November 30, 2018

Sanitary Survey Report
For
San Luis Obispo Water Department
San Luis Obispo County

State Water Resources Control Board
Division of Drinking Water
Southern California Field Operations Branch
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I. INTRODUCTION

Purpose of Report

The purpose of this report is to document the findings of the recent Sanitary Survey conducted at San Luis Obispo Water Department (SLOWD). Sanitary Surveys are required every three years, at a minimum, and cover eight different elements: Source, Treatment, Distribution System, Finished Water Storage, Pumps/Pump Facilities/Controls, Monitoring/Reporting/Data Verification, System Management and Operation, and Operator Compliance with State Requirements. Each element is comprised of several components. The water system needs to comply with all regulations pertaining to each element. If the Division of Drinking Water (DDW) identifies a significant deficiency in any element category during a Sanitary Survey, the water system will be required to correct the significant deficiency in a specified time frame.

System Description and Information

The SLOWD operates under a domestic water supply permit with permit number 04-06-07P-006, issued by the DDW on August 24, 2007. The permit is subject to Surface Water Treatment Rule (SWTR). SLOWD is classified as a community water system and serves the City of San Luis Obispo. It serves 46,117 people through 15,188 service connections. SLOWD's service connections include 13,007 residential housing, 1,631 commercial/institutional, 56 industrial and 494 landscape service connections. SLOWD also has 48 recycled water connections.

SLOWD's main sources of water are raw surface water from the Whale Rock Reservoir, Santa Margarita Reservoir and Nacimiento Water Project. It has two standby groundwater wells – Pacific Beach Well and Fire Station Well 4. SLOWD operates a surface water treatment plant which treats combine surface water from the Whale Rock Reservoir, Santa Margarita Reservoir and Nacimiento Water Project. SLOWD provides chlorination for the well water for disinfection purpose. There are 12 domestic water storage tanks and seven booster pump stations in SLOWD's distribution system. SLOWD has one inactive well –Mitchell Park Wells; one irrigation well – Range Well; and three destroyed well – Auto Park Well, Dalidio well and Pacific Beach Well 02. The Calle Joaquin/Dennys Well has been deeded back to the property owner and the connection to SLOWD has been removed.

DDW previously conducted a Sanitary Survey of SLOWD on March 11 and April 23, 2014. A Notice of Violation was issued to SLOWD on July 16, 2015, for exceeding the trihalomethane maximum contaminant level (MCL) in drinking water supply based on locational running annual average (LRAA) at a distribution system sampling location.

Source of Information
All information included in this report is from DDW files, SLOWD personnel, and site visits on April 24 and September 18, 2018.

II. INVESTIGATION AND FINDINGS

II.a Element 1 – Sources

SLOWD's main sources of water come from three surface water sources: Santa Margarita Reservoir, Whale Rock Reservoir and Lake Nacimiento. SLOWD's groundwater sources are two standby wells (Pacific Beach Well and Fire Station Well 4). Santa Margarita Reservoir is open to non-water contact recreational activities like boating and fishing. The Whale Rock Reservoir is open to shoreline fishing and picnicking. Lake Nacimiento is open to human recreation and boating activities.

II.a.1 Groundwater

The Pacific Beach Well was changed to standby status in March 2015 because it had detected hexavalent chromium levels above the previously established maximum contaminant level (MCL) level in October and November 2014. Currently DDW is working on establishing a new hexavalent chromium MCL. The Fire Station Well was changed to standby status because of its close proximity to a methyl tert-butyl ether (MTBE) plume which originated from a gas station. The Fire Station Well has been in standby status since 2005. **SLOWD could inactivate the two standby wells. If the two wells are inactivated, SLOWD does not have to sample the wells to comply with drinking water requirements. However, SLOWD has to complete the Title 22 drinking water sampling requirements (the complete set of drinking water chemicals and a clean bacteriological activity sample) before the wells can be activated as potable water sources.**

Pacific Beach Well (Standby)
The Pacific Beach Well was constructed in 1988 with a depth of 140 feet. It is housed and located in a residential area. There are no sewage lines or sewage disposal facilities located within 50 or 100 feet of the well site, respectively. The well has an 8-inch plastic well casing and is gravel packed. The highest perforations are located 40 feet below surface. There is a 22-feet thick clay layer above the highest perforations located at the top of the well formation. The well's annular seal is 35 feet deep and is surface sealed. It is equipped with a submersible pump which is powered by an electric motor. The well's air vacuum release valve is screened. The chlorination system is still located at the well site.

Fire Station Well 4 (Standby)
The Fire Station Well 4 was constructed in 1988 with a depth of 125 feet. It is not housed and located at a fire station in a residential area. There is a sewer lateral located about 50 feet from the well site. The well has an 8-inch plastic well casing and is gravel packed. The highest perforations are located 55 feet below surface. Two clay layers are located above the highest perforations at the depth of three feet (15 feet thick) and 33 feet (22 feet thick). The well has a

50 feet annular seal and is surface sealed. It is equipped with a submersible pump which is powered by an electric motor. A MTBE plume from a leaking underground storage of a gas station is located about 200 feet from the well site. SLOWD has not pumped from the well to avoid influencing the known MTBE contamination plume. The well's air vacuum release valve is screened. The chlorination system has been removed, but the chlorination system housing remains in place.

Table 1: Active Well Information

Source Name & PS Code	Well Yield (gpm)	Highest Perforations (ft)	Pump	Pump Capacity (gpm)
Pacific Beach Well	100	40	Submersible	100
Fire Station Well 4	100	55	Submersible	100

Note: ft = feet, gpm = gallon per minute

II.a.2 Surface Water Sources

SLOWD's water supplies come from three surface water sources: Santa Margarita Reservoir, Whale Rock Reservoir and Lake Nacimiento. The three surface water sources are open to various degrees of recreational activities.

Salinas/Santa Margarita Reservoir

The Santa Margarita Reservoir is located on the Salinas River. It was built with the completion of a dam 1941. It has a full storage capacity of 23,843 acre-feet. The capacity when the dam was first constructed was 26,000 acre-feet. The Santa Margarita Reservoir's watershed consists of approximately 71,680 acres public and private land between the east slope of the Santa Lucia range and the west slope of the La Panza Range in central San Luis Obispo County (SLOC). The Salinas/Santa Margarita Reservoir is the focal point of the watershed. About 65 percent of the land within the watershed is publicly owned land; including Los Padres National Forest (about half of the entire watershed), the Santa Margarita Lake Regional Park and Natural Area. The other 35 percent of the land within the watershed is privately own. The watershed is sparsely populated and with minimal development. The reservoir needs to discharge the same amount of water it receives until water is flowing in the Salinas River. SLOC is responsible for the water discharge.

The reservoir is open to non-water contact sport activities including boating, fishing and hiking. There are designated camping and picnic areas. SLOC Parks Department is overseeing those recreational activities in the Santa Margarita Lake Regional Park and Natural Area. There are two boat ramps connecting to the reservoir. Each boat ramp has a fish cleaning station. The reservoir has four vaulted, 11 chemical and 8 flush toilets located at the campground and shoreline areas. These toilets are possible contamination sources for the reservoir.

The United States Army Corporation of Engineers owns and SLOWD operates the Salinas/Santa Margarita Reservoir dam, the reservoir, the intake structure and the conveyance pipelines. Public access to the dam and intake structure is restricted. The intake structure has five ports; SLOWD determines which port is used when obtaining water from the reservoir. Water from the reservoir is delivered to SLOWD's surface water treatment plant via the Santa Margarita Booster Pump Station and the Cuesta Tunnel. Water from the reservoir has enough head to bypass the first booster pump station, so only the second booster pump station is needed. The conveyance pipeline is about 16 miles long. The SLOC maintains most of the pipeline and the two booster pump stations.

Whale Rock Reservoir

The Whale Rock Reservoir was created in 1961. The reservoir has a storage capacity of 40,660 acre-feet. The Whale Rock watershed is about 13,000 acres located west of the Santa Lucia range in the northwest area of the SLOC. About 11,000 acres of the watershed are privately owned lands. The remaining 2,000 acres are public owned lands; including a portion of the Los Padres National Forest to the eastern portion of the watershed, plus the state owned Whale Rock Reservoir and the surrounding lands. The privately owned lands are used for animal grazing, crop production and rural residences.

The reservoir receives water mainly from the Old Creek, Cottontail Creek and their associated tributaries. A 1973 amended permit allows shoreline fishing after adequate facilities and supervision were provided. Currently shoreline fishing is permitted from late April until mid-November. There are seven vaulted restroom facilities around the reservoir. Most of the restrooms are located along the shoreline where fishing is allowed. Picnicking around the reservoir shorelines is also allowed. The Whale Rock Reservoir Commission operates the recreational facilities around the reservoir.

Access to the intake and the dam is restricted. The area within 1,000 feet of the intake (both the reservoir and the shoreline areas) is closed for public use. The intake structure has five ports. SLOWD, in conjunction with other water systems who receives water from the reservoir, would determine which port is used depending on the reservoir water quality. The conveyance pipeline connecting the reservoir to SLOWD's surface water treatment plant is about 16 miles long. There are two booster pump stations along the pipeline. SLOWD maintains the reservoir, the conveyance pipeline and the two booster pump stations.

Lake Nacimiento

Lake Nacimiento is operated by the Monterey County Water Resources Agency (MCWRA). It is located in the northern part of San Luis Obispo County bordering Monterey County. In 1957, the MCWRA (formerly the Monterey County Flood Control and Water Conservation District) built a dam on the Nacimiento River and therefore created the Nacimiento Reservoir. The Nacimiento River is a tributary to the Salinas River. The dam provides flood control and groundwater recharge to the Salinas River Valley through controlled releases. Due to human recreational and boating activities in the Nacimiento Reservoir, MCWRA implemented a Mussel Prevention Program at the reservoir to prevent the spread of the quagga and zebra mussels (both are invasive species from Europe) by screening all boats entering the reservoir.

The Nacimiento Reservoir has a maximum storage capacity of 377,900 acre-feet when it is full. The reservoir is 18 miles long with 165 miles of shoreline during full capacity. The reservoir has 325 square miles of watershed which covers area in both Monterey and San Luis Obispo Counties. Lake Nacimiento's watershed can be divided into two major sections – the upper and lower watershed. The upper watershed (104,670 acres) drains into the Nacimiento River and the lower watershed (103,390 acres) drains into the reservoir directly. The upper watershed is located almost entirely in Monterey County while the lower watershed is located almost entirely in the San Luis Obispo County. The Nacimiento River originates in the Santa Lucia Mountains within the Los Padres National Forest (LPNF).

The Nacimiento Water Project (NWP) is a raw water wholesaler which delivers untreated water from Lake Nacimiento to participating water systems in SLOC. NWP's raw water supply is owned and operated by the San Luis Obispo County Flood and Water Conservation District (District). The raw water is only a supplemental supply to the participating water systems. The District has a formal agreement with the Monterey County Water Resources Agency (MCWRA) for an entitlement of 17,500 acre-feet of water from the Nacimiento Reservoir. The entitlement is subject

to the availability of water in the Nacimiento Reservoir. The entitlement has been in place since 1959, but NWP only began delivering the untreated surface water to the participating public water systems in 2011. NWP has the ability to deliver 15,750 acre-feet of water (90 percent of the entitlement) to the participating public water systems.

NWP uses an intake for pumping water from the Nacimiento Reservoir. The intake is located at the northeast end of the reservoir. The intake consists of the intake shaft, tunnel and pipe. The intake shaft is a vertical 180 feet deep, 20 feet in diameter shaft and wet well. The intake tunnel is located at 660 feet elevation in the Nacimiento Reservoir. It is a 500-foot long and at least 48-inch in diameter horizontal tunnel. It connects the intake shaft to the intake pipe. The intake pipe slopes along the Nacimiento Reservoir bottom from elevation 660 to 810 feet. The pipe has seven ports located at 20-foot intervals from elevation 660 to 780 feet. The ports can be opened and closed using hydraulic pressure system actuating valves. The ports are fitted with fish screens. Access to the dam and the intake structure is restricted.

Currently SLOWD is one of five public water systems entitled to a share of the raw water delivered by NWP; the City of Paso Robles, Templeton Community Services District, Atascadero Mutual Water Company and San Luis Obispo County Service Area No. 10A – Cayucos are the other four public water systems. Santa Margarita Ranch LLC bought 250 acre-feet per year entitlement and plans to use the raw water for agricultural usage. SLOWD and the City of Paso Robles each treats the raw water from Lake Nacimiento through their own surface water treatment plant. The Lake Nacimiento water quality determines which intake port is used. The pipeline is about 40 miles long from the reservoir to SLOWD's surface water treatment plant.

Salinas/Santa Margarita and Whale Rock Reservoirs Inspection
SLOWD implemented programs to inspect the vaulted/chemical/flush toilets, fish cleaning stations, camp sites and other recreational activity areas within the reservoir boundaries. SLOWD submits monthly inspection reports to DDW detailing the observations for each reservoir. **A review of those monthly reports since 2015 showed there were no issues with the recreational activities within the boundaries of the Salinas/Santa Margarita and Whale Rock Reservoirs.**

II.a.3 Watershed Sanitary Survey

Watershed Sanitary Surveys
Water systems with surface water sources are required to conduct a watershed sanitary survey for the water sources every five years. SLOWD receives and treats surface water from three different sources. It is responsible for the watershed sanitary surveys for the Salinas/Santa Margarita and Whale Rock Reservoirs. The NWP is responsible for the watershed sanitary survey for Lake Nacimiento. SLOWD completed the 2016 watershed sanitary surveys for the Salinas/Santa Margarita and Whale Rock Reservoirs; it sent a copy of the watershed sanitary survey reports to DDW in August 2017.

Salinas/Santa Margarita Reservoir Watershed Sanitary Survey: In the 2016 Salinas/Santa Margarita Reservoir watershed sanitary survey report, SLOWD identified cattle grazing and wild animals are major potential contamination sources of Giardia Lamblia and/or Cryptosporidium. Grazing is not permitted within the boundaries of the Santa Margarita Lake Regional Park and Natural Area. The last grazing lease was terminated by the San Luis Obispo County on May 31, 1997. The report also concluded that human recreational activities in the Santa Margarita Lake Regional Park and Natural Area are potential contamination sources for pathogens because of

private sewage disposal practices and the proximity of recreational users to surface waters. SLOC does not own any land in the watershed area, therefore has no control over land use activities, such as cattle grazing. The San Luis Obispo County implemented routine screening for cyanotoxins for the reservoir in August 2016 due to the potential for harmful algal blooms. San Luis Obispo County plans to test reservoir for microcystin and cylindrospermopsin monthly from May through October; and will conduct testing for cyanotoxins whenever blue-green algae counts are greater than 2,000 cells per milliliter of water for the months November through April.

SLOC is considering officially changing the designation of Santa Margarita Lake from non-body contact recreational reservoir to full body contact recreation. Please keep DDW updated on the progress of this change.

Whale Rock Reservoir Watershed Sanitary Survey: In the 2016 Whale Rock Reservoir watershed sanitary survey report, SLOWD identified erosion in the reservoir watershed is a significant source of sediment during rain season which could cause high turbidity issues. The cattle grazing within the watershed is a potential bacteriological contamination source (including Giardia Lamblia and/or Cryptosporidium) and a nutrient source. Agricultural pesticide and/or herbicide usage in the croplands within the watershed is another potential contamination source. San Luis Obispo County implemented the same cyanotoxins monitoring program for the Whale Rock Reservoir as the Salinas/Santa Margarita Reservoir.

Lake Nacimiento Watershed Sanitary Survey: The San Luis Obispo County Public Work Department (SLOC PWD) completed the initial Lake Nacimiento watershed sanitary survey in 2011. SLOC PWD conducted the updated survey in 2015 and sent the survey report to DDW in June 2016. Most of the watershed is rural and sparsely populated. There are several residential communities along the shore of the Nacimiento Reservoir. The Heritage Ranch and Oak Shores are the two largest communities and each is served by their own centralized wastewater treatment facilities. Two small communities of North Shore Ski and Boat Club, and Laguna Vista Boat Club utilize septic tanks/leach fields or collection/holding systems which are pumped and hauled for offsite disposal. There are other individual septic systems in the watershed utilized by homeowners which are not within a community structure. The 2015 survey report concluded that mercury can be a concern in the source water (a closed mercury mine is located within the watershed), but the risk to the consumer is negligible due to the extremely low mercury concentration and that treatment processes utilized for surface water treatment or groundwater recharge system should be able to remove the mercury. Recreational activities are allowed in the Nacimiento Reservoir including boating, water skiing, swimming and fishing. The public can access the reservoir through the Lake Nacimiento Resort, owned by the MCWRA. The recreation area has 19 lodges, seven camping areas (with 330 camping spaces), a restaurant and a marina with a fueling station. The resort is served by 16 septic tanks and four floating toilets on the reservoir with one of the floating toilets located at the marina. Monterey County Parks Department maintains the sewage disposal systems.

II.a.4 Source Assessment and Water Demand

The following table lists the possible contaminating activities for SLOWD's water sources. SLOWD last conducted the drinking water source assessment in March 2014.

Table 2: Possible Contaminating Activities

Source	Physical Barrier Effectiveness	Possible Contaminating Activities (top ranked)
Salinas/Santa Margarita Reservoir	Low	Managed forest, cattle grazing, human recreational activities and areas, low density septic systems, historic mining operations

Table 2: Possible Contaminating Activities		
Source	Physical Barrier Effectiveness	Possible Contaminating Activities (top ranked)
Whale Rock Reservoir	Low	Human recreational activities and areas, transportation corridors, low density septic systems, historic mining operations, cattle grazing in watershed, pesticide and herbicide use in crop lands in watershed, erosion in watershed
Nacimiento Reservoir	Low	Wastewater discharges and collection systems; septic systems, chemical toilets and floating toilets, urban runoff, industrial runoff (wineries, mines, military facilities); agriculture/cropland; herbicides and pesticides; grazing animals; wild animals, mine runoffs (inactive mercury and active calcium carbonate mines); hazardous material storage (petroleum products, wine production, water treatment and fueling stations); recreational use (boating and body contact); cultivation of marijuana; traffic accidents or spills; geologic hazards; fire
Pacific Beach Well (Standby)	Moderate	Animal grazing, sewer collection systems, automobile gas stations, above ground storage tanks, high density housing, freeways/state highways
Fire Station Well 4 (Standby)	Moderate	Automobile gas station, fleet/truck/bus terminals, photo processing and/or printing, sewer collection systems, above ground storage tank, high density housing, parking lots/malls, freeways/highways

Table 3: Water Demand Data					
Year	Maximum Day		Maximum Month Demand		Annual Water Demand (MG)
	Date	Volume (MG*)	Month	Volume (MG)	
2008	6/20	9.471	July	226.8	2,271.62
2009	5/29	8.73	July	210.6	2,147.58
2010	NR	7.931	May	189.92	1,912.45
2011	9/28	7.931	September	194.08	NR
2012	10/4	7.978	July	189.19	1,923.98
2013	5/27	9.13	May	196.24	2,035.39
2014	7/8	7.806	May	190.28	1,910.08
2015	7/17	6.32	October	155.47	1,685.03
2016	9/27	6	October	155.66	1,626.3
2017	10/17	8	October	189.47	1,777.26

*MG = Million Gallons. NR – Not Reported in the Annual Report submitted to DDW.

In the previous 10 years, the maximum day demand was 9.471 million gallons (MG) in 2008, according to SLOWD's Annual Report data. The capacity of the treatment plant is 16 million gallons per day (MGD) and the two wells are capable of producing 0.288 MGD when activated. SLOWD's 12 potable water reservoirs can store up to 26.28 MG of water. Based on the maximum day demand of 9.471 MG of water from 2007, SLOWD has adequate source and storage capacity to meet maximum day demand.

II.b Element 2 – Treatment

SLOWD treats raw surface water from three different sources and needs to comply with the SWTR. SLOWD's surface water Treatment Plant was permitted by DDW, with the latest treatment process changes made in 2007. SLOWD chlorinates water from the two wells as a precautionary measure when the wells are operating. It provides corrosion control and pH adjustment to the water leaving the surface water treatment plant. SLOWD fluoridates the treated water from the treatment plant prior to the distribution system.

Surface Water Treatment Plant Upgrades
SLOWD plans to upgrade its ozone generating system in the next two to three years because the current system cannot generate enough ozone to treat the combined water from all the three

surface water sources coming in at the same time. SLOWD plans to install a liquid oxygen (LOX) system to replace the current ambient air, ozone generating system. The LOX system will generate ozone in a much higher concentration than the system that SLOWD is currently using (with ozone concentration of about two percent). SLOWD plans to modify the ozone injection from bubbling to side streaming along with the upgrading of the ozone generating system. **During the September 18, 2018 site visit, SLOWD's contractor (California Environmental Controls, Inc.) was testing a new ozone generating system for the treatment plant. SLOWD shall apply and receive a permit amendment from the DDW before replacing the current ozone system.**

SLOWD is partnering with Pacific Gas and Electric Company (PG&E) and PG&E's consultant to become energy self-sufficient. SLOWD is studying the installation of solar panels at the treatment plant site and an energy recovery system for the water received from Nacimiento Water Project.

II.b.1 Surface Water Treatment Plant

SLOWD's surface water Treatment Plant treats the blended surface water from Salinas/Santa Margarita Reservoir, Whale Rock Reservoir and Lake Nacimiento. It is located in a rural area northwest of the city. SLOWD's treatment plant has a maximum treatment capacity of 16 MGD. It can be operated in two separate trains, each train capable of 8 MGD. Raw water from the three surface water sources can be blended in a 750,000-gallon forebay or in the raw water inlet vault prior to the ozone contact basins. The forebay is used every day to balance out the inflow to the treatment plant. The treatment plant typically treats a blended water.

The treatment plant processes include pretreatment ozone injection, chemical additions, flash mixing, coagulation, ballasted flocculation, dual media filtration, chlorination, corrosion control/pH adjustment and fluoridation. The ballasted flocculation process, permitted in 2007, replaced the flocculation and sedimentation processes in the conventional surface water treatment process. It is considered equal to the conventional treatment process.

The treatment plant is operated by certified drinking water operators from 4:00 AM to 11:00 PM with shifts from 4:00 AM to 2:00 PM and 1:00 to 11:00 PM. The operators have treatment levels 3 to 5 and are trained on the treatment plant operations.

Ozone Injection
SLOWD's treatment plant was upgraded in 1994 to include ozone pretreatment. Ozone is used for pretreatment disinfection, disinfection byproduct reduction, taste and odor control. Ozone can oxidize iron and manganese; therefore, increases their removal efficiency. SLOWD uses ambient air to generate ozone. The ambient air is compressed using three air compressors. Moisture is removed before the air enters the Emery-Trailigaz ozone generators. Each of the ozone generators can produce up to 250 pounds of ozone per day (lbs/day). The ozone system is designed so only two generators are operated at a time while the third one remains standby. The generators are rotated daily. The generators are capable of producing ozone for the full treatment plant operation.

SLOWD's treatment plant has two parallel ozone contact basins. Each basin has four contact chambers with fine bubble diffusers for adding the ozone into the raw water. Chamber #1, of each of the two treatment trains, is equipped with approximately 60 ozone diffusers that provide about 120 ft^3/min of ozone. Chamber #2, from each of the treatment trains, is equipped with about 40 gas diffusers that provide approximately 80 ft^3/min of ozone. Chambers 3 and 4 are not equipped with ozone diffusers. The following table provides more information about the

chambers.

Table 4: Ozone Chambers				
Chambers	Length (feet)	Width (feet)	Nominal Water Depth (feet)	Total Volume (ft^3)
1	5.25	20	21	2205
2	5.25	20	21	2205
3	4	20	21	1680
4	4	20	21	1680

Ozone is added in the first two chambers at approximately 2.6 milligrams per liter (mg/L). The off-gas from each basin is collected and the ozone in the off-gas is destroyed before being released to the atmosphere.

Coagulant/Polymer Additions
After ozone treatment, the water flows to the two parallel rapid mix basins. Coagulants are injected into the water for enhancing the filtration process and efficiency before and at the rapid mix basins. Each train has a rapid mix basin. The basin is measured at 6x6 feet, with water depth at about 6.5 feet. The basin is equipped with an axial flow, vertical turbine that provides an average velocity gradient of 400 per second.

Liquid alum (48.5 percent) is used as a coagulant for total organic carbon (TOC) removal. It is injected near the end of the ozone contact basins, before rapid mix. SLOWD has increased the liquid alum dosage rate from 15-20 to 30-35 milligrams per liter (mg/L) for maximum total organic carbon removal. The dosage was determined from the TOC removal efficiency during the Actiflo system pilot study. Higher dosages are used when treating Santa Margarita Reservoir water. The liquid alum is stored in two tanks, each with a storage capacity of 7,500 gallons. SLOWD utilizes two day-tanks for the liquid alum injection process; each day-tank has a storage capacity of 180 gallons. Two metering pumps are used to inject the liquid alum to the two treatment trains. SLOWD has a third standby pump which can be used if needed.

Liquid cationic polymer is injected at the rapid mix basins. The dosage rate is between 0.02 to 2.0 mg/L. The liquid cationic polymer is stored in an 80-gallon drum in a chemical pump room. One drum lasts about a week. Two metering pumps are used to inject the cationic polymer to the mix basins. SLOWD has a third standby pump which can be used if needed.

Actiflo Treatment Process
The pretreated surface water (injected with coagulants) then goes through the Actiflo treatment process (with two trains). SLOWD typically only runs one train at a time. The Actiflo treatment process is a high-rate clarification process that uses sand and polymer to aid the settling of the flocs. Two Actiflo units replaced the flocculation and sedimentation basins; each treatment train has one Actiflo unit. Each Actiflo unit can treat eight million gallons of water per day (MGD), with a maximum capacity of 12.0 MGD. Each Actiflo unit can be operated with a flocculation detention time of 6-10 minutes and sedimentation up flow rates of 20 gallons per minute per square feet (gpm/ft^2). The Actiflo units contain coagulation, sand and polymer injection, maturation and settling basins.

The water from the rapid mix basins flows to two parallel microsand injection chambers (one for each treatment train). At 8 MGD, each chamber has a hydraulic detention time of 2.7 minutes. The chambers each have a 10 horse-power (hp), variable speed mixer.

Water from the microsand injection chambers flows to two coagulation chambers. The microsand, coagulants and solids are thoroughly mixed in the chambers. The coagulation chambers each have a hydraulic detention time of 2.7 minutes at 8 MGD. The chambers each have a 10 hp, variable speed mixer.

Water from the coagulation chambers flows to two parallel maturation basins (one for each treatment train). Each basin has 5.8 minutes of hydraulic detention time at 8 MGD. There is a 7.5 hp, variable speed, mixing element in each basin. The mixing creates flocs to be removed during the sedimentation process. SLOWD uses ballasted flocculation process to minimize basin size needed for flocculation.

From the maturation basins, water flows to two parallel sedimentation basins (one for each treatment train). The basins have inclined lamella tube settlers and residual scrapers. The lamella tube settlers help to improve the sedimentation process by increasing the settling area. The scrapers remove the settled particles and facilitate the re-use of the microsand. At 8 MGD, each basin has an overflow rate of 20 gpm/ft^2. SLOWD cleans the lamella tube settlers every two to four weeks depending on the amount and quality of water treated.

Microsand Recirculation System
Each of the treatment trains has a microsand recirculation system to facilitate the reuse of the microsand. The removed particles from the sedimentation basins goes into the microsand recirculation systems. Each system contains three hydrocyclones, which are used to separate the microsand from the coagulated solids. The separated microsand is returned to the injection chambers to be re-used in the injection basins. Some microsand is lost during the treatment process and SLOWD has to periodically replenish the microsand supply in the injection chamber. The sludge left from the microsand separation process is sent to the solids thickening process.

Sludge Thickener
After the microsand is separated from the sludge, the remaining sludge is sent to a package treatment plant near the conventional sedimentation basin for further treatment. The package plant includes a rapid mix chamber, flocculation tank and a sedimentation chamber with plate settlers for treating the recovered water from the thickening process. The thickened solids are collected in a 12-feet diameter tank with a storage capacity of 6,500 gallons. The remaining sludge is discharged to the drying ponds. Water recovered from the thickening process is returned to the headworks of the surface water treatment plant. The return flow rates determined by the number of sand pumps running. One sand pump is used when the flow is less than 5 MGD; two sand pumps are required when the flow rate exceeds 5 MGD. SLOWD monitors the returned water for flow and turbidity and can put the recovered water into the filter backwash recovery basins.

Filtration Process
The surface water treatment plant has four dual media filters with 20-inch of anthracite and 10-inch of sand. Each filter provides a total filtration area of 700 square feet. SLOWD monitors the influent and effluent turbidities continuously and/or every four hours using Hach 1720, 2100N and Ratio turbidimeters.

The filters are capable of filtering to waste after SLOWD retrofitted the filter gallery. The recarbonation chamber was converted to a filter to waste channel. Two pumps are used for the filter to waste process. The pumps are used alternately between lead and lag to even out usage. Each of the pumps is capable of 220 gallons per minute (gpm). Near the raw water inlet line of the surface water treatment plant, SLOWD utilizes a sump pump to deliver water from the filter to

waste channel back to the head work of the treatment plant. The typical filter to waste run time is 15 minutes, but could be adjusted depending the desired turbidity levels are reached.

When one filter is taken off line for backwash, the remaining filter flow rates are increased, but is not to exceed 6.0 gpm/ft^2. However, the filter flow rates remain steady during filter runs to prevent spiking and ozone adjustments (which affect chlorine contact time calculations). Each filter is monitored continuously with on-line turbidimeters. The turbidimeters are equipped with 7-day charts and are connected to the supervisory control and data acquisition (SCADA) system. The turbidimeters are compared to a laboratory model weekly; the HACH turbidimeters are calibrated with a primary standard every 90 days. The turbidimeter alarm levels for each filter are set at 0.1 and 0.25 nephelometric turbidity unit (NTU).

The filters were rehabilitated in 1994 with new filtering media; and modifications to under drains and effluent piping to improve the filtration and backwash performances. The filtering media was refilled in 2006/2007.

A filter will be backwashed when it reaches the maximum set point for headloss, run time (30 to 40 hours) or turbidity. Typically, a backwash is initiated due to hours operated or head loss. The backwash water supply is from two 180,000-gallon tanks located at the surface water treatment plant. When a filter is backwashed, the flow rates for the remaining online filters increase proportionally. To comply with the SWTR, the flow rate through a filter may not exceed 6 gpm/ft^2 (this is calculated using 6 MGD or 4,200 gpm for one filter, which has 700 ft^2 of filtering area). At 16 MGD through the surface water treatment plant with one filter out of service, the flow rate through the remaining three filters is 5.3 gpm/ft^2 for each filter.

The backwash set points change according to the different seasons. The backwash flow rate is between 10 to 20 gpm/ft^2. The backwash generally follows these processes:

- Air scour the filter between 3 and 5 ft^3/min-ft^2 for approximately 5 minutes. The air is turned off and the backwash water begins to flow
- The backwash flow rate for the first 2 minutes is 10 gpm/ft^2
- The next 5 minutes the flow rate is 20 gpm/ ft^2
- The final 2 minutes the flow rate is 10 gpm/ ft^2
- The media is allowed to settle and the filter water level is raised to its optimum height. The effluent valve is opened approximately 1% every minute. The full flow rate is achieved in 15 to 20 minutes.

The filters have had turbidity spikes above 0.3 NTU (CAP goal) at times after backwash. DDW has recommended SLOWD to optimize the filter performance by shortening the filter run time, using filter aid polymer and other measures.

Filter Backwash Recovery

The spent filter backwash water is sent to two settling basins. The backwashed water then sits in the basins for one to two hours to allow the solid particles to settle; afterward the water is pumped to a Lamella plate settler near the sludge drying beds. The backwashed water is treated with a polymer and chlorine at the plate settler. The treated backwashed water re-enters the surface water treatment plant prior to the ozone contactor. The sludge in the basins is pumped to the sludge drying bed.

SLOWD monitors the reclaimed water turbidity levels and flow rates. The allowable reclaimed

water flow rate depends on the amount of water being returned by Actiflo process (the returned water from sludge thickening). A logic controller determines the allowable reclaimed water flow rate by subtracting the Actiflo process return rate from 10 percent of the overall surface water treatment plant influent flow rate. The difference is the allowable reclaimed water flow rate.

Sludge Drying Beds
Sludge from the Actiflo solids thickening process and the spent backwash water reclaiming process is discharged to three sludge drying beds. Water evaporates from the sludge in the drying beds, which reduces the weight and volume of the sludge. The dry solids left in the drying beds are sent to landfill.

Post Surface Water Treatment Process Chemical Additions

Sodium Hypochlorite: SLOWD injects 12.5 percent sodium hypochlorite into the water following the filtration. The dosage is between 2.0 to 3.0 mg/L. The sodium hypochlorite is stored in two 2,500-gallon and one 1,000-gallon storage tanks. The sodium hypochlorite is delivered in 4,700-gallon shipments on an as-needed basis. SLOWD utilizes two 110-gallon day tanks and three metering pumps for injecting sodium hypochlorite into the effluent of the surface water treatment plant. Two of the metering pumps are used to provide the sodium hypochlorite while the third pump serves as a standby.

The sodium hypochlorite injection pumps are equipped with alarms. SLOWD monitors the chlorine residuals through grab samples every two hours and the pH every four hours. SLOWD operators obtain samples from sampling points located at the treatment plant combine effluent, Clearwells 1 and 2 for chlorine residuals analysis in the onsite laboratory. SLOWD maintains a chlorine residual between 1.7 to 2.0 mg/L and tries to keep the chlorine residual in the water leaving the clearwells at 1.3 mg/L. SLOWD operators will investigate the chlorine feed pumps and system if the chlorine residuals fall below the target levels.

Sodium Hydroxide (Caustic Soda): SLOWD at times adds sodium hydroxide to the surface water treatment plant effluent for corrosion control and/or pH adjustment. SLOWD has two metering pumps for sodium hydroxide feed; one pump provides the feed while a second one serves as a standby. The sodium hydroxide feed system is located in the ozone generation building.

Filter Aid Polymer: SLOWD has the ability to add polymer (filter aid, non-ionic) to the backwashed water; but this chemical feed system is rarely used.

Fluoridation
SLOWD fluoridates the surface water treatment plant effluent with sodium silicofluoride (Na_2SiF_6) that contains 61 percent fluoride ion. The sodium silicofluoride is delivered in solid form and SLOWD has to dissolve it before injecting it into the filtered water. A hopper is used to deliver the solid sodium silicofluoride into the dissolving tank through a volumetric screw feeder. The hopper is equipped with dust control. The dissolving tank has a mixing element. The hopper and the screw feeder are located on a scale.

SLOWD provides optimum level fluoridation for the treated surface water, not the groundwater. Surface water accounts for about 98 percent of the total annual supply. Currently SLOWD only provides treated surface water to its customers. If groundwater is used, it could result in pockets of the distribution system not have optimum fluoride levels. DDW recommends SLOWD to fluoridate its groundwater supplies.

The United States Department of Health and Human Services Agency (HHS) recommend that waters systems practicing fluoridation to adjust the optimal fluoride concentration to 0.7 milligrams per liter (mg/L), as opposed to the previous temperature-dependent optimal level ranges of 0.7 to 1.2 mg/L. The change was based on scientific evidence coming from the Centers for Disease Control and Prevention. Currently, SLOWD fluoridates its water leaving the treatment plant at levels between 0.6 to 1.2 mg/L, with an optimum concentration of 0.7 mg/L. SLOWD collects daily samples from the treatment plant and weekly samples from the distribution system for fluoride analysis. **A review of the monthly fluoride report results since January 2014 showed that the fluoride levels were within the targeted range in SLOWD's treated water supply.**

Treated Water Storage
SLOWD uses two clearwells for storing the treated water from the surface water treatment plant. The two clearwells replaced an older 4 MG clearwell. The two clearwells each are capable of storing up to 2 and 3 MG of water. The two clearwells can be operated independently of each other; SLOWD can take one clearwell out of service for cleaning and maintenance while the other clearwell is operating.

Turbidity Monitoring and Alarm Set Points
SLOWD monitors the turbidity levels at the Actiflo effluent, the filter effluents, the treatment plant effluent, the package thickener effluent and the backwashed water treatment process effluent. High turbidity level set points were established for each process. A higher turbidity level alarm will be triggered through the SCADA system if the effluents of those processes exceeded the high turbidity set points.

Table 5: Turbidity Monitoring and High Alarm Set Points	
Location	High Alarm Set Point (NTU)
Actiflo Effluent	2.0
Filter Effluent	0.25
Package Thickener	2.0
Washwater Treatment Plant	2.0

Chlorine Contact Time (CT) Compliance
SLOWD uses ozone as a primary disinfectant for CT purposes. Sodium hypochlorite is used as a secondary disinfectant to provide the required chlorine residual in the distribution system. Under the SWTR, a surface water treatment plant needs to provide 3-log Giardia and 4-log viruses inactivation using a combination of filtration and disinfection treatment. SLOWD's surface water treatment plant is considered equivalent to a conventional surface water treatment plant; therefore, it is credited with 2.5-log Giardia and 2.0-log viruses removal credit. SLOWD needs to provide 0.5-log Giardia and 2.0-log viruses inactivation through the disinfection process. The CT credit is obtained through the ozone chambers in each of the two treatment trains. SLOWD determines the ozone concentration in the water leaving each chamber through sampling locations on each chamber's outlet.

If the ozone concentration at the outlet of the first chamber is greater than 0.1 mg/L, then the first chamber is credited with 1-log viruses inactivation; if the ozone concentration is greater than 0.3 mg/L, then 0.5-log Giardia inactivation is credited. The ozone concentration in the second, third and fourth ozone chambers are all considered in total CT calculation and log inactivation.

SLOWD is required to submit a monthly surface water treatment report to DDW that includes daily

amount of water treated, turbidity measurements, chlorine residuals of treated water and from the distribution system, CT parameters, water quality complaints, water borne illness reports from the customers and various other treatment plant performance information. **A review of the monthly reports since 2014 showed that SLOWD complied with the SWTR requirements; except in May 2016 where individual filter effluent exceeded the turbidity performance levels where effluent turbidity exceeded 0.3 and 1.0 NTU. In both September and December 2016, the total organic carbon removal percentages were below the required total organic carbon removal percentage.**

Cryptosporidium Action Plan
The surface water treatment plant has been evaluated for Cryptosporidium Action Plan compliance. The following table has the optimization goals for the different processes at the treatment plant.

Table 6: Cryptosporidium Optimization Criteria	
Location	**Optimization Goals**
Sedimentation/Clarification Basin Effluent (Actiflo Process)	1 to 2 NTU
Combined Filter Effluent	Less than 0.1 NTU
Reclaimed Backwash Water Effluent	Less than 2.0 NTU
After Filter Backwash/Filter -to-Waste	Less than 0.3 NTU

II.b.2 Groundwater Treatment – Chlorination

SLOWD has two standby well. SLOWD provides wellhead chlorination when the wells are in use. SLOWD uses five-gallons-per-hour metering pump to inject 12.5 percent sodium hypochlorite into the water leaving each of the well sites. The sodium hypochlorite is stored in 55-gallon drums on the well sites. The chlorination system is housed. SLOWD tries to maintain a chlorine residual of 0.5 to 1.0 mg/L in the water leaving the well site.

II.b.3 Distribution Reservoir Chlorination Treatment

SLOWD maintains chlorination facilities at three distribution reservoir sites: Reservoir 1, Reservoir 2 and Edna Saddle Reservoir. SLOWD boosts the chlorine residual in the reservoirs. Its operators visit each site every morning. The operators analyze and record the chlorine residuals from the boosting operation.

Reservoir 1 Chlorination
A chlorination system is maintained at the reservoir site. SLOWD adds chlorine to the reservoir to boost the chlorine residual level to about 1.0 mg/L, which amounts to 2-4 gallons of sodium hypochlorite. The sodium hypochlorite is stored in a 50-gallon container, which is filled approximately once a week during peak demand and every other week during lower demands. The chlorine pump is set at 7 gallons per day during the September 18, 2018 site visit. Chlorine residual is monitored inside the reservoir and in the reservoir effluent.

Reservoir 2 Chlorination
SLOWD maintains a chlorination system at the reservoir. The chlorine residual level is boosted to about 1.0 mg/L leaving the east end of Reservoir #2, which requires 2-4 gallons of sodium hypochlorite. The sodium hypochlorite is stored in a 50-gallon container, which is filled approximately once a week during peak demand and every other week during lower demands. The chlorine pump is set at 12 gallons per day during the September 18, 2018 site visit. The

reservoir has an internal baffle to improve water circulation. Chlorine can be fed to either the east or west side of the baffle wall pumps, which are set to operate alternatively to even out usage. Typically, chlorine is fed to the west side and the residual is carried to the eastside of the reservoir and out to the distribution system.

Edna Saddle Reservoir Chlorination
SLOWD maintains a chlorination system at the reservoir site and periodically uses the system to boost the chlorine residual in the reservoir. A metering pump is used for chlorine injection. The chlorine pump is set at 10 gallons per day during the September 18, 2018 site visit. The sodium hypochlorite is stored in a 55-gallon container.

II.b.3 Recycled Water Sites

SLOWD maintains 48 recycled water use sites, with one approved in 2017 and five proposed in 2018. SLOWD received a Master Reclamation Permit from the California Regional Water Quality Control Board – Central Coast Region in 2003. The first delivery of the recycled water took place in 2006 after the completion of an initial eight miles of recycled water distribution pipelines. Mychal Boerman is currently the Recycled Water Coordinator for the City of San Luis Obispo. The recycled water comes from the San Luis Obispo wastewater treatment plant. The wastewater is treated to tertiary standards through solid removal, chemical additions, flocculation, coagulation, filtration and disinfection with chlorine contact time. The treated wastewater leaving the treatment plant maintains a chlorine residual between 1 to 5 mg/L. DDW does not have any record of a tracer study on the chlorine contact basin at the wastewater treatment facility. The wastewater treatment facility currently is not required to calculate the CT of the treated wastewater to determine if the tertiary standards are met.

The recycled water system consists of a storage reservoir and a booster pump station, which are both located at the wastewater treatment facility site. The storage reservoir has a 600,000 gallon capacity. The storage reservoir can receive potable water through an air gap. The booster station has two 40-hp Jockey and three 125-hp Floway pumps. The Jockey pumps each are capable of 390 gpm, while the Floway pumps each is capable of 1,267 gpm. The booster station has the capacity to add two more pumps.

Of the 48 recycled water use sites, 41 are for irrigation purposes only and seven are for other uses (construction purposes). The irrigation hours are generally from 6:00 PM to 6:00 AM to limit the public exposure to the recycled water. In 2017, SLOWD reported 77.72 MG of recycled water used. The used sites were inspected 576 times by the City of San Luis Obispo in 2017. There was one pressure/shutdown test performed at the use sites in 2017. DDW visited recycled water use sites located at a community garden and the nearby Laguna Lake Golf Course, Damon Garcia Sports Field and Laguna Middle School on September 2018. **The Laguna Lake Golf Course has its own irrigation well and uses the well water to mix with the recycled water for irrigating the golf course. It had recently installed 3 pressures tanks for operation of the well. The three pressure tanks are not used to receive and/or store recycle water.** They are used to operate the well automatically instead of manually. The following table provides more information about the recycled water use sites; however, it does not include all use sites.

Table 7: Recycled Water Use Sites

Site Name	Site Address	Purpose of Use	Inspection	Backflow Protection Type
Damon Garcia Sports Field	680 Industrial Way	Landscape Irrigation	Monthly	RP

Table 7: Recycled Water Use Sites				
Site Name	Site Address	Purpose of Use	Inspection	Backflow Protection Type
Los Osos Valley Rd. Medians	10990 Los Osos Valley Rd.	Landscape Irrigation	Monthly	N/A
Los Osos Valley Rd. Medians	11000 Los Osos Valley Rd.	Landscape Irrigation	Monthly	N/A
Calle Joaquin Parkways	1500 Calle Joaquin	Landscape Irrigation	Monthly	N/A
Courtyard by Marriott (2 meters)	1605 Calle Joaquin	Landscape Irrigation	Monthly	RP
Irish Hills Plaza (2 meters)	11951/11981 Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
Costco	1540 Froom Ranch Way	Landscape Irrigation	Monthly	RP
Laguna Village Shopping Center	11550 Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
Laguna Lake Golf Course	11175 Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
City Corporation Yard Hydrant	25 Prado Road	Hydrant	Monthly	N/A
Laguna Middle School	11050 Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
Laguna Hills Park	925 San Adriano	Landscape Irrigation	Monthly	RP
Laguna Lake Park	504 Madonna Rd.	Landscape Irrigation	Monthly	RP
French Park	4165 Morning Glory	Landscape Irrigation	Monthly	RP
Islay Park	1511 Tank Farm Rd.	Landscape Irrigation	Monthly	RP
Construction Water Hydrants	Industrial Way, Tank Farm Rd, Prado Rd, and Calle Joaquin	Hydrant	Monthly	N/A
Cal Trans	31 Prado Road	Landscape Irrigation	Monthly	N/A
Water Reclamation Facility Hydrant	35 Prado Road	Hydrant	N/A	N/A
De Vaul Park - City	1593 Madonna Road	Landscape Irrigation	Monthly	RP
Los Osos Valley Rd. Medians	1401 Madonna Road	Landscape Irrigation	Monthly	N/A
DeTolosa Homes (2 meters)	1501 and 1601 Madonna Rd.	Landscape Irrigation	Monthly	N/A
Los Verdes Park I (2 meters)	92 and 93 Los Verdes Drive	Landscape Irrigation	Monthly	N/A
Meathead Movers	3600 Higuera S.	Landscape Irrigation	Monthly	RP
Mission Community Bank	3380 Higuera S.	Landscape Irrigation	Monthly	RP
Margarita Medians (3 meters)	211, 301, 385 Margarita	Landscape Irrigation	Monthly	N/A
Prefumo Creek Commons (2 meters)	11980 A&B Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
Olive Garden	11966 Los Osos Valley Rd.	Landscape Irrigation	Monthly	RP
Hampton Inn	1530 Calle Joaquin	Landscape Irrigation	Monthly	RP
America's Tire	1443 Calle Joaquin	Landscape Irrigation	Monthly	RP
Mangano Homes (3 meters)	300 and 392 Prado; 3420 Serra Meadows	Landscape Irrigation	Monthly	N/A
Marigold Center		Landscape Irrigation	N/A	N/A
Tract 2342 (Serra Meadows)		Landscape Irrigation	N/A	N/A
Prado Road Streetscape		Landscape Irrigation	N/A	N/A
SESLOC HQ (3807 Broad Street)		Landscape Irrigation	N/A	N/A
Madonna Road Apartments (1550 Madonna Road)		Landscape Irrigation	N/A	N/A
CalTrans Highway 101 Corridor (Madonna Rd North)		Landscape Irrigation	N/A	N/A
CalTrans District Office (Madonna Road)		Landscape Irrigation	N/A	N/A

Table 7: Recycled Water Use Sites				
Site Name	Site Address	Purpose of Use	Inspection	Backflow Protection Type
Tract 3011 (Southern Detention Basin)		Landscape Irrigation	N/A	N/A
Tract 2353		Landscape Irrigation	N/A	N/A
Prado Road Streetscape Extension, Segment D		Landscape Irrigation	N/A	N/A
120 Tank Farm Road		Landscape Irrigation	N/A	N/A
Prado Road Streetscape Extension, Segment E		Landscape Irrigation	N/A	N/A
SoCal Gas Pipeline Safety Enhancement Plan		Pipeline Pressure Testing	N/A	N/A
Righetti Ranch		Landscape Irrigation	N/A	N/A
Bonetti Ranch		Landscape Irrigation	N/A	N/A
Perry Ford Landscape		Landscape Irrigation	N/A	N/A
Coast BMW		Landscape Irrigation	N/A	N/A
1301 Calle Joaquin		Landscape Irrigation	N/A	N/A

*AF=Acre Feet

II.c Element 3 – Distribution System

SLOWD's distribution system covers the City of San Luis Obispo. The water distribution system consists of 15 pressure zones. The pressures in the pressure zones range from 40 to 125 pounds per square inch (psi). SLOWD's water mains consist of 4 to 12-inch asbestos cement, 6 and 16-inch polyvinyl chloride (PVC), 4 to 16-inch cast or ductile iron, and 3 to 20-inch steel mains. SLOWD uses at least 6-inch PVC C900 pipe for main replacement. SLOWD follows the California Waterworks Standards for separation of potable water mains and non-potable pipelines.

For newly installed lines, SLOWD will use HTH tablets or chlorine gas for disinfection with a 24-hour contact time and a final chlorine residual of at least 25 mg/L. Bacteriological tests are made after the disinfection. Repairs to fractured mains are made under partial pressure; if a section is replaced, the newly installed line will be swabbed with a chlorine solution and flushed according to American Water Works Association disinfection procedures.

SLOWD has 187 distribution system dead ends and flushes the dead ends as required by water quality results. There are 5,334 valves in SLOWD's distribution system. The goal is to exercise the distribution valves every three to five years. SLOWD maintains 1,659 backflow prevention devices to protect its water system from cross connections according to the 2017 Annual Report; there is zero reported inactive backflow prevention device in 2017. Mr. Jon Williams is the cross connection control program coordinator for SLOWD. **SLOWD tested 1,478 out of the 1,659 backflow prevention devices in 2017. SLOWD is required to test all the backflow prevention devices every year.** New services shall be evaluated for any cross connections and backflow hazards. SLOWD should periodically survey existing service connections for potential backflow hazards or cross connections. SLOWD serves the City's waste water treatment plant. Potable water is delivered to a tank located at the waste water treatment plant through an air gap.

Table 4: Backflow Prevention Device Testing Results					
Year	Total # in System	# Installed	# Tested	# Failed	# Repaired
2015	1,575	47	1,478	113	105

Table 4: Backflow Prevention Device Testing Results					
Year	Total # in System	# Installed	# Tested	# Failed	# Repaired
2016	1,597	60	1,473	14	93
2017	1,659	44	1,478	2	80

II.d Element 4 – Finished Water Storage

SLOWD maintains 12 storage reservoirs for treated water. The reservoirs have a total capacity of 26.28 MG. SLOWD personnel inspect the conditions of the reservoirs on a monthly basis. The reservoirs are to be inspected and cleaned every four to five years. SLOWD has upgraded the SCADA system at the reservoir sites.

Clearwell #1
The reservoir was constructed above ground and of steel in 2008. It has a capacity of 3.0 MG. It is located at the surface water treatment plant. The reservoir has a separate inlet and outlet. The inlet is angled and has a sample tap. The reservoir is equipped with cathodic protection. The overflow and drain discharge to a catch basin through an air gap. The reservoir receives water from the surface water treatment plant and supplies water to the distribution system. The reservoir's air vents, overflow and drain are screened or have flap gates. The overflow and drain can discharge to the pond located next to the surface water treatment plant.

Clearwell #2
The reservoir was constructed above ground and of steel in 2007. It has a storage capacity of 2.0 MG. The reservoir is located at the surface water treatment plant. It has a separate inlet and outlet. The inlet is angled and has a sample tap. The reservoir is equipped with cathodic protection. It receives water from the surface water treatment plant and delivers water to the distribution system. Its overflow and drain discharges to a catch basin through an air gap. The reservoir's air vent, overflow and drain are screened or have flap gates. The overflow and drain can discharge to the pond located next to the surface water treatment plant.

Bishop Tank
The reservoir was constructed of welded steel and above ground in 2007 in replacement of the old tank. It has a 750,000-gallon storage capacity. The reservoir is located above a residential area at a hillside. The reservoir site is fenced. The reservoir has a separated inlet and outlet. The air vacuum release valves on the inlet and outlet are screened. The reservoir is equipped with cathodic protection. The reservoir receives water from Reservoir #1 through the distribution. The overflow discharges to a sump which leads to the storm drain and the drain can discharge to the surface onsite. The reservoir's air vent, overflow and drain are screened or have flap gates. **The edges of a few cathodic plates on top of the reservoir are rusted. It is recommended that SLOWD take preventative measures to stop the rusting.**

Edna Saddle Tank
The reservoir was constructed above ground and of welded steel in 1975. It has a storage capacity of 4.0 MG. The reservoir is located inside a blasted depress area in a hill. The reservoir site is fenced and locked. The reservoir is equipped with cathodic protection with internal epoxy coating. It has a common inlet/outlet. The reservoir receives water from the Terrance Hill Pressure Zone and delivers water to the Edna Saddle Pressure Zone. The internal overflow discharges to a storm drain which leads to a ranch near the south side of the hill. The reservoir's air vent and overflow are screened. **The west side of the reservoir roof is littered with rocks of various sizes. Hikers from a nearby trail threw rocks at the reservoir and the rocks chipped paint from the roof and side of the reservoir. The paint chipped areas are rusted.**

It is recommended that SLOWD repaint the rusted areas and to create a greater controlled perimeter around the reservoir to prevent hikers from throwing rocks at the reservoir. A booster pump is physically disconnected from the inlet/outlet line inside the vault. **An air vacuum release valve was not screened on the inlet/outlet line in the vault. SLOWD shall screen or cap the open valve. A bulging spot was observed on the upper panel of the reservoir. SLOWD shall investigate the cause of the bulge and take appropriate actions to mitigate the cause.**

Ferrini Tank
The reservoir was constructed of welded steel and above ground in 1985. The reservoir is located in a rural area. The reservoir site is fenced. It has a storage capacity of 160,000 gallons. The reservoir has a common inlet/outlet. It receives water from the Ferrini Booster Station and supplies water to the Ferrini Heights Pressure Zone. The overflow discharges to a sump through an air gap. The drain discharges to the surface on the reservoir site. The reservoir's air vent is screened and overflow has a flap valve. **A loose cathodic plate was observed on top of the reservoir. Vegetations are growing around the base of the reservoir. SLOWD shall tighten the loose cathodic plate and remove the vegetations around the base of the reservoir. SLOWD shall send pictures to DDW of the vegetation removal within 30 days of this Sanitary Survey Report.**

Islay Tank
The reservoir was constructed of concrete in 1996. It is a buried reservoir with only the hatch and air vents/second hatch being above ground. The reservoir has a storage capacity of 400,000 gallons. It is located in a rural area inside a ranch. The reservoir site is fenced and locked. The reservoir has a common inlet/outlet. It receives water from Reservoir #2. It delivers water to Edna Saddle Pressure Zone. The reservoir's air vents are screened. Cow activities were observed around the fence of the reservoir during the September 18, 2018 site visit.

Reservoir #1
The reservoir is constructed of concrete (sides and base) in 1939 and is partially buried. It has a floating cover. The floating cover and liner were replaced in 1997. SLOWD has an operations and maintenance plan for the floating cover to ensure it meets sanitary conditions. The plan includes daily, quarterly, semi-annual, annual and seasonal duties. SLOWD operators visit the reservoir daily and maintain a daily log of the reservoir cover conditions. SLOWD adds chlorine to the reservoir please see the Distribution Reservoir Chlorination Treatment section for detailed information.

The reservoir has a storage capacity of 7.0 MG. It is located in a rural area and the site is fenced. The reservoir has a common inlet/outlet; the piping inside the reservoir splits to improve mixing. It receives water from Clearwells 1 and 2. It supplies water to Reservoir Canyon (Reservoir #1) Pressure Zone. **SLOWD plans to remove the reservoir in the future. The floating cover for the reservoir has numerous patches of various sizes. A floating cover has a life expectancy about 20 to 25 years. The current floating cover was installed in 1997 and the cover is approaching the end of its life expectancy. SLOWD should consider replacing the floating cover before it reaches the end of its useful life.**

Reservoir #2
The reservoir was constructed of concrete (sides and base) in 1941 and is partially buried. It has a floating cover and a liner. The roof's drainage system was rehabilitated in 2002. SLOWD has an operations and maintenance plan for the floating cover to ensure it meets sanitary conditions. The plan includes daily, quarterly, semi-annual, annual and seasonal duties. SLOWD operators

visit the reservoir daily and maintain a daily log of the reservoir cover conditions. SLOWD adds chlorine to the reservoir; please see the Distribution Reservoir Chlorination Treatment section for detailed information.

The reservoir has a maximum storage capacity of 8.0 MG. It is located in a rural area. SLOWD built a new perimeter fence in 1998.The reservoir has a common inlet/outlet. However, it is baffled into east and west to help water mixing. The reservoir receives water from Clearwells 1 and 2. It supplies water to the High Pressure Zone. **The floating cover for the reservoir has numerous patches of various sizes. A floating cover has a life expectancy about 20 to 25 years. The current floating cover was cleaned, drained and spots repaired in 2018. The cover was installed over 20 years ago and is approaching the end of its life expectancy. SLOWD should consider replacing the floating cover before it reaches the end of its useful life.**

During the September 18, 2018 site visit, water was observed on top of the floating covers for both the east and west side of the reservoir. SLOWD shall remove all water from the top of the floating cover. A possible hole was observed on the northwest corner of the east portion of the reservoir. SLOWD shall repair the hole if it exists. Vegetation was growing on the perimeter of the reservoir near the edge of the floating covers. SLOWD shall remove the overgrowing plants. SLOWD shall send pictures of the dry floating cover, repair hole (if needed) and the vegetation free perimeter around the reservoir.

SLOWD plans to replace the reservoir with two tanks. It is currently looking at alternative sites for the two new tanks and has picked out a preferred site. The preferred site is located on a location owned by California Poly Technical University San Luis Obispo nearby Highway 1. SLOWD needs to send a permit amendment application to DDW for the construction of the two new tanks if each tank has a capacity of 100,000 gallons or more. SLOWD needs to send a drawing of the tank design to DDW for review and approval.

Rosemont Tank
The reservoir is constructed above ground and of welded steel in 1995. It has a maximum storage capacity of 43,500 gallons. It is equipped with cathodic protection. The reservoir is located in a rural area. It has a common inlet/outlet. The reservoir site is fenced and locked. The reservoir receives water from the Rosemont Booster Station. It supplies water to the Ferrini Heights and Highland Pressure Zones. The overflow and drain discharges to a sump which leads to a lower elevation away from the reservoir. The reservoir's air vent is screened; the drain is closed with screwed metal plate; and the overflow has flap valve.

Serrano Tank
The reservoir is constructed above ground and of welded steel in 1965. It has a maximum storage capacity of 100,000 gallons. It is equipped with cathodic protection. It has a common inlet/out. The reservoir is located in a rural area. The reservoir site is fenced and locked. The reservoir receives water from the Bressis Booster Pump Station. It delivers water to the Serrano Tank Pressure Zone. The reservoir's air vent is screened. **The edge of a cathodic plate on top of the reservoir is rusted. It is recommended that SLOWD take preventative measures to stop the rusting.**

Slack Tank
The reservoir was constructed of welded steel and above ground in 1956. It has a storage capacity of 77,000 gallons. The reservoir has a common inlet/outlet. It is located in a residential area. The reservoir site is fenced. The reservoir receives water from the McCullum Booster Pump Station. It delivers water to the Slack Street Pressure Zone. **The reservoir has been**

taken out of service for the last nine to ten months because SLOWD is testing if the reservoir is needed for maintaining pressure and providing water supply to the Slack Street Pressure Zone. Currently Reservoir #2 is providing water to the Slack Street Pressure Zone. SLOWD plans to abandon the reservoir in the future if the testing showed that Reservoir #2 is able to supply the water to the Slack Street Pressure Zone.

Terrace Hill Tank
The reservoir was constructed of welded steel and above ground in 1959. It has a storage capacity of 750,000 gallons. It is equipped with cathodic protection. The reservoir is located in a residential area. The reservoir site is fenced and locked. The reservoir has a common inlet/outlet. It receives water from Reservoir 2 and delivers water to the Terrace Hill Pressure Zone. The reservoir's air vent is screened. **A plant is growing at the base of the reservoir. SLOWD shall remove the plant and send a picture to DDW confirming the removal within 30 days of this Sanitary Survey report. Rust spots and signs of water ponding were observed on top of the reservoir. It is recommended that SLOWD take steps to remediate the rusting spots and water ponding areas. SLOWD has plans to eliminate the reservoir in the future.**

Table 5: Active Reservoir Info

Reservoir Name	Type	Year Built	Capacity (MG)	Comments
Clearwell #1	Steel	2008	2.0	Last inspected and cleaned in 2013; last re-lined or coated in 2007.
Clearwell #2	Steel	2007	3.0	Last inspected and cleaned in 2015. Last relined or coated in 2007.
Bishop Tank	Welded Steel	2007	0.75	Last inspected in 2008 and cleaned in 2007. Last relined or coated in 2007.
Edna Saddle Tank	Welded Steel	1975	4.0	Last inspected and cleaned in 2010. Last reline or coated in 1998.
Ferrini Tank	Welded Steel	1985	0.1	Last inspected and cleaned in 2009. Last reline or coated in 1993.
Islay Tank	Concrete	1996	0.4	Last inspected 2016 and cleaned in 1996.
Reservoir #1	Concrete	1939	7.0	Last inspected and cleaned in 2017. Last relined/recoated in 1997.
Reservoir #2	Concrete	1941	8.0	Last inspected and cleaned in 2002. Last reline or coated in 1988.
Rosemont Tank	Welded steel	1995	0.043	Last inspected and cleaned in 2014. Last reline or coated in 1995.
Serrano Tank	Welded steel	1954	0.1	Last inspected and cleaned in 2009. Last reline or coated in 1993.
Slack Tank	Welded steel	1955	0.077	Currently out of service. Will be abandoned in the future
Terrace Hill Tank	Welded steel	1957	0.75	Last inspected and cleaned in 2015. Last relined or coated in 1997.

II.e Element 5 – Pumps, Pump Facilities, and Control

SLOWD operates seven active booster pump facilities in its potable water distribution system. The booster pump stations all have hookups for standby generators in case of power failure. SLOWD has upgraded the SCADA system at the booster pump station sites.

Alrita Booster Pump Station
The Alrita Booster Pump Station is located in a residential area. It has two pumps and an

emergency fire pump. The pump station is fenced and the pumps are housed. The pump station moves water from Bishop Tank to the Alrita Pressure Zone through two pressure tanks. The two pressure tanks are located at the back of the pump station. The pressure in the incoming water is about 60 psi which is boosted to 100 psi. The pumps come on when needed. The pumps are used alternately to even out usage, both pumps can run at the same time if demand requires. The pump station site is fenced and the pumps are housed. SLOWD operators visit the site weekly.

Bishop Booster Pump Station (Emergency)
The Bishop Booster Pump Station is located at the edge of a parking lot near the San Luis Obispo County Public Health Department. It has one 50-hp pump for fire emergency purpose. The pump station had previously installed a pump to move water from Reservoir #1 to the Bishop tank, but it was determined the pump was not required because water can be moved from Reservoir #1 to the Bishop Tank by gravity. Currently that pump is physically disconnected. The pump station site is fenced and the pump is housed.

Bressis Booster Pump Station
The Bressis Booster Pump Station is located in a residential area. It has two 40-hp pumps. Each pump is capable of 500 gpm. The pump station receives water from the Foothill Pressure Zone and delivers water to the Serrano Tank. The pump station site is fenced and the pumps are housed. SLOWD operators visit the site weekly.

Ferrini Booster Pump Station
The Ferrini Booster Pump Station is located in a rural area by Highway 1. It has two 75-hp Weinman pumps. Each pump is capable of 1,060 gpm. The pumps are setup to use alternately to even out usage; both pump can be used simultaneously if water demand requires. The pump station receivers water from the Transfer Pump Station and delivers water to the Ferrini Tank. The pumps are housed and the site is fenced. SLOWD operators visit the site weekly. **A valve for one of the pumps is leaking. SLOWD has plans to fix the leak. It shall send pictures to DDW of the repaired leaking valve within 30 days of this Sanitary Survey report.**

McCollum Booster Pump Station
The McCollum Booster Pump Station is located in a residential area. It has a 15-hp Auroa pump and an emergency fire pump. The pump station delivers water from Reservoir #1 to the Slack Tank. The water pressure is boosted from approximately 80 psi to 90 psi. The pump station is housed. **The pump station is currently out of service for nine to ten months. The water main has been re-routed and the valves to the pump station are closed. SLOWD is testing if it could provide adequate pressure and water to its customers without the pump station. SLOWD plans to abandon the pump station in the near future if the testing shows that the station is not needed. SLOWD plans to re-use the pumps.**

Reservoir Canyon (Reservoir #1) Booster Pump Station
The Reservoir Canyon (Reservoir #1) Booster Pump Station is located in a rural area next to Reservoir #1 by Highway 101. It has two 3-hp Jacuzzi pumps. The pumps boosts water from Reservoir #1 to three hydropneumatic tanks which serve six homes in the Reservoir Canyon area across Highway 101. The pump station site is fenced and the pumps are housed. A new meter was installed at the pump station site and will be connected to the SCADA system in the future. SLOWD operators visit the site weekly.

Rosemont Booster Pump Station
The Rosemont Booster Pump Station is located in a rural/residential area. It replaced the Fielmar

booster pump station. It has two 10-hp Paco pumps. Each pump is capable of 146 gpm. The pumps are used alternately to even out usage; if needed, both pumps can be used simultaneously. The pump station moves water from the Highland Pressure Zone to the Rosemont Tank. The incoming water pressure is about 20 psi and is boosted to about 85 psi. The pump station site is fenced and the pumps are housed. SLOWD operators visit the site weekly.

Transfer Booster Pump Station
The Transfer Booster Pump Station is located next to Clearwell #2. It has four identical 75-ph U.S. Electrical Motors pumps. Each pump is capable of 1,500 gpm. The pump station receives water from Clearwell #2 and delivers water to Reservoir Zone 2. The water pressure is boosted to about 70 psi. The pump station is controlled by the distribution system pressure and used daily. Normally only two to three pumps are used; but all four pumps can be used at the same time. The pumps are housed inside a building. The pump station has a bypass valve that allows Reservoir 2 water to fill Reservoir 1.

Table 6: Booster Pump Stations

Pump Station Name	# of Pump	Pump Power (hp)	Capacity (gpm)	Receive Water from	Delivers Water to
Alrita	3 (with one fire pump)	2 2-ph, fire pump 75-hp		Bishop Tank	Alrita Pressure Zone
Bishop (Emergency)	1 emergency fire pump	50-hp		---	---
Bressis	2	40-hp each	500 each	Foothill Pressure Zone	Serrano Tank
Ferrini	2	75-hp each	1,060 each	Transfer Booster Pump Station	Ferrini Tank
McCollum	1 & a fire pump	15-hp	200	Reservoir #1	Slack Tank
Reservoir #1	2	3-ph each		Reservoir #1	4 nearby homes
Rosemont	2	10-hp each	146 each	Highland Pressure Zone	Rosemont Tank
Transfer	4	75-hp each	1,500 each	Clearwell #2	Reservoir 2 Zone

II.f Element 6 – Monitoring, Reporting, and Data Verification

California laws and regulations require a public water system to routinely monitor its groundwater sources for general physical parameters, general minerals, inorganic chemicals, radiological chemicals, volatile organic chemicals (VOCs), Non-volatile synthetic organic chemicals (SOCs), total coliform bacteria, and fecal coliform bacteria (*E. coli*).

A public water system is also required to routinely monitor its distribution system for total coliform bacteria, fecal coliform bacteria, lead and copper, disinfection byproducts, chlorine residuals, and asbestos when the water has been determined to be aggressive. SLOWD treats surface water and is therefore required to monitor its distribution system to comply with surface water treatment regulations.

1,2,3-Trichloropropane Monitoring
DDW implemented the MCL for 1,2,3-Trichloropropane (1,2,3-TCP) on December 14, 2017. The 1,2,3-TCP MCL and Detection Limits for Purposes of Reporting (DLR) are set at the same level, which is 5 parts per trillion (ppt). Community and non-transient-non-community (NTNC) water systems are required to start the initial four quarters of 1,2,3-TCP monitoring beginning January 1, 2018. If 1,2,3-TCP is detected from a source, the community or NTNC water system must contact its regulating DDW District Office and conduct appropriate follow up monitoring according

to the Drinking Water regulations.

After completing the initial monitoring where a source has not had 1,2,3-TCP detection, a community or NTNC water system must sample that source every three years. If the water system serves 3,300 or fewer people, only one sample is required; if the water system serves more than 3,300 people, then two quarterly samples are required.

Water systems need to monitor standby sources once every three years for three consecutive cycles, before water systems may be reduced to monitoring once every nine years. The first round of monitoring for 1,2,3-TCP for standby sources is due by January 1, 2021.

Currently, the Environmental Laboratory Accreditation Program (ELAP) certifies SRL524M as the only analytical method for detecting 1,2,3-TCP to the DLR level. A community or NTNC water system may use sampling results (tested using SRL524M method) from 2016 and/or 2017 to substitute up to three of the four initial quarterly samples for groundwater sources (no surface water substitution). The request must be made in writing to the regulating DDW District Office. More information can be found in the following link to DDW's 1,2,3-TCP webpage –

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/123TCP.html

II.f.1 Chemical Source Monitoring and Reporting

II.f.1.A Source Monitoring Schedule

The following table shows the previous monitoring dates, the monitoring frequencies and the next due dates for future monitoring for primary and secondary chemicals, general physicals and minerals of the source waters. For synthetic organic chemicals, only atrazine and simazine is monitored for the groundwater sources; the surface water are granted a waiver from SOCs monitoring.

Table 7A: Chemical Monitoring of Sources

Source Name & PS Code		General Physical & Minerals	Inorganic*	Radiological	VOCs*	SOCs*
Salinas/Santa Margarita Reservoir 4010009-009	Last Sample	9/11/2017	9/11/2017	10/7/2013	9/11/2017	Needs to begin initial 1,2,3-TCP monitoring on 1/1/2018
	Frequency	1 year	1 year	9 years	3 years	
	Next Sample	September 2018	September 2018	October 2022	September 2020	
Whale Rock Reservoir 4010009-012	Last Sample	9/12/2017	9/12/2017	10/7/2013	9/12/2017	Needs to begin initial 1,2,3-TCP monitoring on 1/1/2018
	Frequency	1 years	1 years	6 years	3 years	
	Next Sample	September 2018	September 2018	October 2019	September 2020	
Pacific Beach Well 4010009-006	Last Sample	5/16/2013	5/16/2013	6/13/2011	5/16/2013	5/3/2016
	Frequency	9 years	9 years	9 years	9 years	9 years
	Next Sample	May 2022	May 2022	June 2020	May 2022	May 2025
Fire Station 4 Well – Standby 4010009-004	Last Sample	5/17/2010	5/17/2010	6/13/2011	5/17/2010	5/3/2016
	Frequency	9 years	9 years	9 years	9 years	9 years
	Next Sample	May 2019	May 2019	June 2020	May 2019	May 2025

*For Inorganics, asbestos is on a nine years sampling cycle and the next sampling date is May 2022. NR = Not Required. For VOCs, the Salinas/Santa Margarita Reservoir last sampled for 1,3-Dichloropropene (total) on 9/20/2016 and the next sampling date will be in September 2019. For SOCs, 1,2,3-TCP MCL is enacted on December 14, 2017, SLOWD needs to begin initial monitoring January 1, 2018.

Table 7B: Chemical Monitoring of Sources					
Source Name & PS Code		Nitrite (As N)	Nitrate (As N)	Perchlorate	Hexavalent Chromium
Salinas/Santa Margarita Reservoir 4010009-009	Last Sample	9/11/2017	9/11/2017	9/11/2017	Monitoring Requirements pending on new MCL implementation date.
	Frequency	3 year	1 year	1 year	
	Next Sample	September 2020	September 2018	September 2018	
Whale Rock Reservoir 4010009-012	Last Sample	9/12/2017	9/12/2017	9/12/2017	
	Frequency	3 years	1 year	3 years	
	Next Sample	September 2020	September 2018	September 2018	
Pacific Beach Well 4010009-006	Last Sample	5/16/2013	5/18/2017	5/16/2013	
	Frequency	9 years	1 year	9 years	
	Next Sample	May 2022	May 2018	May 2022	
Fire Station 4 Well – Standby 4010009-004	Last Sample	5/17/2010	5/18/2017	9/10/2014	
	Frequency	9 years	1 year	9 years	
	Next Sample	May 2019	May 2018	September 2023	

II.f.1.B Source Monitoring Results

General Physical and Minerals (Secondary Drinking Water Standard)

Table 8: General Physical and Minerals						
	MCL	DLR	Salinas/Santa Margarita Reservoir	Whale Rock Reservoir	Pacific Beach Well	Fire Station 4 Well
Aggressive Index‡			11.0	12.0		
Bicarbonate Alkalinity (mg/L) ‡			110	210	460.0	300.0
Calcium (mg/L) ‡			35	51	40.0	39.0
Carbonated Alkalinity (mg/L) ‡			ND	ND	ND	ND
Hydroxide Alkalinity (mg/L) ‡			ND	ND	ND	ND
Magnesium (mg/L) ‡			18	37	78.0	52.0
pH‡			7.1	7.7	7.3	7.3
Sodium (mg/L) ‡			18	31	19.0	26.0
Total Hardness as $CaCO_3$ (mg/L) ‡			161	279	421.0	311.0
Aluminum (mg/L)	0.2		ND	ND	ND	0.040
Color (Units)	15		12	50	ND	ND
Copper (mg/L)	1.0	0.05	ND	ND	ND	ND
Foaming Agents (MBAS) (mg/L)	0.5		ND	ND	ND	ND
Iron (mg/L)	0.3	0.1	ND	ND	ND	0.4
Manganese (mg/L)	0.05	0.02	0.020	0.150	ND	0.02
Methyl-tert-butyl ether (MTBE) (mg/L)*	0.005		ND	ND	ND	ND
Odor – Threshold (Units) at 60°C	3	1	4	8	ND	ND
Silver (mg/L)	0.1	0.1	ND	ND	ND	ND
Thiobencarb (mg/L)†	0.001		---	---	---	---
Turbidity (Units)	5	0.1	1.5	2.5	ND	1.8
Zinc (mg/L)	5.0	0.05	ND	ND	ND	0.06

Table 8: General Physical and Minerals						
	MCL	DLR	Salinas/Santa Margarita Reservoir	Whale Rock Reservoir	Pacific Beach Well	Fire Station 4 Well
Total Dissolved Solids (mg/L)	1000*		220	380	460.0	360.0
Specific Conductance (uS/cm)	1,600*		392	647	830.0	664.0
Chloride (mg/L)	500*		13	25	34.0	30.0
Sulfate (mg/L)	500*	0.5	77.1	88.3	30.0	59.0

*The values for Total Dissolved Solids, Specific Conductance, Chloride, and Sulfate are upper values of MCL ranges for which No fixed MCL has been established.
†Thiobencarb was waived from monitoring.
‡These constituents do not have any MCLs or DLRs.
MCL = maximum contaminant levels, DLR = Detection Limits for Purposes of Reporting
ND = Not Detected. The NDs for the General Physical and Minerals are set below the DLR levels.

SLOWD's ground water and surface water met the general physical and minerals MCLs; SLOWD shall continue to monitor its potable water sources for general physical and minerals constituents according to the monitoring schedule.

Inorganic Chemicals

Table 9: Inorganic Chemicals						
	MCL (mg/L)	DLR (mg/L)	Salinas/Santa Margarita Reservoir	Whale Rock Reservoir	Pacific Beach Well	Fire Station 4 Well
Aluminum	1.	0.05	ND	ND	ND	0.04
Antimony	0.006	0.006	ND	ND	ND	ND
Arsenic	0.010	0.002	ND	ND	ND	ND
Asbestos*	7 MFL*	0.2 MFL > 10 um*	ND	ND	ND	ND
Barium	1.	0.1	ND	ND	0.129	0.0847
Beryllium	0.004	0.001	ND	ND	ND	ND
Cadmium	0.005	0.001	ND	ND	ND	ND
Chromium (total)	0.05	0.01	ND	ND	0.014	0.005
Cyanide*	0.15	0.1	ND	ND	---	---
Fluoride	2.0	0.1	0.2	0.3	0.1	0.5
Hexavalent Chromium	0.010	0.001	ND	ND	---	---
Lead		0.005	ND	ND	ND	0.0017
Mercury	0.002	0.001	ND	ND	ND	ND
Nickel	0.1	0.01	ND	ND	0.002	0.002
Nitrate (as N)	10.	0.4	ND	ND	1.1	5.4
Nitrate + Nitrite (sum as N)	10.	---	ND	ND	1.6	0.8
Nitrite	1.	0.4	ND	ND	ND	ND
Perchlorate	0.006	0.004	ND	ND	ND	ND
Selenium	0.05	0.005	ND	ND	ND	ND
Thallium	0.002	0.001	ND	ND	ND	ND

*MFL = million fibers per liter, MCL for fibers exceeding 10 micro-meter (um) in length. The asbestos results were from 2013 for the surface and ground water. Hexavalent chromium results are from 2014.
ND is not detected.

SLOWD's surface and ground water sources met the inorganic chemicals standards. SLOWD shall continue to monitor its sources for inorganics according to the monitoring schedules.

Radioactivity
The following table has the latest radiological activities monitoring results for SLOWD's wells and surface water sources. The most recent gross alpha results are below the DLR; except the Whale Rock Reservoir, which was detected at 3.62 pCi/L.

Table 10: Radiological Results

	GA†	GA CE†	Radium 226	Radium 228	Uranium
MCL (pCi/L)	15	---	Ra-226 + Ra-228 = 5		20
DLR (pCi/L)	3	---	1	1	1
Salinas/Santa Margarita Reservoir	1.79	1.11	**GA+0.84xCE-Ur**: ¥ No further action is required for this sampling event	No further action is required for this sampling event	**GA+0.84xCE:** † No further action is required for this sampling event
Whale Rock Reservoir	3.62	1.47	No further action is required for this sampling event	No further action is required for this sampling event	3.62+0.84x1.47=4.85 No further action is required for this sampling event
Pacific Beach Well	0.029	1.03	No further action is required for this sampling event	No further action is required for this sampling event	No further action is required for this sampling event
Fire Station 4 Well	ND	1.4	No further action is required for this sampling event	ND	No further action is required for this sampling event

*ND = non-detect.
†GA+0.84xCE is used to find out if further sampling is required for uranium and/or radium isotopes. GA=Gross Alpha result; CE is the gross alpha counting error.
¥GA+0.84xCE-Ur is used to determine if further sampling for radium isotopes. Ur is uranium concentration.

Volatile Organic Chemicals (VOCs)
The most recent raw water sampling results showed SLOWD's surface water and groundwater sources comply with VOCs MCLs (all the results were below the DLR). SLOWD shall continue to monitor its sources for VOCs according to the monitoring schedules.

Non-Volatile Synthetic Organic Chemicals (SOCs)
SLOWD is granted a waiver from SOCs monitoring except atrazine and simazine for the groundwater sources. The surface water sources are granted a waiver from SOCs monitoring. The atrazine and simazine results from 2016 were non-detect for groundwater sources. SLOWD shall continue to monitor the groundwater wells for atrazine and simazine according to the monitoring schedules.

For 1,2,3-TCP, water systems need to monitor standby sources once every three years for three consecutive cycles, before water systems may be reduced to monitoring once every nine years. The first round of monitoring for 1,2,3-TCP for standby sources (Pacific Beach and Fire Station 4 Wells) is due by January 1, 2021. SLOWD sampled the two standby wells on February 22, 2018 and the results were non-detect. The next round of 1,2,3-TCP sampling for the two standby wells will be in 2021.

SLOWD shall begin initial monitoring of its surface water sources for 1,2,3-TCP beginning January 2018. The initial monitoring consists of four quarterly samples. Please refer to the 1,2,3-TCP section for more detail information.

Raw Water Sources Bacteriological Monitoring

SLOWD takes monthly samples from the surface water sources to determine the water quality of the reservoirs. When the groundwater sources are activated, quarterly samples are to be taking from the wells. However, SLOWD took weekly samples from the groundwater wells in the past when the wells were active. SLOWD sends the source bacteriological activity sampling results to DDW. The following table has the groundwater and surface water sources' bacteriological activity results since January 2015.

Table 16: Bacteriological Monitoring (Total Coliform and E. coli)

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Salinas/ Santa Margarita Reservoir	2015	13-0-0	4.5-0-0	2-0-2	23-0-0	---	350-0-4	79-0-0	49-0-0	13-0-2	---	---	---
	2016	---	---	6.8-0-0	7.8-0-0	13-0-0	4.3-0-2	79-0-0	---	14-0-4.5	33-0-0	46-0-2	2.3-0-0
	2017	---	---	---	---	---	---	33-0-2	4.5-0-0	7.8-0-0	23-0-7.8	---	33-0-0
Whale Rock Reservoir	2015	4.5-0-0	0-0-0	2-0-0	7.8-0-0	4.5-0-0	11-0-4	23-0-0	4.5-0-0	49-0-0	7.8-0-0	22-0-1.8	4.5-0-0
	2016	2-0-0	1.8-0-1.8	0-0-0	0-0-0	4.5-0-2	4.3-0-0	4.5-0-0	2-0-0	17-0-0	130-0-0	13-0-0	4.5-0-0
	2017	7.8-0-0	79-0-2	---	---	6.8-0-0	---	4.5-0-0	23-0-0	4.5-0-0	7.8-0-0	0-0-0	2-0-0
Nacimiento Reservoir	2015	---	---	---	4.5-0-0	2-0-0	23-0-0	2-0-0	4.5-0-0	0-0-0	13-0-4.5	0-0-0	4-0-0
	2016	0-0-0	0-0-0	0-0-0	0-0-0	13-0-2	0-0-0	4.5-0-0	0-0-0	21-0-2	4-0-0	4.5-0-0	2-0-0
	2017	2-0-0	920-0-7	---	---	0-0-0	---	2-0-0	4.5-0-0	13-0-0	7.8-0-0	2-0-0	3.7-0-0
Pacific Beach Well	2015	4-0-0	4-0-0	4-0-0	Well offline – Standby Status								
	2016	Well offline – Standby Status											
	2017												

Surface Water Key: # of total coliform colony forming units (CFUs) - # of *E. Coli* CFUs - # of Fecal Coliform CFUs; all surface
Groundwater Key: # of samples collected - # of total coliform positive results - # of Fecal Coliform positive results

II.f.2 Long Term 2 Enhance Surface Water Treatment Rule Round 2 Monitoring Plan (LT2 SWTR R2MP)

SLOWD submitted a LT2 SWTR R2MP to DDW on April 19, 2016. SLOWD plans to sample for Cryptosporidium, *E. Coli* and turbidity at the combined raw surface water sampling location (4010009-010). The location is upstream of any chemical addition. The samples will be collected every month beginning October 2016 and until September 2018. SLOWD will utilize BioVir Laboratories for the Cryptosporidium analyses using analytical method 1623. DDW reviewed and approved the plan; an approval letter was sent to SLOWD on June 6, 2016. SLOWD has been sampling for cryptosporidium according to the sampling schedule. The sampling results have shown no detection of cryptosporidium oocysts in the raw surface water samples.

II.f.3 Distribution System Monitoring and Reporting

II.f.3.A Distribution System Monitoring Schedule

The Aggressive Index (AI) values for SLOWD's surface water treatment plant effluent is 12.2 based on the latest sampling result on September 6, 2018. The 2018 AI value is above 11.5 and therefore not considered corrosive to asbestos cement pipes. **SLOWD does not have to take a sample from a location in its distribution system with asbestos cement pipes which is most vulnerable to the corrosive water and test the sample for asbestos.**

SLOWD chlorinates its potable water at the surface water treatment plant by adding 12.5 percent sodium hypochlorite to the filtered water. It is required to monitor the chlorine residual concentration in its distribution system. SLOWD takes 15 weekly disinfectant residual samples along with the bacteriological activity samples from its distribution system. SLOWD is required to monitor the distribution system for disinfection by-products: Haloacetic acids (HAA5) and total trihalomethanes (TTHMs) in its distribution system.

Lead and copper samples were last taken in 2016. The sampling frequency for lead and copper is three years. The next round of sampling is due in the summer months of 2019**.** SLOWD has four locations for taking quarterly disinfection byproducts (DBP) samples, according to the June 2011 Stage 2 DBP Monitoring Plan.

II.f.3.B Distribution System Monitoring Results

Disinfection Byproducts Monitoring Results

SLOWD currently complies with the Stage 2 Disinfectants/Disinfection Byproducts (DBPs) Rule Monitoring. SLOWD collects four quarterly samples from four locations from its distribution system to test for HAA5 and TTHMs to comply with requirements for DBPs. The following table has the monitoring results for HAA5 and TTHMs since 2015.

Table 13: HAA5 and TTHMs Results

Site Name & PS Code		1625 Calle Joaquin – STG 2 DBP 4010009-018		1325 Ella – STG 2 DBP 4010009-019		1490 Southwood – STG 2 DBP 4010009-020		3195 S. Higuera – STG 2 DBP 4010009-021	
DPPs (MCL, mg/L)		HAA5 (0.060)	TTHMs (0.080)	HAA5 (0.060)	TTHMs (0.080)	HAA5 (0.060)	TTHMs (0.080)	HAA5 (0.060)	TTHMs (0.080)
2015	Q1	0.008	0.030	0.008	0.040	0.008	0.044	0.009	0.040
	Q2	0.017	0.075	0.015	0.065	0.023	**0.095***	0.010	0.055
	Q3	0.021	0.052	0.010	0.057	0.012	0.059	0.011	0.052
	Q4	0.014	0.041	0.015	0.044	0.015	0.042	0.014	0.045
2016	Q1	0.015	0.043	0.024	0.062	0.025	0.057	0.028	0.062
	Q2	0.013	0.046	0.022	0.051	0.013	0.044	0.015	0.059
	Q3	0.020	0.055	0.026	0.057	0.027	0.066	0.030	0.069
	Q4	0.016	0.041	0.028	0.036	0.018	0.031	0.024	0.036
2017	Q1	0.014	0.034	0.014	0.035	0.017	0.036	0.011	0.023
	Q2	0.022	0.037	0.022	0.039	0.019	0.035	0.017	0.032
	Q3	0.017	0.053	0.020	0.056	0.020	0.066	0.019	0.059
	Q4	0.014	0.033	0.018	0.039	0.011	0.032	0.013	0.031

Q = Quarter.

*The second quarter result from 1490 Southwood caused the long running annual average to exceed the TTHM MCL. A citation was issued to SLOWD. SLOWD has implemented measures to lower the TTHMs level in its distribution system.

Chlorine Residual Results

To comply with the maximum residual disinfectant level for chloramines of 4.0 mg/L, SLOWD monitors its distribution systems for chlorine residual concentrations. It collects weekly samples, along with the bacteriological samples, to analyze for the chlorine residuals. The following table has the 2014 to 2017 monthly average results for chlorine residual levels from SLOWD's distribution system.

Table 14: Distribution Chlorine Residuals Results (mg/L)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
201	0.81	0.74	0.66	0.66	0.65	0.57	0.57	0.60	0.60	0.71	0.77	0.68

Table 14: Distribution Chlorine Residuals Results (mg/L)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.75	0.75	0.75	0.78	0.83	0.76	0.71	0.87	0.86	0.91	0.87	0.83
2016	0.74	0.84	0.82	0.86	0.79	0.71	0.81	0.84	0.89	0.89	0.78	0.84
2017	0.89	0.72	0.80	0.86	0.76	0.72	0.73	0.66	0.62	0.64	0.80	1.06

Lead and Copper Results
For compliance with the Lead and Copper Rule (LCR), SLOWD collects and tests a reduced 30 LCR samples from its customers' taps triennially. Recent results are summarized in the following table. The lead and copper 90th percentile results were under the action level for samples taken in 2013 and 2016. SLOWD notified its customers of the latest Lead and Copper testing results.

Table 15: Lead and Copper Monitoring of Distribution System					
Sampling Date	# of Samples	90th% Lead (mg/l)		90th% Copper (mg/l)	
		Action Level	0.015	Action Level	1.3
		DLR	0.005	DLR	0.050
July 2013	30	0.009		0.114	
June 2016	30	0.0011		0.169	

II.f.4 Bacteriological Monitoring and Reporting

SLOWD has a Bacteriological Sample Siting Plan (BSSP) dated June 2014 with DDW. The BSSP shall be updated when necessary or at least every 10 years. SLOWD has 15 distribution sampling locations for bacteriological monitoring purposes. The following table summarizes the number of samples collected each month, the number of samples tested positive for total coliform bacteria and *E. coli* from the distribution system from 2015 to 2018.

Table 16: Bacteriological Monitoring (Total Coliform and *E. coli*)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	60-0-0	60-0-0	75-0-0	60-0-0	60-0-0	75-0-0	60-0-0	60-0-0	75-0-0	60-0-0	60-0-0	75-0-0
2016	60-0-0	60-0-0	75-0-0	60-0-0	75-0-0	60-0-0	60-0-0	75-0-0	60-0-0	60-0-0	75-0-0	60-0-0
2017	75-0-0	60-0-0	60-0-0	60-0-0	75-0-0	60-0-0	63-1-0	75-0-0	60-0-0	75-0-0	60-0-0	60-0-0
2018	75-0-0											

Key: # of samples collected - # of total coliform positive results - # of *E. coli* positive results

II.g Element 7 – System Management and Operations

SLOWD is a community water system. Carrie Mattingly is the Utility Director of SLOWD. Jason Meeks is the Water Treatment Plant Supervisor. He is the chief operator and water quality contact for SLOWD. Aaron Floyd, Water Division Manager, is the emergency contact. Marcus Henderson is the Distribution System Chief Operator.

DDW has an Emergency Notification Plan (ENP) on file from SLOWD dated May 1, 2014. Some of the information in the ENP are outdated. SLOWD needs to update the ENP and send a copy of the updated ENP to DDW. SLOWD has an Emergency Disinfection Plan dated July 25, 1991. SLOWD submitted its 2017 Annual Report and 2017 Consumer Confidence Report (CCR) to DDW. SLOWD distributed a copy of its 2017 CCR to its customers. SLOWD

has an Operations and Maintenance Plan, dated October 2004, for the Reservoirs 1 and 2 floating covers. DDW has a copy of SLOWD's Power Outage Contingency Plan dated April 2003.

SLOWD reported 49 distribution system problems for 2017 and investigated 69 problems: 57 were caused by service line material failure; and 12 were caused by main line material failure. SLOWD received 37 complaints from its customers in 2017. Of the complaints, 10 were about odor and taste - most were caused by stagnant water or low chlorine residual. There were 11 complaints regarding water color due to mainline breaks or sheared fire hydrants. There were 15 complaints about pressure which were caused by malfunctioning residential pressure reduce valves. There was one complaint about bleaching of towels which was caused by personal care products.

Drought Preparedness
The State will continue to update water conservation measures depending on current weather conditions. Therefore, the States measures continue to change based on current conditions. DDW recommends that SLOWD stays informed by visiting the State's Water Conservation Portal at –

http://www.water boards.ca.gov/water_issues/programs/conservation_portal/.

DDW also recommends that SLOWD conducts an ongoing well production and groundwater level monitoring program as well as ensuring any water conservation measures are achieved that are required by the State. The well production data shall be recorded on minimum of a monthly basis and reported in the EAR.

Climate Change
California is making efforts to adapt to a changing climate. A principle of the state's adaptation strategy document, Safeguarding California, is to prioritize actions that not only mitigate greenhouse gas emissions, but also help the state prepare for climate change impacts. Improved coordination, implementation, and integration of adaptation planning efforts and funding of the state's climate policies can directly protect the state's natural and built infrastructure, communities, environmental quality, public health, safety and security, natural resources, and economy from the unavoidable impacts of climate change. Drinking water systems are encouraged to use U.S. EPA's Climate Resilience Evaluation and Awareness Tool (CREAT) –

https://toolkit.climate.gov/tool/climate-resilience-evaluation-awareness-tool-creat

II.h Element 8 – Operator Compliance with State Requirements

SLOWD is classified as a distribution D4 and treatment T5 water system. Jason Meeks is the Water Treatment Plant Supervisor and Chief Operator for the treatment operation. He is a T5 certified water operator. Marcus Henderson is the Chief Operator for the distribution system and is a D4 certified water operator. SLOWD shall make sure its operators' certifications are current.

Table 17: Operator Certifications

Distribution					Treatment			
Name	Grade	Operator Number	Expiration Date		Name	Grade	Operator Number	Expiration Date
Jeff Cannon	D2	30738	3/1/2020		Danford Chang	T3	29911	10/1/2020
Charles Corrow	D3	29870	3/1/2019		Franklin Cronkite	T5	24218	2/1/2021
Ryan Dale	D4	38640	9/1/2020		Gary Hughes	T4	12711	7/1/2020

Table 17: Operator Certifications							
Distribution				Treatment			
Name	Grade	Operator Number	Expiration Date	Name	Grade	Operator Number	Expiration Date
Jerry Davis	D3	18647	1/1/2020	Jason Meeks	T5	21850	3/1/2021
Marcus Henderson	D4	38307	12/1/2019	Jeff Montijo	T4	23532	6/1/2019
Joe Little	D3	32020	9/1/2021	Michael Van Belleghem	T4	26684	6/1/2020
John Murphy	D3	10265	6/1/2021				
Michael Tate	D3	30366	6/1/2019				
Travis Tutt	D5	28464	8/1/2021				

III. CONCLUSION

The review of SLOWD's reports and routine water quality monitoring results indicates SLOWD's treated surface water meets all the applicable primary and secondary maximum contaminant levels, and the SWTR requirements. SLOWD's standby wells also meet the primary and secondary drinking water standards. Under normal circumstance, SLOWD is able to provide potable water to its customers that meet the California drinking water standards.

A site inspection of SLOWD's drinking water sources, surface water treatment plant, storage tanks, water distribution system and water quality sampling sites shows SLOWD manages its system properly and according to the California drinking water laws and regulations. SLOWD has recently upgraded its SCADA system. It has discontinued the use of the Slack Tank and the McCollum Booster Bump Station during the Sanitary Survey site visits. It plans to abandon both facilities in the near future. SLOWD has plans to eliminate the Terrace Hill Tank in the future. SLOWD shall ensure the changes made to the water system do not disrupt the water supply or affect the water quality for the customers. Please keep DDW up-to-date on these changes.