural loads, and at least 10 feet into emplace unruptured soils or friable serpentinite bedrock, as determined by the geotechnical engineer in the field. The piers should be reinforced and designed by the project structural engineer. All of the piers should be designed to withstand an eight-foot soil creep zone. All piers should be tied together with grade or tie beams. The grade beams should be designed to span between the piers in accordance with structural requirements. The tie or grade beams should not be spaced no greater than 15 feet apart in both directions.

The piers may be designed using an allowable dead plus live skin friction of 650 pounds per square foot (psf). The top eight feet should be neglected for vertical capacity. This value may be increased by one-third for short duration wind and seismic loads. A value of one-half the vertical capacity of the pier should be used to resist uplift forces. End bearing should be neglected because of difficulty in cleaning out small diameter pier holes and the uncertainty of mobilizing skin friction and end bearing simultaneously.

- b. Lateral Loads. Lateral loads resulting from wind, soil creep, or earthquakes can be resisted by the piers through a combination of cantilever action and passive resistance of the soil surrounding the pier. A passive equivalent fluid pressure of 350 pounds per square foot per one foot of depth acting on two pier diameters should be used. The upper eight should be neglected

for passive resistance. The lateral pressures used in design should be equal to an active equivalent fluid pressure of 60 pounds per square foot per one foot of depth (psf/ft) acting on two pier diameters.

- c. Settlement. The maximum and differential settlement of the piers is estimated to be small and within tolerable limits.
- d. Drilling Conditions. If groundwater is encountered, it may be necessary to de-water the holes and/or place concrete by the tremie method. If caving soils are encountered, it may be necessary to case the holes.

12. RETAINING WALLS

- a. Static Lateral Earth Pressures. Retaining walls free to rotate on the top should be designed to resist active lateral earth pressures. If walls are restrained by rigid elements to prevent rotation or supporting compacted engineered fill, they should be designed for "at rest" lateral earth pressures.

Retaining walls should be designed to resist the following earth pressures (triangular distribution):

Active Pressure (level backfill) (15% or less)	50 psf/ft
At Rest Pressure (level backfill) (15% or less)	65 psf/ft
Active Pressure (sloping backfill)	65 psf/ft
At Rest Pressure (sloping backfill)	80 psf/ft

The use of heavy, multi-ton compaction equipment such as large sheepsfoot rollers should not be allowed within a distance equal to one-half of the total wall height from the back face of retaining walls or the walls should be designed for additional induced lateral earth pressures. Excessive pressures will cause the walls to deflect excessively.

- b. Pseudostatic Force. For retaining walls taller than six feet, the horizontal pseudostatic force acting upon the retaining wall during a seismic event should be calculated from the following equation:

$$P_E = 15.3 H^2 \text{ where,}$$

$$P_E = \text{Pseudostatic Force (lbs)}$$

$$H = \text{retained height (ft)}$$

The location of the pseudostatic force is assumed to act at a distance of 0.33H above the base of the wall.

- c. Drainage. We recommend that a backdrain be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The

backdrains should consist of four-inch diameter SDR 35 perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining Class II permeable drain rock. The Class II permeable drain rock should extend 12 inches horizontally from the back face of the wall and extend from the bottom of the wall to one foot below the finished ground surface. The upper 12 inches should be backfilled with compacted fine-grained soil to exclude surface water. We recommend that the ground surface behind retaining walls be sloped to drain. Under no circumstances should surface water be diverted into retaining wall backdrains. Where migration of moisture through walls would be detrimental, the walls should be waterproofed.

13. SEISMIC DESIGN

Based on criteria presented in the 2019 edition of the California Building Code (CBC) and ASCE (American Society of Civil Engineers) STANDARD ASCE/SEI 7-16, the following minimum criteria should be used in seismic design:

- a. Site Class: C
- b. Mapped Acceleration Parameters: $S_s = 1.50 \text{ g}$
 $S_1 = 0.60 \text{ g}$
- c. Spectral Response Acceleration Parameters: $S_{MS} = 1.80 \text{ g}$
 $S_{M1} = 0.84 \text{ g}$
- d. Design Spectral Acceleration Parameters: $S_{DS} = 1.20 \text{ g}$
 $S_{D1} = 0.56 \text{ g}$

14. DRAINAGE

- a. General. Seepage was not encountered in our exploratory test pits at the time of our subsurface investigation however could be encountered during the landslide repair. Whenever water seepage is observed, the condition must be evaluated by the geotechnical engineer prior to covering with fill materials to assess whether a drainage blanket or subdrain is required.
- b. Surface Drainage. Drainage control design should include provisions for positive surface gradients so that surface runoff is not permitted to pond, particularly above the repaired slope. Surface runoff should be directed away from the landslide areas. We recommend the construction of a V-ditch above the water tank and landslide to divert water from area. Water collected should be discharged to an existing watercourse or erosion resistant area. PJC should approve the drainage discharge locations. The use of rock lined drainage swales may be necessary. If the drainage facilities discharge onto the natural ground, adequate means should be provided to control erosion and to create sheet flow.

- c. Keyway Subdrains. A subdrain consisting of a four-inch, heavy walled, perforated pipe with Class II permeable drain rock should be placed at the uphill side of the keyway. The pipe should consist of SDR 35 or equivalent. The Class II permeable material should extend at least three feet above the base of the keyway. The perforated pipe should outlet into a solid line that discharges into erosion resistant area down slope from the fill slope.
- d. Interceptor Drain. We recommend that an interceptor drain should be constructed above, and along the western margin of the water tank. The actual location and depth of the trench should be determined in the field, we anticipate it will be on the order of three to five feet below the ground surface. The bottom of the trench should be lined with a few inches of Class 2 permeable drain rock. A SDR-35 four inch diameter, perforated pipe, with holes down and sloped to drain, should be placed on top of the thin layer of Class 2 permeable drain rock. The trench should then be backfilled to within 12 inches of the finished surface with drain rock. The upper 12 inches should consist of compacted soil to reduce surface water inclusion.
- e. Retaining Wall Backdrains. We recommend all retaining walls be provided with backdrains or the walls should be designed for full hydrostatic conditions. Retaining wall backdrain design specifications are provided in the retaining wall section of this report.

15. LIMITATIONS

The data, information, interpretations and recommendations in this report are presented solely as bases and guides for the geotechnical design of the distressed water tank located off of Pearl Avenue in Cazadero, California. PJC developed the conclusions and professional opinions presented herein in accordance with generally accepted geotechnical engineering principles and practices. As with all geotechnical reports, the opinions expressed here are subject to revisions in light of new information, which may be developed in the future, and no warranties are either expressed or implied.

This report has not been prepared for use by parties other than the designers of the project. It may not contain sufficient information for the purpose of other parties or other uses. If any changes are made in the project as described in this report, the conclusions and recommendations contained herein should not be considered valid unless the changes are reviewed by PJC, and the conclusions and recommendations are modified and approved in writing. This report and the drawings contained herein are intended only for the design of the proposed structure. They are not intended to act by themselves as construction drawings or specifications.

Soil deposits and bedrock formations may vary in type, strength, and many other important properties between the points of observation and exploration.

Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations, or for other reasons. Therefore, it must be recognized that PJC does not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The criteria presented are based upon the findings at the points of exploration and upon interpretative data, including interpolation and extrapolation of information obtained at points of observation.

16. ADDITIONAL SERVICES

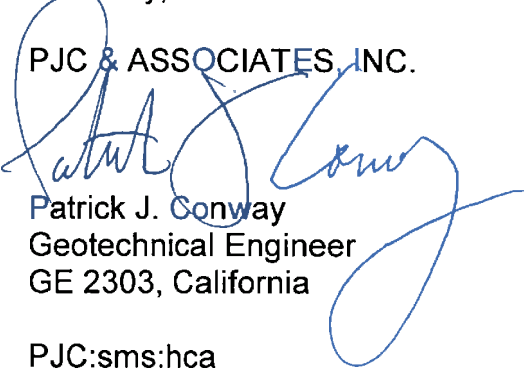
Upon completion of the project plans, they should be reviewed by our firm to confirm that the design is consistent with the recommendations of this report. During the course of this investigation, several assumptions were made regarding building loads and development concepts. Should our assumptions differ significantly from the final intent of the project designers, our office should be notified of the changes to assess any potential need for revised recommendations. Observation and testing services should be provided by PJC to verify that the intent of the plans and specifications is carried out during construction; these services should include observing and testing during grading, observation of keyway excavations, observation of drilled piers, and observing construction of drainage facilities.

These services will be performed only if PJC is provided with sufficient notice to perform the work. PJC does not accept the responsibility for items that they are not notified to observe.

It has been a pleasure working with you on this project. Please call us if you have any questions regarding the results of this investigation, or if we can be of further assistance.

Sincerely,

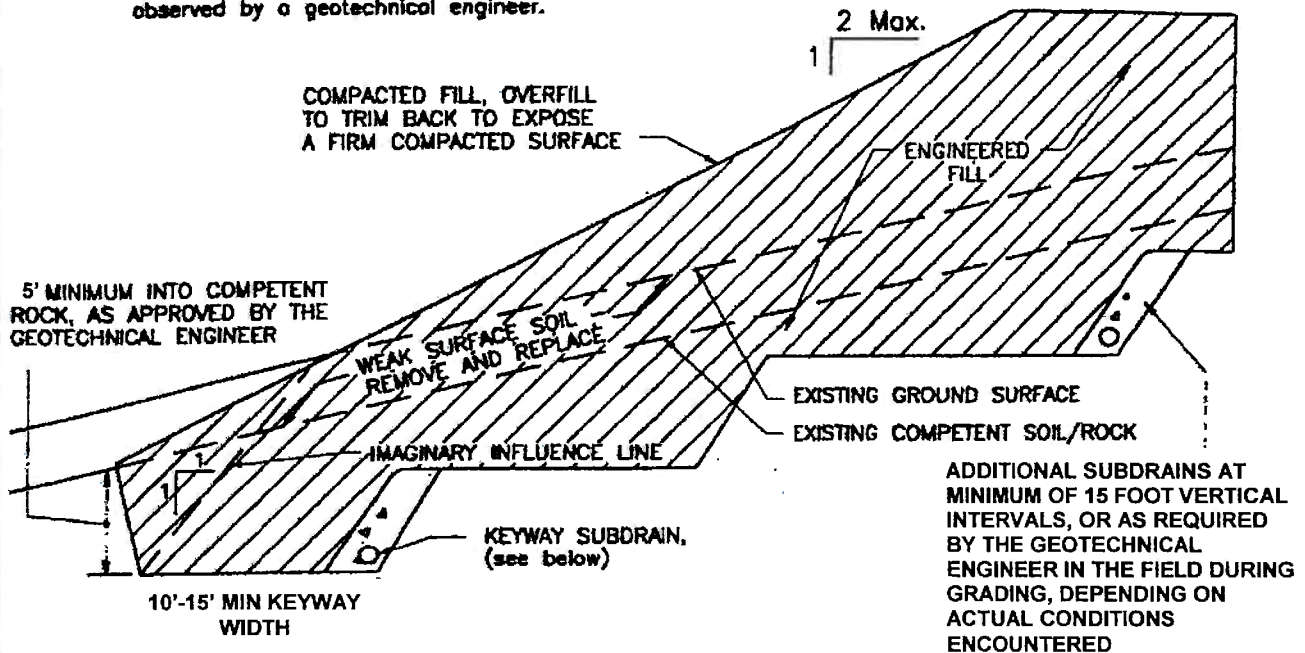
PJC & ASSOCIATES, INC.


Patrick J. Conway
Geotechnical Engineer
GE 2303, California

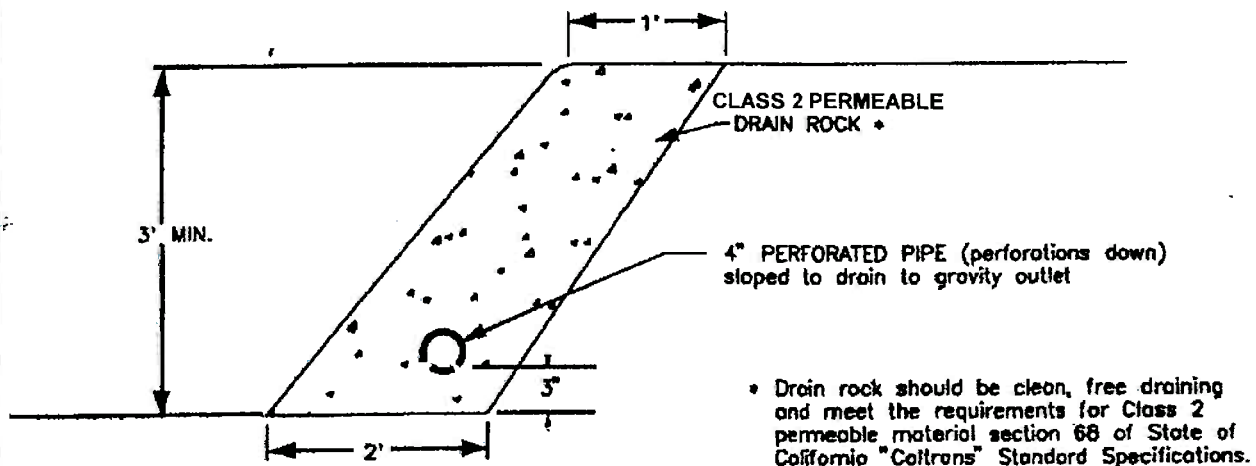
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- Notes: 1. Keyway excavation and subdrain installation should be observed by the Geotechnical Engineer.
 2. Where existing slope exceeds 6:1 excavate series of benches in competent soil/rock.
 3. All subdrains should have cleanouts at a minimum of 400 foot intervals and at upslope end.
 4. Installation of all subdrains should be observed by a geotechnical engineer.



FILL SLOPE DETAIL
not to scale



SUBDRAIN DETAIL
not to scale



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LANDSLIDE BUTTRESS DETAIL
PROPOSED WATER TANK STABILIZATION
PEARL AVENUE
CAZADERO, CALIFORNIA

Proj. No: 9766.01

Date: 6/20

App'd by: PJC

PLATE

1A



APPROXIMATE SCALE: 1"= 40'

EXPLANATION



TEST PIT LOCATION AND DESIGNATION

- - - APPROXIMATE OUTLINE OF LANDSLIDE (Q_{ls})

REFERENCE: GOOGLE EARTH PRO, IMAGERY DATED JUNE 16, 2017.



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TEST PIT LOCATION MAP PROPOSED WATER TANK STABILIZATION PEARL AVENUE CAZADERO, CALIFORNIA

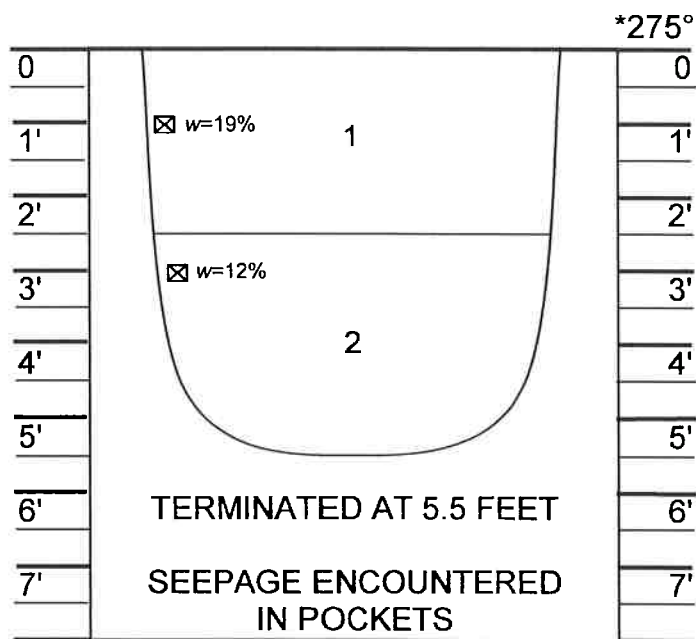
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PLATE

2



*Orientation of Test Pit

LITHOLOGY

- 1) 0.0'-2.5'; SCHIST (KJfs); orangish gray, soft, friable, highly weathered (BEDROCK).
- 2) 2.5'-5.5'; SHEARED SHALE (KJfs); dark gray, weak, slightly hard, highly weathered (BEDROCK).



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LOG OF TEST PIT 1
PROPOSED WATER TANK STABILIZATION
PEARL AVENUE
CAZADERO, CALIFORNIA

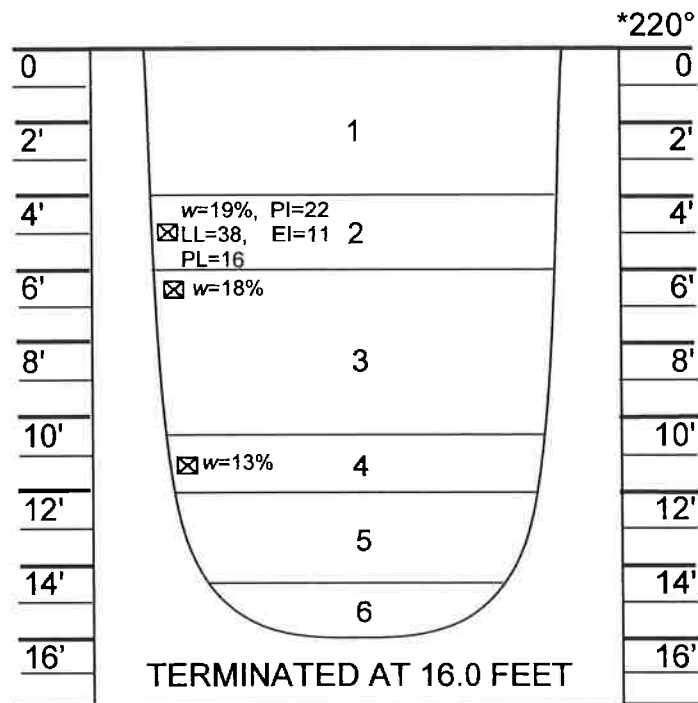
Proj. No: 9766.01

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PLATE

3



NO GROUNDWATER SEEPAGE
ENCOUNTERED

*Orientation of Test Pit

LITHOLOGY

- 1) 0.0'-4.0'; SANDY CLAY (CL); grayish brown, moist, soft, medium plasticity, with roots, with gravels at 4' (FILL/LANDSLIDE DEPOSIT).
- 2) 4.0'-6.0'; SANDY CLAY (CL); orangish grey, moist to wet, medium stiff, medium plasticity, with slickensides (LANDSLIDE PLANE).
- 3) 6.0'-10.5'; SANDY CLAY (CL); greenish grey to yellowish brown, very moist, medium stiff to stiff, medium plasticity (RESIDUAL SOIL).
- 4) 10.5'-12.0'; SERPENTINE (KJfs); green, soft, friable, highly weathered (BEDROCK).



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LOG OF TEST PIT 2
PROPOSED WATER TANK STABILIZATION
PEARL AVENUE
CAZADERO, CALIFORNIA

Proj. No: 9766.01

Date: 6/20

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PLATE

4

MAJOR DIVISIONS				TYPICAL NAMES	
COARSE GRAINED SOILS More than half is larger than #200 sieve	GRAVELS more than half coarse fraction is larger than no. 4 sieve size	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
	SANDS more than half coarse fraction is smaller than no. 4 sieve size	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVEL-SAND MIXTURES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than half is smaller than #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50	ML		INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, VERY FINE SANDS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS OR LEAN CLAYS	
		OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50	MH		INORGANIC SILTS, MACACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	HIGHLY ORGANIC SOILS		Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

KEY TO TEST DATA

LL — Liquid Limit (in %)
 PL — Plastic Limit (in %)
 G — Specific Gravity
 SA — Sieve Analysis
 Consol — Consolidation

 "Undisturbed" Sample
 Bulk or Disturbed Sample
 No Sample Recovery

			Shear Strength, psf
			↓
		Confining Pressure, psf	↓
*Tx	320	(2600)	Unconsolidated Undrained Triaxial
Tx CU	320	(2600)	Consolidated Undrained Triaxial
DS	2750	(2000)	Consolidated Drained Direct Shear
FVS	470		Field Vane Shear
*UC	2000		Unconfined Compression
LVS	700		Laboratory Vane Shear

Notes: (1) All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated
 (2) * Indicates 1.4" diameter sample



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USCS SOIL CLASSIFICATION KEY PROPOSED WATER TANK STABILIZATION PEARL AVENUE CAZADERO, CALIFORNIA

Proj. No: 9766.01

Date: 6/20

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PLATE

5

ROCK TYPES



Conglomerate



Shale



Metamorphic Rocks
Hydrothermally Altered Rocks



Sandstone



Sheared Shale Melange



Igneous Rocks



Meta-Sandstone



Chert

Bedding Thickness

Massive	Greater than 6 feet
Thickly Bedded	2 to 6 feet
Medium Bedded	8 to 24 inches
Thinly Bedded	2-1/2 to 8 inches
Very Thinly Bedded	3/4 to 2-1/2 inches
Closely Laminated	1/4 to 3/4 inches
Very Closely Laminated	Less than 1/4 inch

Joint, Fracture or Shear Spacing

Very Widely Spaced	Greater than 6 feet
Widely Spaced	2 to 6 feet
Moderately Widely Spaced	8 to 24 inches
Closely Spaced	2-1/2 inches
Very Closely Spaced	3/4 to 2-1/2 inches
Extremely Closely Spaced	Less than 3/4 inch

HARDNESS

Soft - Pliable, can be dug by hand

Slightly Hard - Can be gouged deeply or carved with a pocket knife

Moderately Hard - Can be readily scratched by a knife Blade; Scratch leaves heavy trace of dust and is readily visible after the powder has been blown away

Hard - Can be scratched with difficulty; scratch produced little powder and is faintly visible

Very Hard - cannot be scratched with pocket knife, leaves metallic streak

STRENGTH

Plastic - Capable of being molded by hand

Friable - Crumbles by rubbing with fingers

Weak - an unfractured specimen of such material will crumble under light hammer blows

Moderately Strong - Specimen will withstand a few heavy hammer blows before breaking

Strong - Specimen will withstand a few heaving ringing hammer blows and usually yields large fragments

Very Strong - Rock will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

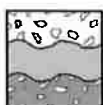
DEGREE OF WEATHERING

Highly Weathered - Abundant fractures coated with oxides, carbonates, sulphates, mud, etc., through discoloration, rock disintegration, mineral decomposition

Moderately Weathered - Some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition

Slightly Weathered - A few stained fractures, slight discoloration, little to no effect on cementation, no mineral decomposition

Fresh - Unaffected by weathering agents, no appreciable change with depth



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BEDROCK CLASSIFICATION KEY PROPOSED WATER TANK STABILIZATION PEARL AVENUE CAZADERO, CALIFORNIA

Proj. No: 9766.01

Date: 6/20

App'd by: PJC

PLATE

6

APPENDIX A FIELD INVESTIGATION

1. INTRODUCTION

The field program performed for this study consisted of excavating two exploratory test pits (TP-1 and TP-2) at the project site. The exploration was completed on May 6, 2020. The test pit locations are shown on the Test Pit Location Plan, Plate 2. Descriptive logs of the test pits are presented in this appendix as Plates 3 and 4.

2. TEST PITS

The test pits were excavated with a extend-a-hoe equipped with 24-inch bucket. Disturbed samples for logging and laboratory testing were collected. The excavation was performed under the observation of a certified engineering geologist of PJC who maintained a continuous log of soil conditions and obtained samples suitable for laboratory testing. The soils were classified according to Unified Soil Classification System as presented on Plate 5. The bedrock was classified according to Plate 6.

Disturbed samples used in the laboratory investigation were obtained from various locations during the course of the field investigation, as discussed in Appendix A of this report. Identification of each sample is by pit number, sample number and depth. All of the various laboratory tests performed during the course of the investigation are described below in Appendix B.

APPENDIX B LABORATORY INVESTIGATION

1. INTRODUCTION

This appendix includes a discussion of test procedures of the laboratory tests performed by PJC for use in the geotechnical study. The testing program was carried out by employing, whenever practical, currently accepted test procedures of the American Society of Testing and Materials (ASTM).

Disturbed samples used in the laboratory investigation were obtained during the course of the field investigation as described in Appendix A of this report. Identification of each sample is by test pit number and depth.

2. INDEX PROPERTY TESTING

In the field of soil mechanics and geotechnical engineering design, it is advantageous to have a standard method of identifying soils and classifying them into categories or groups that have similar distinct engineering properties. The most commonly used method of identifying and classifying soils according to their engineering properties is the Unified Soil Classification System described by ASTM D-2487-83. The USCS is based on recognition of the various types and significant distribution of soil characteristics and plasticity of materials. The index properties tests discussed in this report include the determination of natural water content, Atterberg limits, and expansion index testing.

- a. Natural Water Content. Natural water content of the soils were determined, often in conjunction with other tests, on selected undisturbed samples. The samples were extruded and visually classified, trimmed to obtain a smooth flat face, and accurately measured to obtain volume and wet weight. The samples were then dried in accordance with the procedures of ASTM 2216-80 for a period of 24 hours in an oven, maintained at a temperature of 100 degrees C.
- b. Atterberg Limits Determination. The liquid and plastic limits of selected fine-grained soil samples were determined by air drying and breaking down the sample.
- c. Expansion Index Testing. An expansion index test was performed on a selected sample in accordance with ASTM D4829. The results are summarized in the body of this report.

APPENDIX C REFERENCES

1. "Foundations and Earth Structures" Department of the Navy Design Manual 7.2 (NAVFAC DM-7.2), dated May 1982.
2. "Soil Dynamics, Deep Stabilization, and Special Geotechnical Construction" Department of the Navy Design Manual 7.3 (NAVFAC DM-7.3), dated April 1983.
3. "Soil Mechanics" Department of the Navy Design Manual 7.1 (NAVFAC DM-7.1), dated May 1982.
4. USGS Cazadero, California Quadrangle 7.5-Minute Topographic Map, revised 2002.
5. USGS National Seismic Hazard Maps, dated 2008.
6. California Building Code (CBC), 2019 edition.
7. *Geology for Planning in Sonoma County, Special Report 120, Plate 2A*, prepared by the California Division of Mines and Geology, dated 1980.
8. *Geologic Map and Map Database of Western Sonoma, Northernmost Marin, and Southernmost Mendocino Counties, California: Miscellaneous Field Studies Map MF-2402*, provided by the U.S. Geological Survey, prepared by Blake, M.C., Graymer, R.W., and Stamski, R.E., dated 2002.