

**Operations and Maintenance Plan  
for  
Alleghany County Water District's  
Drinking Water System**

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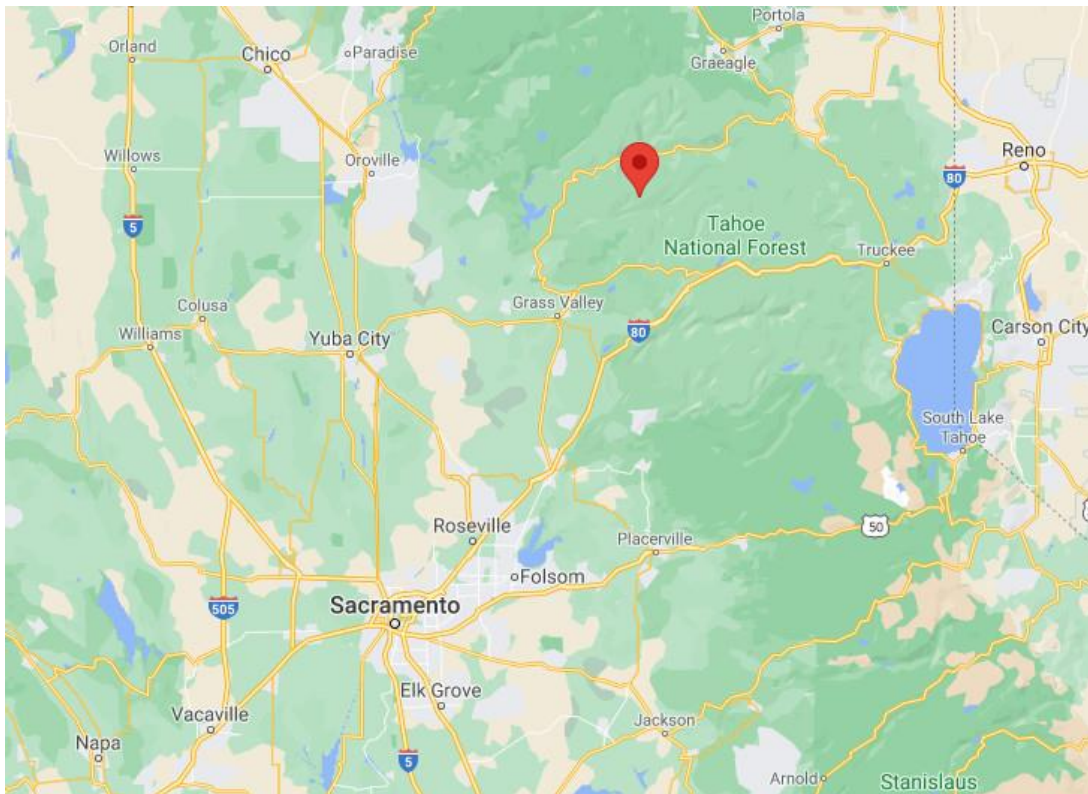
# Section 1: Introduction

## Purpose

The purpose of this plan is to provide documentation of operations and maintenance procedures designed to produce the optimal quality of water from the treatment process at Alleghany County Water District (CA4600012) water system and as a training tool for new hires. The manual contains system contact information, a description of system features along with their operation and maintenance, work sheets, record keeping forms, safety and emergency procedures, and a sampling plan for monitoring the quality of drinking water. The system owner shall operate the facility in accordance with this plan.

Alleghany is a census-designated place in Sierra County, California, United States. The system serves 53 customers, and the population is 83. Established in 1857, Alleghany is one of California's oldest and most historical mining towns.

Alleghany is located at 39°27'52.7"N 120°50'55.8"W, north of Sacramento CA and west of Reno NV.



## Section 2: System Information

### System Information

System Identification Number	CA 4600012
System Name and Address	Alleghany County Water District 109 Main St. Alleghany CA 95910 PO Box 860, Alleghany CA 95910
System Owner	Alleghany County Water District
Directions to the System	From Nevada City take highway 49 north toward Downieville and stay north on 49 past North San Juan. The turn off to Alleghany is east from highway 49 between the communities of Camptonville and North San Juan. Approximately 3 miles past the middle fork of the Yuba River, take a right hand turn on Ridge Road. Ridge Road eventually turns into main street. Alleghany is located approximately 1 hour north east from Nevada City.  Warning: GPS needs to be set for paved road only.
Location/Town	Alleghany, CA

### Operators' Information

Name and Title	Phone Number	Alternative Number	E-mail
Bruce Coons, Chief Water Operator	Day/Evening: 530-287-3262 (home) 530-287-3427 (work)	Pumphouse: 530-287-3204	bruce.a.coons@usps.gov
Edward Snyder, Water Distribution Operator	Home: 530-287-3248	Pumphouse: 530-287-3204	mountainmansnyder168@gmail.com

## System Description

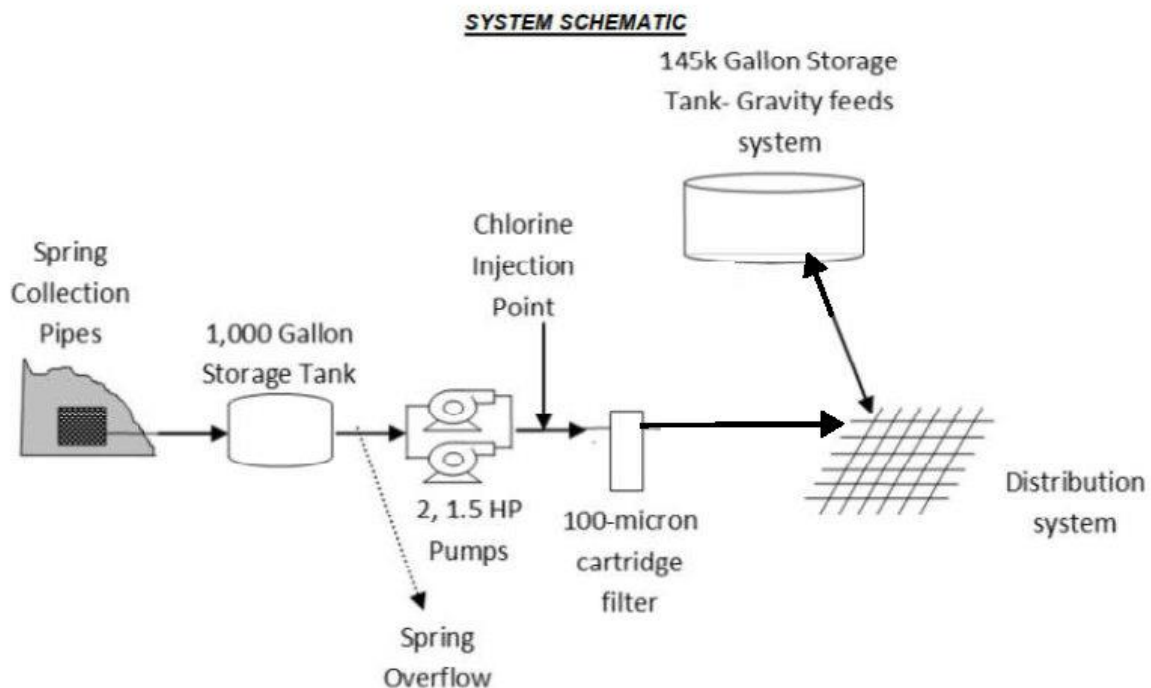
The Alleghany County Water District's (AWCD) is a community water system. The system services approximately 56 customers with a population of 80 people. The system consists of spring collection pipes from Ram Spring, a 1000-gallon storage tank, two pumps, and a 100-micron cartridge filter that leads up to a 150,000-gallon storage tank. The water is then gravity fed to the distribution system. The District completed drilling in 2017 at the spring source to convert the springs to horizontal wells to change the source from the previously classified "groundwater under the direct influence of surface water" to the current "groundwater" classification. The previous surface water treatment plant is no longer in use, and the district uses the previously existing 100-micron filter as a precaution and provides continuous chlorination. Ram Spring is the single drinking water source. However, the community hopes to build redundancy and tap into another local spring. The spring and pumphouse are at 109 Main Street Alleghany, CA 95910.

## System Schematic

**Water Source:** Ram Spring

**Chlorine Disinfection:** Injection point located inside the Pump House.

**Storage Tank:** The water flows directly into the system from the pump house and up to the tank. It is a closed system.



## Flow Rate

The flow rate from the spring varies with the season with low flow around 40 gallons per minute (gpm) and high flow up to 200-gpm. The spring collection system is made of 8 horizontally driven collection pipes with details in the below Table:

Pipe #	Depth (ft)	Casing Notes
1	55	28' solid; 25' perforated
2	55	25' solid; 30' perforated
3	46	20' solid; 26' perforated
4	55	20' solid; 25' perforated
5	50	20' solid; 30' perforated
6	51	21' solid; 30' perforated
7	42	20' solid; 20' perforated
8	18	10' solid; 8' perforated

The driven pipe lengths range in depth from 18 to 55 feet. Each horizontal pipe has a sanitary seal of at least 10 feet. Each pipe is equipped with a sample tap and ball valve allowing each to be shut off should there be a bacteriological issue.

Water is pumped from the spring into the water system and tank at a rate of 20-gpm using two 2 HP centrifugal pumps. (only one pump at a time is used). The spring produces more water than the system demands, and more than the system is allowed to use based on their water rights agreement with the Sixteen to One Mine. The lease limits ACWD to 20-gpm but allows for maximum pumping capacity to be used in the event of an emergency such as a fire. Currently 40 to 60-gpm is the maximum pumping capacity if both pumps are used at the same time.

Following the upgrades to the spring a series of MPA tests were performed in both the dry and wet seasons. The tests did not show the influence of surface water, allowing the springs to re-classified as groundwater. It has been observed that the springs produce higher flows during winter and spring, especially following precipitation.

## Geography and System Map

### Water System Geography and Industry

Geography Near Water System	Located within the town of Alleghany in southwest Sierra County California.,
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Industry Near Water System	<input type="checkbox"/> Commercial Retail	<input type="checkbox"/> Food Service/Restaurants	<input type="checkbox"/> Hospitals
	<input type="checkbox"/> Agriculture	<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Auto Shops
	<input type="checkbox"/> Wastewater Treatment Plant	<input type="checkbox"/> Other: Describe	<input checked="" type="checkbox"/> None

**Water Source Geography and Industry**

Geography Near Water Source	Located within the town of Alleghany in southwest Sierra County California.
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Industry Near Water Source	<input type="checkbox"/> Commercial Retail	<input type="checkbox"/> Food Service/Restaurants	<input type="checkbox"/> Hospitals
	<input type="checkbox"/> Agriculture	<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Auto shops
	<input type="checkbox"/> Wastewater Treatment Plant	<input type="checkbox"/> Other: Describe	<input checked="" type="checkbox"/> None

**Treatment**

Precautionary chlorination is conducted under the guidance of the State Division of Drinking water. The system uses a dilution of 1,300 mL of 10.0% sodium hypochlorite mixed with 25 gallons of water. The system aims for a trace residual in the farthest dead end of the distribution system. Once a year or if needed the system will shock chlorinate the storage tank with 0.75 gallons of chlorine aiming for a residual of 0.5-0.6 ppm. Chlorine is injected at a rate of 100 ml per minute. The free chlorine resolution of the solution is .30 mil per liter. A 100-micron Harmsco filter that was part of the old surface water treatment plant is still used. The filters are cleaned weekly and changed once a month after the cartridges are saturated in a water and chlorine solution. There is some silt that is captured by the filters, hence their continued use.

**Storage Facility**

Alleghany CWD stores its water in a 150,000 bolted steel storage tank. The storage tank was built in 2018 as part of the Division of Financial Assistance (DFA) grant funded construction project. In 2020, as part of the tank construction contract, the interior of the tank was inspected. During this inspection it was found that the bottom layer of bolts had not been properly sealed during construction and were corroding. The contractor replaced the bolts in 2020. The tank’s water level ranges from 22 to 26 feet.

The District bought the temporary storage tanks that were in use during the installation of the new storage tank. The temporary tanks are for use in the case of a fire emergency or if the main tank must be taken out of service. The temporary tanks are not permitted to be permanently connected to the system. They can only be connected to the system in an emergency with notification to DDW.

## Cross Connection

A cross-connection survey was conducted in 2015. No areas of concern were identified, and the apparent cross connection hazards are low.

## Distribution Piping

The majority (approximately 80%) of the piping material is transite/asbestos cement placed into service in 1977. The remaining approximately 20% is PCV put into service in 1995 and later. Static Pressure in the system is approximately 1.5 pounds.

## Distribution System

**Fire Hydrants (see map). All hydrants are dry barrel due to freezing concerns in winter. Flow capacity will be added after the 2022 hydrant flush is conducted.**

Hydrant	Size	PSI	Location (GPS if available)	Flow Capacity (gpm)	Inspection Frequency	Color
1	2 ½"	51	Post Office 365 Main Street		1/year	Red
2	2 ½ "	32	Across from Plaza Court		1/year	Red
3	2 ½ "	68	Casey's Place 230 Main St		1/year	Red
4	2 ½ "	63	Mine Office 527 Miners St		1/year	Red
5	2 ½ "	53	115 Main Street		1/year	Red
6	2 ½ "	55	111 Main Street		1/year	Red
7	2 ½ "	68	Pumphouse 109 Main Street		1/year	Yellow
8	2 ½ "	68	105 Main Street		1/year	Red
9	2 ½ "	69	102 Main Street		1/year	Yellow
10	2 ½ "	70	Junction of Miners and Main South		1/year	Yellow
11	2 ½ "	98	503 Main St		1/year	Yellow
12	2 ½ "	110	Across from 16 to 1 gate		1/year	Yellow
13	2 ½ "	112	Park		1/year	Yellow
14	2 ½ "	107	Across from 518 Miners St		1/year	Red
15	2 ½ "	80	521 Miners St		1/year	Red
16	1 ½ "	78	701 Kanaka Creek Rd		1/year	Red
17	1 ½ "	58	100 Main Street		1/year	Red



18	2 ½ "	10	105 Hell's Half Acre at tank site		1/year	Yellow
19	1 ½ "	14	604 Mammoth Springs Rd		1/year	Red







## Map of System Components

# ALLEGHANY

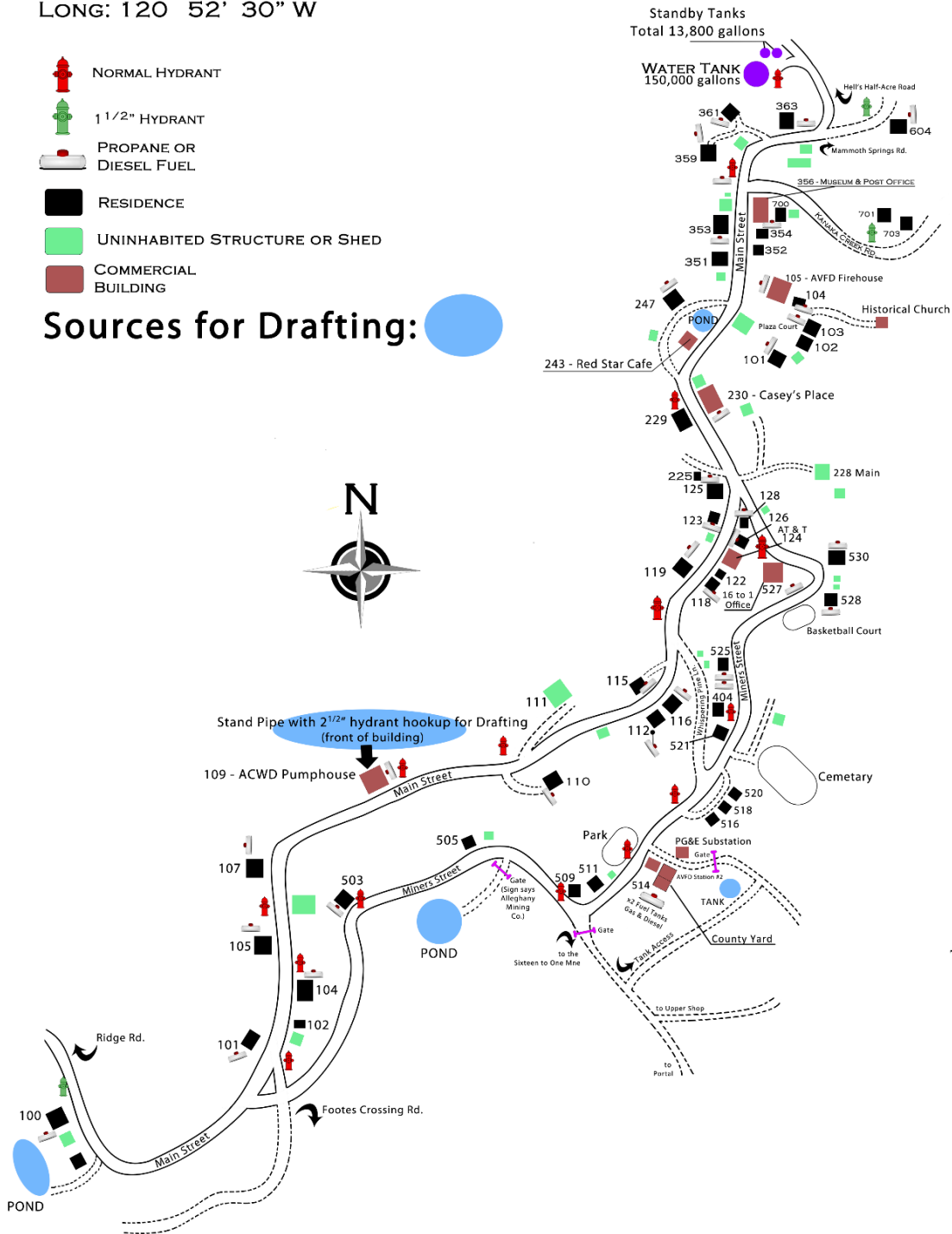
SEC: 34 T19N R 10E

LAT: 39 28' 00" N

LONG: 120 52' 30" W

-  NORMAL HYDRANT
-  1 1/2" HYDRANT
-  PROPANE OR DIESEL FUEL
-  RESIDENCE
-  UNINHABITED STRUCTURE OR SHED
-  COMMERCIAL BUILDING

Sources for Drafting: 



Updated  
1/24/2019

## Section 3: System Components

The following are the basic components of the Alleghany County Water District's water system. The water system is a closed pressure system with 4-inch water mains that deliver the water to the customer meters, the fire hydrants, and the water storage tank.

Most of the system was installed in 1977. The water storage tank was replaced in 2018. The District completed drilling in 2017 at the spring source to convert the springs to horizontal wells. Six horizontal wells gravity feed into a 1,100-gallon holding tank connected to the pumphouse. Inside the pumphouse two 20-gpm booster pumps work alternately to pump the water through 100-micron filters and out into the system and up to a 150,000-gallon water storage tank that gravity feeds back into the system on demand. During pumping a trace amount of chlorine is injected into the water. A SCADA system is installed and controls the pumps.

Normal water production capacity is 20-gpm but in the event of an emergency such as a fire that can be doubled by running both pumps at the same time. Please see appendix for a list of system assets and inventory.

### System Components

- **Six horizontal wells connected to manifold at spring site**
- **1,100-gallon storage tank fed by manifold, feeds pumps**
- **Pumphouse located at spring site, houses pumps, chlorine injection equipment, monitoring equipment and SCADA system**
- **Two 20-gpm booster pumps inside pumphouse distribute water from spring into the system and 150,000-gallon storage tank. The pumps alternate (use one at a time) to prevent burn-out and to comply with the terms of the district's water lease.**
- **Water mains, service boxes with meters, fire hydrants**
- **150,000-gallon water storage tank located above town for gravity feed**

## Suppliers

Organization or Department	Name & Position	Telephone	Notes
General Supplies	B&C Hardware (Local)	530-273-6105	
System electronics and pumps	Aqua Sierra Controls Jon Densmore	530-488-0237	530-823-3241
Rental Equipment	Golden Green Rentals	530-273-0064	
Chlorine	Hach Company (Mail Order) B&C Hardware (Local)	800-227-4224 530-273-6105	
Pipe & Fitting Supplier	Ferguson - Grass Valley	530-615-2355	
Personal Protective Equipment	B&C Hardware (Local)	530-273-6105	
Rental Equipment Supplier	Golden Green Rentals	530-273-0064	

## Vendor, System Support and Contractor Contacts

See Emergency Response Plan for a list of vendors and support contacts

## Land

The following parcels belong to Alleghany County Water District.

	Parcel Number	Acres	Street Address	Description
1	004-190-032-0	0.55	105 Hell's Half Acre Rd	Water Tank
2	004-230-020-0	1.39	608 Mammoth Springs Rd.	Cumberland East side of Mammoth Springs Rd. North of 604 Mammoth Springs (House)
3	004-250-004-0	0.45	227 Main St.	Vacant lot where Bucket Club used to be
4	004-250-028-0	0.43	100 Hope Lane	Church
5	004-260-029-0	0.48	109 Main Street	Pumphouse LAND NOT OWNED PART OF 99 YEAR LEASE
6	004-270-006-0	0.88	Park	Leased from the County not owned by ACWD the county provides the insurance, ACWD pays
	<b>Total Acres</b>	<b>3.3</b>		

# Section 4: System Operations (includes use of auxiliary power and manual operations)

This section describes the system processes under normal operation conditions for the Alleghany CWD water system.

## Normal System Operations – Starting the System

A SCADA System monitors the level of our 150,000-gallon Main Storage Tank by means of a mechanical float and a pressure transducer mounted inside the tank. Data from the float and the transducer are relayed by radio telemetry across town to the SCADA Server located in the Pump House. The Pumps are programmed to start when the Main Tank level drops to 22 ft. (the tanks dimensions are 29 ft. tall X 30 ft. wide). The Hypochlorite Solution Metering Pump is permanently wired into the Booster Pump Panel. The metering pump starts injecting hypochlorite solution into the Distribution System immediately following the activation of the Booster Pumps.

## Normal System Operations – Stopping the System

Once the Main Tank reaches a level of 26 ft. by means of the float and pressure transducer a signal is relayed to the SCADA Controller. Sub-sequentially shutting off Booster Pumps and the Metering Pump.

## During Power Outages – Switch to the Generator

Inside the pumphouse:

- 1.) Turn Main Electrical Panel lever to OFF position
- 2.) Turn off ALL breakers EXCEPT  
    #1, #3, #5 and #14
- 3.) Turn Main Panel lever to GENERATOR
- 4.) Start generator (INSTRUCTIONS BELOW)
- 5.) Reset breakers to ON
- 6.) Reverse for switching back to PG&E

## Generator Start-Up

- 1.) Unlock the generator enclosure gate and go all the way around the generator to the small alcove between the generator and the main building.
- 2.) On the alcove side of the generator, open the farthest/deepest panel in. Inside will be a control panel with gauges and toggle switches.
- 3.) Locate the toggle switch with three positions: Run – Off – Auto. Move the toggle from Auto through Off to Run. The generator will start on its own. \*
- 4.) Leave on Run until generator is no longer needed.
- 5.) Reverse for shutdown.

\*NOTE: lately we've been having trouble getting it to start on the first try. You may need to do this several times before it turns over. If it does not start, flip the toggle from Run to Off, wait a few seconds, then flip it back to Run. Repeat until successful.

### **IF SCADA is not working (and during power outages)**

In the event of a power outage, the system needs to be set to run manually.

**The back-up generator at the pumphouse does not supply electricity to the SCADA** components located at the tank site across town. However, a manual pressure switch relays the tank level data using hard wire telemetry lines to the Pump Panel located at the pumphouse. Which in turn, tells the Booster Pumps when to turn on and off. Please, follow procedures below for MANUAL OVERRIDE:

### **Starting the System:**

- 1) Start generator.
- 2) Disconnect power from PG&E and switch to generator.
- 3) **Switch HOA switch located on the front of Booster Pump Panel to center position "SCADA OFF". (THIS IS ALL THAT NEEDS TO BE DONE IF POWER IS ON BUT SCADA ISN'T WORKING.)**
- 4) Booster pumps will now be controlled by manual pressure switch.

### **Stopping the System:**

Perform Starting System procedures in reverse order.

**SEE INSTRUCTIONS FOR POWER OUTAGES FOR MORE DETAIL.**

# Section 5. Scheduled Maintenance

## Daily Maintenance

- Check water meter readings and record water production.
- Check chemical solution tanks and record amounts used.
- Check and record water levels in storage tanks.
- Inspect chemical feed pumps.
- Check and record chlorine residual at the point of application.
- Check and record chlorine residual in the distribution system.
- Inspect booster pumps
- Check pump running times and pump cycle starts.
- Check instrumentation for proper signal input/output.
- Investigate customer complaints. Record threats or suspicious activity.
- Complete a daily security check.
- Inspect heater operation during winter months.
- Inspect pumps, motors, and controls.

## Weekly Maintenance

- Inspect chlorine testing equipment.
- Check fluid levels and run Generator. Record run hours and any concerns.
- Clean pump house and grounds. Make sure fire extinguishers are accessible.
- Conduct weekly security check.
- Measure water flow from spring manifold and record it. (average for each month is reported to the Board of Directors)

## Monthly Maintenance

- Read electric meter at pump house and record.
- Take appropriate monthly water quality samples.
- Check and record static and pumping levels of holding tank
- Read all customer meters and compare against total water produced for the month.
- Inspect well heads.
- Lubricate locks.
- Inspect storage tanks for defects and sanitary deficiencies.
- Check chlorine residual in Auxiliary Tanks
- Check on-site readings against lab results.
- Confirm completion of monthly reports.

## Annual Maintenance

Possible time-of-year for each task is provided in parentheses.

- Overhaul chemical feed pumps, such as O-rings, check valves, and diaphragms as needed.
- Review Safety Equipment Inspection & Repair Log. Maintain log continuously throughout the year. (first Monday in January)

- Review emergency response plans. (first Monday in January)
- Inspect chemical safety equipment and repair or replace as needed. (first Monday in February)
- Operate all valves inside the treatment plant and pump house. (first Monday in February)
- Inspect, clean, and repair control panels in pump house and treatment plant. (first Monday in March)
- Inspect and clean chemical feed lines and solution tanks. (first Monday in April)
- Inspect water storage tanks
- Flush the distribution system and exercise all valves. Pressure check all of the fire hydrants.
- Perform preventive maintenance on treatment plant and pump house buildings. (first Monday in July)
- Prepare a demand forecast. Identify and evaluate energy conservation measures (for your utility). Identify and evaluate distribution system leaks. Establish/update water loss mitigation program.
- Make sure unnecessary equipment is properly decommissioned. (first Monday in September) f
- Prepare system for winter operation if not completed in September or October. (first Monday in November)
- Plug in block heater for generator after first frost.



## Section 6. Violations List & Enforcement Actions

Currently there are no enforcement actions. In the 28 years between 1993 and 2021 five violations were issued, the majority were due to missed water sampling requirements. Historic violations are shown in the table below. (If viewing this O&M digitally more information can be found by clicking on the violation numbers below.)

The list of violations of the water systems are provided on California's Safe Drinking Water Information System. direct link:

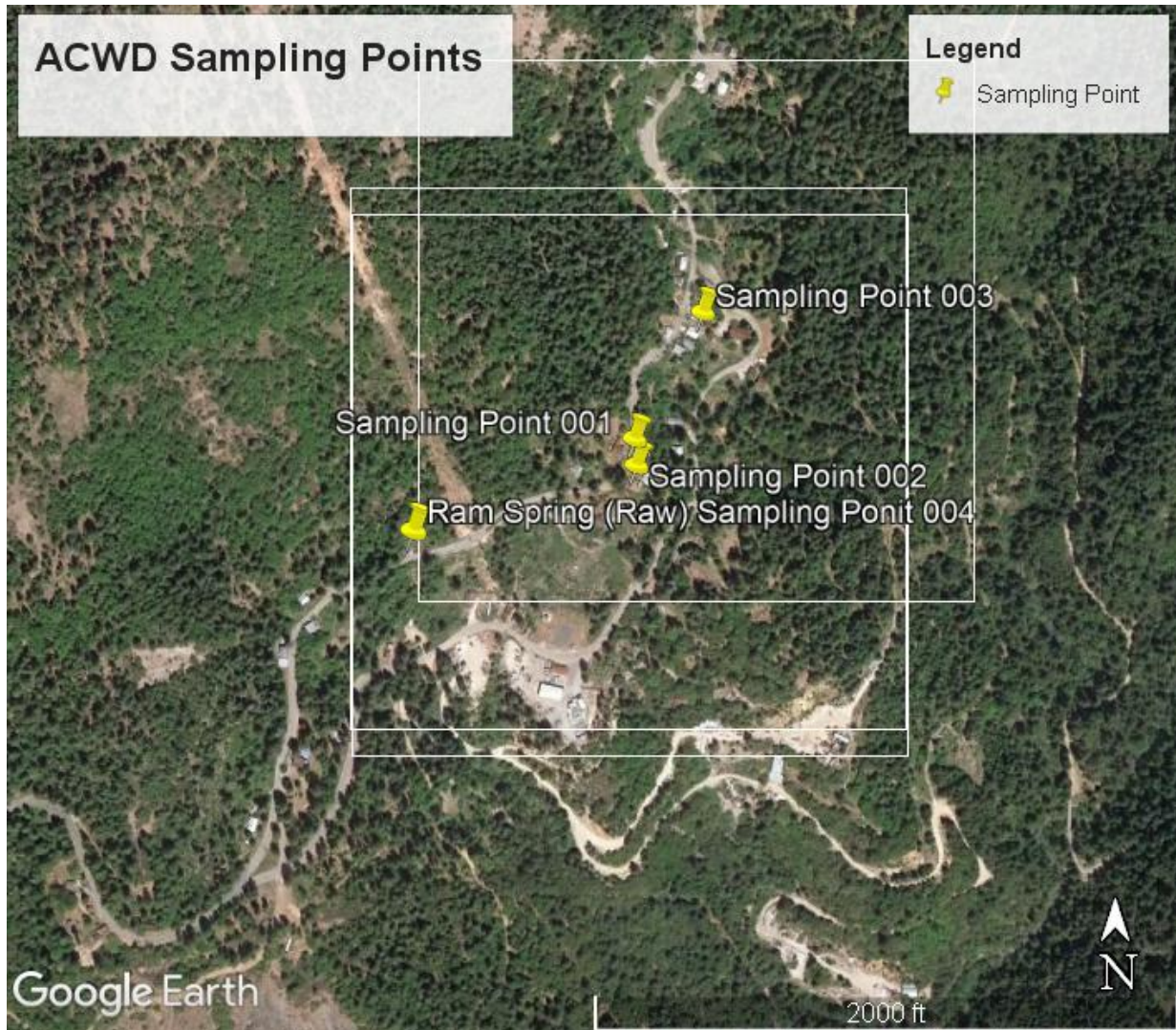
[https://sdwis.waterboards.ca.gov/PDWW/JSP/Violations.jsp?tinwsys\\_is\\_number=4454&tinwsys\\_st\\_code=CA](https://sdwis.waterboards.ca.gov/PDWW/JSP/Violations.jsp?tinwsys_is_number=4454&tinwsys_st_code=CA). These lists are updated when a violation is discovered or when an enforcement action is put in place.

Violation No.	Status	Violation Type	Violation Name	Analyte Code	Analyte Name	Water System Facility State Asgn ID	Water System Facility Name
<a href="#">2019-9402004</a>	V	3A	MONITORING, ROUTINE, MINOR (RTCR)	8000	REVISED TOTAL COLIFORM RULE (RTCR)	null	null
<a href="#">2015-9402003</a>	V	26	MONITORING (TCR), REPEAT MINOR	3100	COLIFORM (TCR)	null	null
<a href="#">2010-702003</a>	V	63	MPL LEVEL NON-COMPLIANCE (LCR)	1030	LEAD	null	null
<a href="#">2006-602002</a>	V	51	INITIAL TAP SAMPLING (LCR)	5000	LEAD & COPPER RULE	null	null
<a href="#">1994-9402001</a>	V	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)	null	null

## Section 7. Water Quality and Monitoring

The Alleghany water system collects water quality samples monthly and delivers them to Cranmer Engineering for analysis. Cranmer Engineering directly reports to the State Water Resource Control Board – Division of Drinking Water – Lassen District located in Redding. The monitoring schedule can be found on the Drinking Water Watch web site at the following link <https://sdwis.waterboards.ca.gov/PDWW/index.jsp> and by searching water system number 4600012.

The following map shows the routine sample locations, updated in 2021 with the current information provided. There are four routine sample locations, one of which is a raw water sample. The current bacteriological sample siting plan includes sampling at 118 Main Street, 116 Main Street, 126 Main Street, and Ram Spring (raw). Please see the Bacteriological Sample Siting Plan in the appendix for more details.



# Appendixes

1. ACWD System Map
2. ACWD System Overview Description
3. ACWD System Overview Illustration
4. Bacteriological Sample Siting Plan
5. Capital Improvement Plan (found in 2021 Rate Study)
6. Ram Spring Monitoring Schedule (from SIDWIS)
7. O&M Manual for Columbian TecTank
8. Additional Operation Manuals
  - a. Backup Generator Engine
  - b. Backup Generator Installation
  - c. Battery Charger
  - d. Booster Pump Manual
  - e. Chlorine Injection System
  - f. Electrical Panel
  - g. Eye Wash Station
  - h. Fire Hydrant