2020 Urban Water Management Plan

This plan was adopted on June ____, 2021
pursuant to
San Luis Obispo City Council Resolution
No. _____ (2021 series).

San Luis Obispo City Council

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The City's 2020 Urban Water Management Plan is available for public review at the City's web page at slowater.org

For 2020, the City's Water Shortage Continency Plan is published separately from the 2020 Urban Water Management Plan consistent with State requirements. The 2020 Water Shortage Continency Plan is also available for public review at the City's web page at slowater.org

Contents

CHAPTER 6. Water Supply Reliability

CHAPTER 7. Water Conservation & Demand Management Measures

For 2020, the City's Water Shortage Continency Plan is published separately from the 2020 Urban Water Management Plan consistent with State requirements.

List of Tables

List of Tables (continued)

List of Figures

Appendices

Chapter 1: Introduction

This 2020 Urban Water Management Plan (UWMP) describes and evaluates current and projected water supply sources through the year 2040, describes the City's water treatment and distribution system, reports current and projects future water demands, assesses current drought risk and the method used for future drought risk assessment, and identifies water demand management measures.

The City's 2020 UWMP was prepared in accordance with the requirements of the Urban Water Management Planning Act, as amended, and includes the following chapters:

1. Introduction
2. Water Service Area and System Description
3. Water Demand and Reduction Targets
4. Water Sources
5. Recycled Water
6. Water Supply Reliability
7. Demand Management Measures

This UWMP was prepared consistent with the land uses, population projections, goals, policies, and programs in the City's *General Plan*.

Per new requirements for the 2020 UWMP, the City's 2020 Water Shortage Contingency Plan (WSCP) is published as a separate volume and may be modified separately from the 2020 UWMP.

1.1 URBAN WATER MANAGEMENT PLANNING ACT

The City's UWMP was prepared in accordance with the Urban Water Management Planning Act (Act). The Act is defined by the California Water Code (CWC), Division 6, Part 2.6, and Sections 10610 through 10656. The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplies more than 3,000 acre-feet (AF) of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR).

Since its passage in 1983, several amendments have been added to the Act, such as those enacted in 2009 related to Senate Bill X7-7 (SB X7-7) requiring each urban retail water supplier to develop urban water use targets to help meet the statewide 20 percent water use reduction goal by 2020 and an interim ten percent goal by 2015. Chapter 4 of this Plan explains the City's targets and implementation strategy used to meet state requirements related to SBx7-7.

The Act has undergone expansion and revision reflected in the City's 2020 UWMP and WSCP to address changing conditions in California's water resource management. These changes focus on water use efficiency, resiliency, and impacts of climate change. New requirements include water loss reporting, analysis of energy use, and a drought risk assessment that analyzes the impact of a drought lasting five consecutive years on local water supplies. The City's WSCP has been modified to be consistent with the required six progressive water shortage levels (10, 20, 30, 40, and 50 percent).

The City's 2020 UWMP serves as a foundational document and source of information for a Water Supply Assessment, (Water Code Section 10613), and a Written Verification of Water Supply, (Water Code Section 66473.7). Both statutes require detailed information regarding water supply availability to be evaluated prior to approval of specific large development projects.

The purposes of the 2020 UWMP are to:

1. Assess current and future water use trends in the community
2. Describe the sources of water supply and the water system
3. Assess water supply reliability
4. Document the water demand management measures
5. Demonstrate compliance with SB X7-7
6. Act as a source document for the City's *General Plan*

7. Act as a source document on the background and history of the water supply system
8. Comply with the state requirements to qualify for State grants and loans.

General Plan and UWMP Interface

The City's *General Plan Water and Wastewater Management Elemen*t (WWME) has been the guiding policy document for the provision of water and wastewater services to the community since 1987. The City adopted the WWME to address water and wastewater services because of the vital role these resources play in the community and the far-reaching impacts of water-related policies on community growth and character. The WWME translates the *General Plan Land Use Element's* capacity for development into potential demand for water supply and wastewater service. Additionally, the WWME outlines how the City plans to provide adequate water and wastewater services for its citizens, consistent with the goals and policies of other General Plan Elements.

The Water Management Section of the WWME was adopted during a time when the City was experiencing water supply shortages. The policies in the original section were written in a manner to address the water scarcity issues that were facing the City in 1987. Though it has been revised and amended several times over the years (the last update was in 2019), each revision focused on how to best allocate the City's limited water supply for the existing residences and future growth envisioned in the General Plan.

1.2 AGENCY COORDINATION

The Act requires the City to coordinate the preparation of its Plan with other appropriate agencies, including other water suppliers that share a common source, water management agencies, and relevant public agencies. The following is a summary of the coordination that the City took in the preparation of this Plan. Supporting documentation is provided in Appendix I.

Whale Rock Reservoir Commission

Whale Rock Reservoir provides water to the City, California Polytechnic State University (Cal Poly), the California Men's Colony, and the town of Cayucos. The Whale Rock Commission oversees the reservoir operations and is made up of representatives from the City, California Men's Colony, and Cal Poly, as well as a representative from the State Department of Water Resources. The City provides the staff for oversight of daily operations and maintenance activities of Whale Rock Reservoir. City staff works closely with staff from the Commission members relative to water planning issues.

Cayucos Area Water Organization

The Cayucos Area Water Organization (CAWO) includes the three water purveyors that serve the town of Cayucos (Paso Robles Beach Water Association, Morro Rock Mutual Water Company, County Service Area 10A) and the Cayucos-Morro Bay Cemetery District. The Whale Rock Commission and the CAWO have an agreement which includes a provision to provide up to 600-acre feet of water per year from the reservoir. The agreement dates back to the period when the dam was being planned and constructed. The agreement has been amended since that time. The water provided to the CAWO is delivered from the Whale Rock pipeline to the Cayucos Water Treatment Plant operated by the County of San Luis Obispo (County). CAWO was notified that the City was updating its UWMP in March 2021.

County Water Resources Advisory Committee

The City is represented on the county-wide Water Resources Advisory Committee (WRAC). The WRAC is an advisory committee to the County Board of Supervisors on issues pertaining to water resources planning. The Committee holds monthly meetings to discuss water resource issues, planned projects or developments, policies, or other related issues that may have county-wide water resource impacts. Recommendations are forwarded to the County Board of Supervisors for its consideration. The Committee discusses items ranging from new water supply projects to water conservation programs and policies. An update regarding the City's preparation and updating of its UWMP was provided to the WRAC. Review and comment by interested members was requested.

Nacimiento Project Commission

The County has an entitlement of 17,500-acre feet of water from Nacimiento Lake and acts as the wholesaler of this water supply. The County oversees the project that delivers water from Nacimiento

Reservoir to agencies participating in the Nacimiento Water Project. The current participating entities include the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, Santa Margarita Ranch, Bella Vista Mobile home park, and County Service Area 10A (Cayucos).

The Nacimiento Project Commission is made up of representatives from each of the four original participating agencies' governing boards, as well as a representative from the County Flood Control and Water Conservation District (i.e. County Board of Supervisors). The Nacimiento Project Commission provides oversight and recommendations to the District relative to the project operations and maintenance and the associated budget. The County, as the water supply "wholesaler", was notified that the City was updating its UWMP in March 2021.

Integrated Regional Water Management Plan

The County has developed an Integrated Regional Water Management Plan which included involvement and participation by the City as well as other agencies and interested individuals throughout the County. The County was notified that the City was updating its UWMP in March 2021.

1.3 PUBLIC PARTICIPATION AND PLAN ADOPTION

The City encouraged public involvement in the 2020 UWMP through a City Council study session in April 2021 and a City Council public hearing in June 2021 for review of the draft document. The City further encouraged involvement of the public through correspondence and public notices. Public hearing notifications were published in *The New Times* (the local area newspaper). A copy of the published Notice of Public Hearing, correspondence, and the resolution of adoption are included in Appendix I. The hearing process provided an opportunity for all City water users to become familiar with the Plan and ask questions about its water resources in addition to the City's continuing plans for providing a reliable, safe, and high-quality water supply.

1.4 PLAN IMPLEMENTATION

Implementation of the 2020 UWMP is the responsibility of the City's Utilities Department. Key staff overseeing the implementation is the Utilities Director, Deputy Director of Utilities (Water), Utilities Project Manager, and Water Resources Program Manager. Annual updates regarding UWMP implementation, as well as other City water resources issues, are provided to the City Council as part of the City's annual Water Resources Status Report in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The 2016 through the 2020 Water Resources Status Reports are provided in Appendix II.

1.5 STANDARDIZED TABLES

In response to the requirements of the CWC, standardized tables for the reporting and submittal of UWMP data were developed and are required for use in 2020 UWMPs by the State. The standardization of data tables allows for efficient data management, expedited review of UWMPs, and compilation of data for regional and statewide planning. The City will submit UWMP and WSCP data electronically to DWR using standardized tables and have included the standardized tables at the end of each chapter and Appendix IV.

1.6 COMPLIANCE CHECKLIST

The City completed the checklist of specific 2020 UWMP requirements and included it in the Plan as Appendix III as requested by DWR. The Checklist includes each 2020 UWMP requirement by subject, applicable CWC section, and the page number where the required element is addressed in the Plan to assist in the DWR review of the City's 2020 UWMP.

1.7 ABBREVIATIONS & ACRONYMS

AB - Assembly Bill
AF - Acre-Foot or Acre-Feet
AFY (or afy) - Acre-Feet per Year
AWWA - American Water Works Association
BMP - Best Management Practice
CII - Commercial, Industrial, and Institutional water use sectors
CIMIS - California Irrigation Management Information System
CWC - California Water Code
DDW - State Water Resources Control Board, Division of Drinking Water
DMMs - Demand Management Measures
DOF - Department of Finance
DWR - California Department of Water Resources
EPA - U.S. Environmental Protection Agency
ETo - Reference Evapotranspiration
GIS - Geographic Information System
GPCD (or gpcd) - Gallons per Capita per Day
GPPD - Gallons per Person per Day
ILI – Infrastructure Leakage Index
IRWM - Integrated Regional Water Management
LRAA - Locational Running Annual Average
LAFCO - Local Agency Formation Commission
MGD - Million Gallons per Day
NOAA NMFS - National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NPDES - National Pollutant Discharge Elimination System
PCE - Tetrachloroethylene
pH - The measure of how acidic/basic water is ranging from 0 (acidic) to 14 (basic), with 7 being neutral.
PRV - Pressure Reducing Valve
RGPCD - Residential Gallons per Capita per Day
RWQCB - Regional Water Quality Control Board
SB - Senate Bill
SB X7-7 - Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SDWA - Safe Drinking Water Act
SGMA - Sustainable Groundwater Management Act
SWRCB - State Water Resources Control Board
THMs - Trihalomethanes
UWMP - Urban Water Management Plan
WDR - Waste Discharge Requirement
WRRF - City of San Luis Obispo Water Resources Recovery Facility
WSCP - Water Shortage Contingency Plan
WTP - City of San Luis Obispo Water Treatment Plant

1.8 REQUIRED UWMP STANDARDIZED TABLES:

Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
4010009	City of San Luis Obispo	15,700	4,817
	TOTAL	15,700	4,817
NOTES: Table 2-1 Volume of water supplied in this table includes only potable water.			

Plan Identification (Select One)	
☒	Individual UWMP
	Regional UWMP (RUWMP)
NOTES: Table 2-2	

Agency Identification	
Type of Agency (select one or both)	
	Agency is a wholesaler
☒	Agency is a retailer
Fiscal or Calendar Year (select one)	
☒	UWMP Tables Are in Calendar Years
	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Day that the Fiscal Year Begins (dd/mm)	
N/A	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES: Table 2-3	

Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
County of San Luis Obispo
NOTES: Table 2-4

Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
None		
County Name	60 Day Notice	Notice of Public Hearing
San Luis Obispo County	☑	☑
NOTES: Table 10-1 (R).		

Chapter 2: Service Area and Water System Description

2.1 SERVICE AREA DESCRIPTION

The City of San Luis Obispo is located about half-way between Los Angeles and San Francisco and has a total area of 13.2 square miles of which 13.02 square miles is land and 0.18 square miles (1.3 percent) is water. Situated in a coastal valley approximately ten miles inland from the Pacific Ocean, the City's Mediterranean climate provides for mild and dry summers and cool winters, with an annual average of about 20 inches of precipitation. Summers are generally warm and sunny, often with morning fog from the Pacific coast. Winters are generally mild, though below freezing lows may be expected during the winter. Temperatures vary widely, with 80° F readings in January and February not uncommon. Table 1, *San Luis Obispo Climate*, includes the 2020 monthly evapotranspiration rate, average maximum high temperature, and average precipitation for the City of San Luis Obispo. As the City receives water from surface water reservoirs located in different watersheds, climate data specific to those surrounding the reservoirs are utilized in water management models.

TABLE 1: San Luis Obispo Climate

	ETo (in)	Average rainfall (in)	Average temperature (F)
January	2.44	4.98	51
February	3.36	3.51	51.5
March	3.07	3.36	54.2
April	4.63	1.44	56.3
May	6.24	0.46	60.2
June	6.32	0.12	64.6
July	6.27	0.12	67.5
August	5.87	0.02	67.6
September	4.52	0.03	66.9
October	4.30	1.22	62.9
November	3.17	1.28	56.4
December	2.64	3.93	51
Annual	52.83	20.46	59.2

Source:

1. Evapotranspiration (ETo) from: California Irrigation Management Information System (CIMIS) Station 52, January 2020 - December 2020.
2. Average rainfall data for 2005-06 through 2018-19: https://www.slocounty.ca.gov/getattachment/1540beaa-ed43-4b08-92e7-fcbd0b394dad/SLO-Reservoir-Precipitation-Data-Site-749.aspx
3. Average Temperature: http://data.org/north-america/united-states-of-america/california/san-luis-obispo-144

2.2 SERVICE AREA POPULATION PROJECTION & OTHER DEMOGRAPHIC INFORMATION

Founded in 1772 and incorporated in 1856, San Luis Obispo is one of California's oldest communities and now serves as the County's hub for commercial and government services. This section describes the City's population projections, demographics information, and employment characteristics.

The City's 2020 population totaled 45,920[1]. From 2011 to 2020, the City grew by 502 people which was below the General Plan's one percent growth maximum. The City's future growth is projected to be located in the Margarita, Orcutt, Airport, Avila Ranch, and Froom Ranch specific plan areas, as well as infill and intensification of existing developed areas, such as the City's' downtown.

The City's total water demand has not increased at a rate that follows the rate of population growth (see Water Supply and Demand with Population chart below). In the past 30 years (from 1991 to 2020), annual water demand in the City has been as high as 6,416 acre-feet in 2007 and as low as 4,040 acre-feet in 1991, a variance of over 2,300 acre-feet. In the past ten years (from 2011 to 2020), water demand has been as high as 5,715 acre-feet and as low as 4,520 acre-feet, a variance of 1,195 acre-feet. This deviation in water demand is influenced by many factors including annual rainfall, the state and local drought declaration from 2014 to 2017, plumbing

[1] Population estimates for the City of San Luis Obispo are available at the California Department of Finance website at: www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

efficiencies such as low flow toilets, shower heads, and appliances, changes in landscaping and irrigation, economic climate, water rates, limited growth, the COVID-19 pandemic in 2020, and the City's strong water conservation ethic.

To be conservative in its water planning, the City uses the growth rate and population projections from the City's *General Plan Land Use Element* (57,200 persons in 2035) and *General Plan Water and Wastewater Management Element* policy on the City's maximum per capita water use rate under SB X7-7 of 117 gpcd, described further in Chapter 3. To comply with State requirements, the 2020 UWMP looks ahead twenty years to project water demand through 2040. As this period extends beyond the 2035 horizon of the *General Plan Land Use Element*, the City has assumed the population would continue to grow annually by one percent for the five years to 2040 for this UWMP. This projection yields a future population of 60,118 in 2040. Table 2 provides the City's actual 2020 population and population projections to 2040. This approach to projecting future water demand ensures the City's water needs will be accommodated.

TABLE 2: City Population

	2020	2025	2030	2035	2040
Land Use Element (2014), Projected Population	48,826	51,317	53,934	57,200	60,118
Actual City Population (2020)	45,920	-	-	-	-

Source:
1. City of San Luis Obispo, General Plan, Land Use Element, Table 3, 2014.
2. Population estimate for the City of San Luis Obispo is from the California Department of Finance website at: www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

According to the US Census American Community Survey Five-Year Estimates for 2013-2017, the City's population age demographics are 13 percent under the age of 18, 35 percent from 18 to 24, 22 percent from 25 to 44, 18 percent from 45 to 64, and 12 percent who are 65 years of age and older.

The City is the civic, economic and cultural hub of the Central Coast. With these major regional employers (Table 3), the City has an estimated daytime population of up to 90,000 persons. Public sector jobs account for a sizeable portion of the job market in the City. Service and retail jobs also comprise a large percentage of employers. The City's median household income was $56,071 (in 2019 dollars[2]), up from $42,461 in 2010. According to the City's *2020 Comprehensive Annual Financial Report*, the top employers within and adjacent to the City are:

TABLE 3: Top Employers

#	Employer	# of Employees
1	California Polytechnic State University (Cal Poly)	3,000
2	County of San Luis Obispo	2,920
3	Dept. of State Hospitals - Atascadero	2,000
4	Pacific Gas and Electric	1,866
5	California Men's Colony	1,517
6	Tenet Health Care Corp.	1,305
7	Compass Health	1,200
8	Lucia Mar School District	1,000
9	Mind Body	929
10	San Luis Coastal Unified School District	760

[2] https://www.census.gov/quickfacts/fact/dashboard/sanluisobispocitycalifornia/PST045219

As the top employer in the area, Cal Poly student enrollment is planned to grow from 21,800 students in 2018-19 academic year to 25,000 students by the 2035-36 academic year (growth of approximately 200 students per year). Cal Poly's faculty and staff population could increase from 3,266 to 3,935 during the same time frame. While Cal Poly has its own water supply source, the City treats water for the University which is located just outside of City limits.

The City is also a popular tourist destination due to its proximity to beaches and open space areas, historic downtown, and its overall vitality. The City's tourism is at its peak during the summer. However, Cal Poly is also out of session at this time, thus reducing the overall daily population served by the City during the summer months.

2.3 WATER SYSTEM DESCRIPTION

The City utilizes three surface water reservoirs to meet its potable water demand. Salinas Reservoir, located nine miles southeast of the community of Santa Margarita, has provided water to the City since 1944. Whale Rock Reservoir, located one-half mile east of the town of Cayucos, has been a water source for the City since 1961. Water deliveries from Nacimiento Reservoir, located 14 miles northwest of the City of Paso Robles, to the City began in January 2011. All surface water supplies are considered to be dependable and of high quality.

Three distinct raw water transmission facilities deliver water to the City's Water Treatment Plant from the Salinas, Whale Rock, and Nacimiento Reservoirs. The City does not currently rely on local groundwater to serve the community's long-term water supply needs. However, the City has relied heavily on groundwater during past droughts and is planning to resume the use of groundwater pumping in the future. Additional information is provided on the City's water sources in Chapter 4.

The City is supplied recycled water from its Water Resource Recovery Facility (WRRF). In 2021, recycled water was utilized for landscape irrigation and for construction water (dust suppression, compaction, etc.). The City will be maximizing the production of recycled water with the upgrade of the WRRF, under construction in 2021. Recycled water is discussed further in Chapter 6. Figure 1 shows the location of the City's reservoirs and conveyance pipelines.

With the enactment of the Safe Drinking Water Act (SDWA) in 1974, Congress authorized the federal government to establish national drinking water regulations. Since that time, many amendments have been made to the SDWA which require additional monitoring and treatment which has resulted in increased operational costs. The following sections discuss the impacts of the current regulations on the City's water treatment facilities and potential impacts of any foreseeable amendments to the current regulations.

Water Treatment

The City's Water Treatment Plant (WTP) is located on Stenner Creek Road, northwest of the Cal Poly campus. The facility was constructed in 1964 to provide treatment of surface water from Salinas and Whale Rock Reservoirs. The WTP is a conventional plant that includes ozone disinfection, coagulation, flocculation, sedimentation, and filtration. The WTP was originally designed to treat up to eight million gallons per day (mgd). In 1977, the plant was upgraded to provide 11.5 mgd of treatment capacity but actually treated up to 12 mgd for limited periods during peak summertime water demands. In 1994, the WTP was upgraded to comply with new regulations and to increase the treatment capacity to 16.0 mgd.

An upgrade completed in 2008 at the WTP added additional onsite storage facilities, replaced an existing pump station, and replaced the sedimentation basin with a new ballasted flocculation process among other improvements. The addition of the *Actiflo* process increased the sedimentation process capacity from eight mgd to 16 mgd. This process was needed to treat the water supply from the Nacimiento Reservoir that went online in January of 2011.

Since the WTP was constructed in 1964, the Safe Drinking Water Act was adopted and was significantly amended. The 1986 amendments were broad in scope and required implementation of new regulations by the U.S. Environmental Protection Agency (EPA). The Safe Drinking Water Act also required the EPA to specify criteria under which filtration is required as a treatment technique for surface supplies. On June 29,

1989, the EPA issued the Surface Water Treatment Rule which defined the standards for surface water treatment and had specific compliance deadlines. The purpose of the regulation is to protect the public, as much as feasible, from waterborne diseases. Waterborne diseases, most notably *Giardia lamblia*, *Cryptosporidium*, and *Legionella*, are most commonly transmitted by surface water contamination.

For the City, the most significant issue is the regulation aimed at reducing the formation of disinfection byproducts, specifically trihalomethanes (THMs), which are a group of compounds formed during disinfection by the reaction of chlorine with naturally occurring organics. The City upgraded the WTP in 1994 to use ozone as the primary disinfectant instead of chlorine. The use of ozone provides enhanced disinfection capability to meet federal and state requirements while reducing the levels of THMs. The use of ozone also helps produce water free of objectionable taste and odor associated with algae blooms at Salinas Reservoir and meets all current, as well as anticipated regulations.

The highest levels of TTHMs typically occur where water age is the greatest, such as in large water tanks with low turnover or poor mixing. With increased levels of water conservation, mixing, and turnover within some of the City's water tanks was decreased during the recent drought. In 2020, to address the issue of increasing TTHMs, mixing, aeration, and ventilation equipment was installed at two of the City's water storage tanks (Clearwell 2 at the Water Treatment Plant and Edna Saddle Tank).

Also in 2020, the City entered into a public/private partnership with Pacific Gas and Electric (PG&E) for the Water Energy Efficiency Project at the WTP. Project components include upgrading the ozone generation system, SCADA system, plant service water, and improvements to the Transfer Pump Station. It is estimated that implementation of the Water Energy Efficiency Project will result in a reduction of energy usage of over 33 percent annually from 2019 WTP operations. The Project is scheduled to be complete in 2021. Additional information on energy use associated with water conveyance, treatment, and distribution to the community is provided in Chapter 4.

City of San Luis Obispo Water Treatment Plant, 2020

FIGURE 1: Multi-Source Water Supply

Reservoir

City Limits

Conveyance Pipelines

Source: City of San Luis Obispo Utilities Department., 2016.

Possible Future Regulatory Changes

As analytical techniques allow for lower levels of regulated water contaminants to be detected, and as new contaminants are added to the regulatory list issued by the EPA and state regulatory agencies, there may be impacts on the City's water treatment operations. While the WTP upgrade was designed to meet the current and anticipated future water treatment standards, new regulations may require additional modifications, depending on the action levels adopted by regulatory agencies. The following are possible regulatory changes which may influence WTP operations:

Regulation of total organic carbon. Could require optimizing enhanced coagulation processes, which may add a pH reduction system to the treatment process (i.e. acid feed, carbon dioxide feed, etc.).

Regulation of THM sub-species. Chlorinated bromides would most likely be targeted, which would not necessarily be problematic unless the action level is extremely low.

Regulation of hypochlorites. Chlorates caused by the decomposition of hypochlorite solution may require coolers or insulation be installed on holding tanks to stabilize temperature inside the tanks. This is a requirement now being considered by the State.

Regulation of THMs via LRAA. THMs are now regulated on a LRAA instead of a system-wide average. This could require changing from hypochlorite to chloramines for final disinfection and/or adding aeration systems to storage tanks and reservoirs.

The effect of any of the potential regulations on the City's treatment operations is dependent on the action level adopted. More technical and complicated processes may require training or hiring of personnel skilled in the maintenance of sophisticated electronic equipment and with increased knowledge in telemetry and computer programming.

Potable Water Distribution System

The City’s potable water distribution system delivers water from the WTP to approximately 15,700 metered customers and over 2,000 fire hydrants via 190 miles of water mains, ten treated water storage tanks, and seven pump stations.

The water delivered from the WTP is split into two main distribution networks, the high-pressure side of town and the low-pressure side. The WTP has a large pump station (the Transfer Pump Station) that pumps water to the high-pressure zones which provide service to the higher elevation areas in the City. The transfer pumps take approximately half of the produced water, increase the pressure, and then provide water to Reservoir #2, Cal Poly, and other portions of the City, generally north and east of the Union Pacific Railroad tracks. Water flows by gravity directly into the lower pressure zones from the WTP's onsite clear well tanks.

Water storage facilities are necessary to provide water during peak demand periods and emergency situations such as fires. The City has ten water storage facilities, seven of which are steel storage tanks ranging in size from 0.04 to 4.0 million gallons and three concrete facilities with a capacity of 0.35 to 7.5 million gallons. In 2021, the combined storage capacity is 24.425 million gallons.

The goal is to provide uninterrupted water flow at adequate pressures (between 40 pounds per square inch (psi) and 80 psi) to meet all fire and domestic flow requirements and to minimize system water loss due to leakage. This pressure range will meet the needs of most irrigation sprinklers and other uses, and provide adequate pressure for fire sprinkler systems. To accomplish this, the City’s Water Distribution staff has eight major work objectives, as follows:

1. Pump station and tank maintenance
2. Water main maintenance and repair
3. Valve exercise and repair
4. Water service repair and renewal
5. Fire hydrant maintenance and replacement
6. Cross connection control
7. Underground Service Alert (USA) markouts
8. Water quality sampling

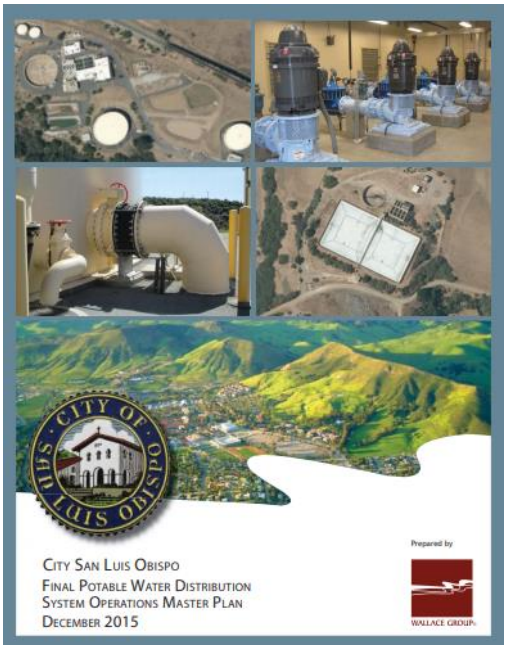
Because of the City's geographic setting, pressure zones are established in the distribution system to maintain these pressure ranges. The City's water distribution system is a complex system of 15 pressure zones and 18 pressure regulating valves (PRVs). It is unlikely this distribution pattern will change, since the WTP will continue to be the principal source of treated water for the City.

Aging pipes must be replaced to avoid major service disruptions and leaks due to deterioration. Parts of the City's water system are approaching, or past, their estimated lifespan with most of the pipes being made of cast iron and ductile iron. Other pipes are made of asbestos cement, or, since the mid-1970's, polyvinyl chloride (PVC). Water pipes serve two basic functions:

1. Larger pipes or transmission mains (ranging in size from 12 to 30 inches), move large volumes of water from one portion of the City to another.
2. Smaller pipes or distribution mains (ranging in size from four inches in the older portions of the City to 12 inches) distribute water within a local area and deliver it to each property in the City.

Fire protection is an important service the City provides to its residents. The fire protection system is a network of over 2,000 public hydrants and approximately 200 private hydrants.

The engineering estimate for the life expectancy of these facilities is 50 years or more depending on pipe type. Pipelines are prioritized for replacement in the City's *Potable Water Distribution System Operations Master Plan*.



System Operation and Maintenance

To retain a reliable water distribution system, preventative maintenance is performed by the City's Water Distribution operators. Preventative maintenance is necessary to minimize water service disruption and prolong system service life.

The City's comprehensive mainline valve exercise program is beneficial to ensure proper operation of valves and minimizes disruptions to water customers during an emergency shutdown. The program assists in identifying problem areas such as broken valves, buried gatewells, and misaligned access sleeves. Identified problem areas are scheduled for repair or replacement which minimizes future water outages and ensures availability in the event of fire. The program has a goal of exercising 1,000 of the system's estimated 5,000 valves per year, allowing for all valves in the system to be exercised every five years.

Since electrical and mechanical pumping equipment consists of moving parts that are subject to wear, a comprehensive preventative maintenance program is required to prolong the useful life and avoid costly emergency equipment breakdowns Weekly inspections of the City's pump station are performed and preventive and corrective maintenance is performed as needed.

The City's water storage tanks are an important component of the water distribution system. As a result of the storage facilities, the system's flow and pressures are improved and stabilized to better serve the customers within a storage tank's service area. Additionally, these supplies serve as a reserve for emergencies such fires, power outages, and equipment failure at the City's Water Treatment Plant. Regular inspections and preventative maintenance are necessary to protect the City's investment in these facilities. This includes regularly scheduled inspections and cleaning, painting and renewing protective coatings, upkeep of facility security systems, maintenance of access roads and sites, and monitoring of cathodic protection systems.

The service line (from the water main to the customer water meter) repair and replacement program has been a priority for the City due to the high likelihood of failure of previously installed polybutylene pipe. The City's water service lines consist of mainly copper and polyethylene pipe, but small amounts of polybutylene pipe may still exist in the system. The City removes and replaces polybutylene materials as they are discovered through routine maintenance and CIP projects. The majority of the City's water service lines have been upgraded to copper and polyethylene material due to the longevity and durability of these two types of materials.

PRVs are necessary to maintain acceptable pressure levels in both low lying and higher elevation areas of the City. These valves reduce plumbing failures and system leakage in areas that would otherwise experience high pressure. The City has 18 PRVs that are inspected and tested annually and rebuilt as needed as part of a PRV maintenance program.

To ensure that fire hydrants operate correctly when needed, testing, maintenance, and repair is performed on an annual basis. It is the responsibility of the Water Distribution staff to perform all maintenance, repairs, and hydrant replacement as needed. Hydrant exercising and flushing is performed by the City in order to proactively identify hydrants that require maintenance and to improve water quality.

Prior to placing a newly constructed water line into service, procedures are in place for disinfection, sampling, and testing consistent with guidelines provided by American Water Works Association and the Division of Drinking Water (DDW). The City's Water Distribution and Water Quality Laboratory staff provide the bacteriological sampling and testing. These procedures assure that all new water lines are free of waterborne pathogens before they are placed in service, protecting the health and safety of the community.

All City-related Underground Service Alerts (USA) mark outs (potable water, wastewater, recycled water, storm drains, fiber optics, and street lights) are consolidated under a single position in the Water Distribution section of the Utilities Department. Consolidation streamlined the process and increased staffing efficiencies. The management of the Underground Utility Locator is the responsibility of the Water Distribution Supervisor.

The City's distribution system is a "D4" system based on rating criteria that classifies the complexity of the system. The State has mandated certification for water distribution operators (minimum of a Grade D1). The City requires water distribution operators to attain Grade D3 certification. Continuing education is mandatory for periodic certification renewals.

Contract Meter Reading

In January 2015, the City executed its first water meter reading contract to address irregular billing period lengths and dates during the City's Average Winter Water Use billing cycle. Utilizing a contract meter reading service provider made it feasible to have all City's water meters read in one week and for billing dates to be standardized for all ratepayers.

Other efficiencies gained include, that contract meter readers take pictures of water meter reads that are outside a normal range of water consumption. These pictures have saved work effort and time in both the Water Resources and Utility Billing sections. Prior to contract meter reading, Water Resources staff had to visit a property to re-read a meter if the meter read appeared outside of a normal range. Staff are now able to utilize the picture taken by the contract meter reader to inform of the potential for a water leak or another cause of high consumption. The pictures have also reduced the number of billing errors related to misread meters.

The City continues to utilize a contract meter reading service provider in 2021 and looks to expand the efficiencies gained through use of these services, and associated technology, in the future.

2.4 REQUIRED UWMP STANDARDIZED TABLES:

Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045 (opt)
	45,920	51,317	53,934	56,686	60,118	N/A

NOTES: Table 3-1 R (Retail).
SOURCES:
1. City of San Luis Obispo, General Plan, Land Use Element, Table 3, 2014. Projections beyond 2035 utilize similar method as projections for 2025 to 2035 (1 percent annual growth).
2. Population estimate for the City of San Luis Obispo is from the California Department of Finance website at: www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

Chapter 3: Current and Projected Water Demand

This chapter includes information on the City's historical potable water demand, current water use, and projections of future potable water demand. These demand projections are used in the City's Drought Risk Assessment provided in Chapter 6 and the annual water supply and demand assessments described in the 2020 Water Shortage Contingency Plan (annual assessments begin in 2022). This Chapter also includes description of the City's water loss auditing program and data on water use for 2016-2019.

3.1 WATER USE BY SECTOR

Existing water use in the City includes single-family and multi-family residential water users, commercial, institutional, and industrial water users (collectively "CII"), and dedicated landscape (irrigation) services. Water system loss and unbilled authorized consumption are also recorded by the City and are covered in detail in section 3.3 of this Chapter. At this time, the City does not provide potable or Title 22 recycled water for use for agricultural purposes, groundwater recharge, conjunctive use, saline water intrusion barriers, wetland or wildlife habitat, or sales/transfers/exchanges to other agencies.

As shown in Table 4, water demand projections for 2025-2035 are based on estimated City population per residential growth management Policy 1.11.2 from the City's *General Plan Land Use Element* updated in 2014. Projections for 2036 to 2040 are based on an extension of the City's one percent population growth factor for that five-year period. This population growth rate limit is notably higher than the actual growth rate the City has experienced. The City has maintained a six-year average annual growth rate of 0.60 percent per year according to the Community Development Department's residential construction permit data reported in the City's *2020 General Plan Annual Report*.[1]

Even the most efficiently managed water systems across the country experience unavoidable water loss from leaks, water main breaks, meter inaccuracies, and other causes. Despite efforts to minimize water loss, according to the US Environmental Protection Agency, the average water system sees a difference of about 15 percent between water produced and water sold each year. The City is working to reduce both real and apparent water losses. Water loss for 2020 and projected future water loss for 2025 through 2040 is provided in Table 4.

TABLE 4: Current and Projected Water Use by Sector

		Potable Water Use Sectors							Population
		Single-Family	Multi-family	Commercial, Industrial, and Institutional	Dedicated Irrigation	System Water Loss	Unbilled Authorized Consumption	Total Volume	
2020	Water Use AFY	2,087	943	922	397	463	5	4,817	45,920
% of 2020 total:		43%	20%	19%	8%	10%	<1%	100%	
2025	Water Use AFY	2,892	1,345	1,278	538	666	7	6,725	51,317
2030	Water Use AFY	3,039	1,414	1,343	565	700	7	7,068	53,934
2035	Water Use AFY	3,223	1,499	1,424	600	742	8	7,496	57,200
2040	Water Use AFY	3,388	1,576	1,497	630	780	8	7,879	60,118

NOTES:
1. Department of Water Resources, Tables 4-1 and Table 4-2.
2. Water demand by sector and population reported for 2020 is actual data.
3. Population growth is projected at one percent per year, per the *General Plan Land Use Element*, Table 3 (57,200 people in 2035).
4. Projections of total water volume are based on a factor of 117 gpcd per the *Water and Wastewater Management Element*.
5. The 2020 percentage of total volume for each water use sector is for the basis of the 2025 to 2040 water use by sector projections.

Source: City of San Luis Obispo Utilities Department, 2021.

[1] The City's *2020 General Plan Annual Report* is available at: www.slocity.org/Home/ShowDocument?id=29847

3.2 DEMAND SECTOR DEFINITIONS

Potable water demand in the City is comprised of several sectors [2], consisting of the following:

Single-family Residential: A single-family dwelling unit. A lot with a free-standing building containing one dwelling unit that may include a detached "accessory" dwelling unit.

Multi-family Residential: Multiple dwelling units contained within one building or several buildings within one complex.

Landscape: Water connections supplying water solely for landscape irrigation. Such landscapes may be associated with multi-family, commercial, industrial, or institutional/government sites, but are considered a separate water use sector if the connection is solely for landscape irrigation.

Commercial: A water user that provides or distributes a product or service.

Industrial: A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classifications System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

Institutional: A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

Distribution System Losses: Examples of system losses are provided in Table 5. Reporting of system losses is required by CWC Section 10631(d)(1).

Unbilled, Authorized Consumption: water used for hydrant flushing, dead end waterline flushing, and other authorized but unbilled uses.

Unconstrained Demand: water demand absent any water supply restrictions.

3.3 DISTRIBUTION SYSTEM WATER LOSS & UNBILLED AUTHORIZED CONSUMPTION TYPES

Senate Bill 555, approved by Governor Brown in October 2015, requires retail water suppliers in California with 3,000 or more connections, or an annual water demand of over 3,000 acre-feet, to conduct an annual audit of their water distribution system to quantify water loss. The standardized audit must be validated by a certified water loss auditor to ensure data accuracy and consistency in reporting. The City submitted its first audited water loss audit to the Department of Water Resources in October 2017 for the 2016 calendar year and has submitted water loss audits annually since.

The City performs annual water loss audits using the methodology outlined in the *Water Audits and Loss Control Programs Manual (M36)* published by the American Water Works Association (AWWA M36). The results of the annual water loss audits are submitted to the State to meet the distribution loss standards enacted by the SWRCB pursuant to Section 10631.1. Additionally, the City submits information identifying steps taken in the preceding year to increase the validity of the data entered in the final audit, reduce the volume of apparent losses, and reduce the volume of real losses.

Water losses can be the result of a variety of issues such as water line leaks, meter inaccuracies, and data handling errors. This is not to be confused with unbilled authorized consumption which accounts for approved uses such as mainline flushing, fire flow testing, and other authorized uses of water that are not billed by the City. Losses which are neither billed nor metered are classified as apparent losses and include unauthorized consumption (water theft), metering inaccuracies, and systematic data handling errors. A sample of common water loss and unbilled authorized consumption types can be seen in Table 5.

[2] The City compiles commercial, industrial, and institutional accounts in one category known as "CII" consistent with CWC 10608.12.

TABLE 5: Common Water Loss & Unbilled Authorized Consumption Types

Examples of Water Loss & Unbilled Authorized Consumption Causes				
Water Loss	Mainline & Service Line Leakage	Meter Inaccuracies	Data Handling Errors	Overflow of Storage Tanks
Unbilled Authorized Consumption	Treatment Plant and Distribution System Process Water	Mainline Flushing	Fire Flow Testing	Water Quality Testing

The City's water loss volume has ranged from 11.5 percent to as low as 6.6 percent of volume supplied over the five-year period from 2016 to 2020. Reductions in water loss are the result of an increased focus on replacing aging infrastructure, including water meters which ensure accurate quantification of water use within the community. During the 2016-2020 period the City also constructed a Supervisory Control and Data Acquisition (SCADA) system which allows for ongoing monitoring of the water distribution system in order to quickly identify leaks and other system abnormalities.

The AWWA M36 methodology utilizes the *Infrastructure Leakage Index* (ILI) as the metric to compare the performance of water suppliers, rather than percent of volume supplied. The ILI is a unit-less benchmarking metric calculated as the ratio of current losses to unavoidable losses, and is a method for comparing performance across suppliers, which accounts for the differences in how suppliers may categorize water loss. Unavoidable losses represent the theoretical lowest level of leakage, considering the water distribution system size, characteristics, and an estimation of background leakage expected in a distribution system. A well-performing system generally has an ILI score less than 3.0, indicating leakage loss is less than three times the unavoidable loss level. The City's average ILI is 1.46 for calendar years 2016 through 2020 exceeding this standard, as shown in Table 6. Full water loss audits for 2016-2020 are available in Appendix VI.

TABLE 6: Water Loss Audit Data and Results

Year	Billed Authorized Consumption	Unbilled Authorized Consumption	Apparent Losses	Real Losses	Unavoidable Real Losses	Infrastructure Leakage Index (ILI)	Water Loss, % volume supplied
2016	3,990.46	13.60	102.76	412.92	204.37	2.02	11.4
2017	4,281.00	21.93	155.56	402.35	204.90	1.96	11.5
2018	4,380.05	7.63	112.13	199.42	206.41	0.97	6.6
2019	4,198.61	4.93	107.59	231.95	249.44	0.95	7.5
2020	4,348.87	4.93	111.72	351.29	249.44	1.41	9.7
					Five-Year Average	1.46	9.34

Source: City of San Luis Obispo, Utilities Department, 2021.

3.4 ESTIMATING FUTURE WATER SAVINGS

Water savings from codes, standards, ordinances, and transportation and land use plans drive reduction in water demand within the City. CWC 10631 (e) (4) (B) (ii) requires that it be noted in the UWMP that the projected water use identified for 2025, 2030, 2035, and 2040 does not reflect any representation of water savings from codes, standards, ordinances, or transportation and land use plans.

3.5 HOUSING

The City's *General Plan Housing Element,* updated in 2020, includes a residential land capacity analysis that shows the City has approximately 387 acres of vacant, underutilized, or deteriorated property that can accommodate approximately 4,140 dwelling units. The City's projected water use figures provided in Table 4 include the projected water use for all future housing in the City, including future lower income households as defined in Section 50079.5 of the Health and Safety Code and the City's *Housing Element*, as required by CWC 10631.1. Table 7 shows the quantity and category of lower income housing units from the *Housing Element* and estimated water use for these affordable housing units.

TABLE 7: Water Demand for Future Lower Income Housing Units

Income Category	Total Housing Units	Estimated Water Use (in acre feet)
Very Low Income	825	247.5
Low Income	520	156
Total	1,345	403.5

Note: Estimated water use was calculated using 0.3 AFY per housing unit following conservative water demand rates.
Source: City of San Luis Obispo, General Plan Housing Element, Table 4, Sixth Cycle Regional Housing Needs Allocation, 1/1/2019 to 12/31/2028.

3.6 BASELINES AND TARGETS FOR WATER USE REDUCTION BY 2020

The Water Conservation Act of 2009 (SB X7-7) was incorporated into Division 6 of the CWC in 2009. According to the CWC, urban retail water suppliers must include in their urban water management plan the baseline daily per capita water use, along with the basis for determining the estimate, including references to the supporting data. The legislation specifically calls for using the methodologies and criteria developed by the DWR and contained in the guidance document *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* to determine compliance as required in the years 2015 and 2020. The legislation directs urban water suppliers to adopt one of the four outlined options or *Target Methods* in the legislation to determine their urban water use targets.

As the City has invested in and implemented water conservation programs since 1988, the baseline periods outlined in the SB X7-7 used to create water use targets in 2015 and 2020 were not achievable using Target Method 1, a flat 20 percent reduction from the baseline period. After reviewing and analyzing the considerable resources required to perform Target Methods 2 and 4, the City chose Target Method 3. This method sets water use goals based on the state hydrologic region target as set forth in SB X7-7. This method represents the local climate and geography, it is important to note that the City lies completely within Central Coast Region (Region 3). The Central Coast Region's 2020 target, expressed in gpcd, is the lowest of any region in the state. Central Coast region goals can be compared with other regions in Table 8.

TABLE 8: Target Method 3 Hydrologic Region Goals

Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
North Coast	137	130
North Lahontan	173	164
Sacramento River	176	167
San Francisco Bay	131	124
San Joaquin River	174	165
Central Coast	123	117
Tulare Lake	188	179
South Lahontan	170	162
South Coast	149	142
Colorado River	211	200

Source: Department of Water Resources.

3.7 UPDATING CALCULATIONS FROM 2010 UWMP

In accordance with *CWC 10608.20 (g)*, and per the recommendation of DWR, the City examined its 2020 Urban Water Use Target and will continue to utilize Method 3 (Hydrologic Region Goals); the City will not change its Target Method. Per DWR's required use of 2010 U.S. Census data, and to correct for discrepancies between DOF's projected populations for 2010, and actual census population data for 2010, the City updated the baseline population calculations for the 2015 Urban Water Management Plan. The

population corrections made slight changes to the 10-year average baseline GPCD, and the five-year average baseline gpcd, but did not change the City's 2015 Interim, or 2020 Urban Water Use Reduction Goals as defined in Method 3 shown in Table 8.

A requirement in the 2020 UWMP is completion and submission of the SB X7-7 Standardized Tables. These tables compile in-depth information about SB X7-7 and provide proof of compliance with the Water Conservation Act of 2009. The SB X7-7 Standardized Tables are provided in Appendix IV.

3.8 BASELINE PERIODS

In the 2010 UWMP, the City defined both ten-year (Baseline GPCD) and five-year (Target Confirmation) baseline periods; these periods remain unchanged from the 2010 UWMP and are used to establish the 2020 Target Goal, along with baseline period per capita figures for water use reduction. Table 9 defines the ten-year baseline period from 1997-2006 and the five-year baseline period from 2004-2008. The methodology used to establish ten-year and five-year baseline periods is included below.

Through analysis of the quantity of total water deliveries made up of recycled water in 2008, it was discovered that the City did not meet the ten percent threshold required to use a 15-year baseline period, leading the City to follow CWC 10608.12 (b) (1) guidance to use a ten-year baseline period. The City's ten-year baseline period of 1997 to 2006 and corresponding populations, annual gross water use, and daily per capita water use (gpcd) calculations provided by DWR can be viewed in SB X7-7 Table 1 in Appendix IV.

As defined by **CWC 10608.12 (b)**, "*base daily per capita water use*" is defined as:

(1) *The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December, 31 2004, and no later than December 31, 2010.*

Or

(2) *For an urban water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of urban water supplier or its urban wholesale water supplier, the urban water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum continuous period ending no earlier than December 31, 2004, and no later than December 31, 2010.*

In accordance with CWC 10608.12 (b) the City calculated its five-year baseline average period water use. Ranging from 2004-2008, the five-year time frame was selected in accordance with *Methodology 3: Base Daily Per Capita Water Use.*

TABLE 9: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	6,359	Acre Feet
	2008 total volume of delivered recycled water	90	Acre Feet
	2008 recycled water as a percent of total deliveries	1.41	Percent
	Number of years in baseline period [1]	10	Years
	Year beginning baseline period range	1997	
	Year ending baseline period range [2]	2006	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range [3]	2008	

[1] If the 2008 recycled water percent is less than ten percent, the first baseline period is a continuous ten-year period. If the amount of recycled water delivered in 2008 is ten percent or greater, the first baseline period is a continuous ten- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

[3] The ending year must be between December 31, 2007 and December 31, 2010.

NOTE: SB X7-7 Table 1, see Appendix IV.

3.9 SERVICE AREA POPULATION

For the 2020 UWMP, the City's service area boundaries have been found to correspond by 95 percent or more with the city limits. This correspondence allows the City to use Department of Finance population estimates as defined in DWR's *Urban Water Management Guidebook*. These population estimates were updated from the 2015 UWMP to reflect differences in population between the Department of Finance projections and the 2010 Census. Population data for each of the baseline years can be found in Table 11.

3.10 GROSS WATER USE

As defined by CWC 10608.12 (g), "Gross Water Use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban water supplier or its urban water wholesale water supplier
(2) The net volume of water the urban retail water supplier places into long term storage
(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier
(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

The City's gross water use is exclusively comprised of water entering the distribution system from four sources: Salinas Reservoir, Whale Rock Reservoir, Nacimiento Reservoir, and groundwater. Per *Methodology 1: Gross Water* of the methodologies document, recycled water delivered within the service area is excluded from the calculation of gross water. Water suppliers are not required to report their recycled water use, nor demonstrate any reduction in recycled water use for the purposes of SB X7-7. For detailed information on volume of water that entered the distribution during the baseline periods and in 2020, please refer to Table 10.

TABLE 10: Annual Gross Water Use

Baseline Year		Volume Into Distribution System	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water	Water Delivered for Agricultural Use	Process Water	
Year 1	1997	6219.76	0	0	0	0	0	6,220
Year 2	1998	5852.94	0	0	0	0	0	5,853
Year 3	1999	6172.13	0	0	0	0	0	6,172
Year 4	2000	6121.19	0	0	0	0	0	6,121
Year 5	2001	5885.52	0	0	0	0	0	5,886
Year 6	2002	6031.44	0	0	0	0	0	6,031
Year 7	2003	5968.75	0	0	0	0	0	5,969
Year 8	2004	6238.95	0	0	0	0	0	6,239
Year 9	2005	6098.43	0	0	0	0	0	6,098
Year 10	2006	5990.47	0	0	0	0	0	5,990
10 - 15 year baseline average gross water use:								6,058
5 Year Baseline - Gross Water Use								
Year 1	2004	6,239	0	0	0	0	0	6,239
Year 2	2005	6,098	0	0	0	0	0	6,098
Year 3	2006	5,990	0	0	0	0	0	5,990
Year 4	2007	6,416	0	0	0	0	0	6,416
Year 5	2008	6,269	0	0	0	0	0	6,269
5-year baseline average gross water use:								6,203
2020 Compliance Year - Gross Water Use								
2020		4,817	0	0	0	0	0	4,817

NOTE: Volume into distribution from Salinas, Whale Rock, and Nacimiento Reservoirs, and groundwater.

3.11 BASELINE PER CAPITA WATER USE

Daily Per Capita Water Use was calculated for the ten-year, five-year, and 2020 compliance year periods (see Table 11). The ten-year average baseline per capita water use was calculated at 123 gpcd while the five-year average baseline per capita water use totaled 124 gpcd. The 2020 compliance year figure of 94 gpcd is low due to continued conservation efforts by the community and decreases in system water losses.

3.12 2015 AND 2020 URBAN WATER USE TARGET

Per CWC 10608.20 (e), water retailers were directed to calculate a 2020 urban water use target, and an interim urban water use target in their 2015 Urban Water Management Plan. This target is referred to as the 2020 target.

As detailed in section 3.6, the City used Target Method 3 to comply with SB X7-7. As noted in Table 8, the Central Coast Hydrologic Region was required to reduce the regional goal of 123 gpcd by five percent, effectively establishing a 117 gpcd goal for the City.

As a requirement of CWC 10608.22, an urban water supplier's per capita daily water use reduction shall be no less than five percent base per capita water use as defined in the five-year baseline average. This calculation, and compliance is confirmed Table 12. The Central Coast Region target goal of 117 gpcd requires a six percent reduction in per capita water use, thus satisfying the requirement for at least a five percent reduction.

All information and DWR tables used to develop baselines and the resulting 2020 target can be viewed in Appendix IV. The summarized information in Table 14 is provided at the recommendation of DWR for quick verification of compliance with the Water Conservation Act of 2009.

TABLE 11: Daily Per Capita Water Use

Baseline Year		Service Area Population	Annual Gross Water Use	Daily Per Capita Water Use (GPCD)
10- to 15-Year Baseline GPCD:				
Year 1	1997	42,983	6,220	129
Year 2	1998	43,421	5,853	120
Year 3	1999	43,766	6,172	126
Year 4	2000	44,179	6,121	124
Year 5	2001	44,293	5,886	119
Year 6	2002	44,406	6,031	121
Year 7	2003	44,293	5,969	120
Year 8	2004	44,271	6,239	126
Year 9	2005	44,630	6,098	122
Year 10	2006	44,483	5,990	120
10- to 15-Year Average Baseline GPCD:				**123**
5-Year Baseline GPCD:				
Baseline Year		**Service Area Population**	**Gross Water Use**	**Daily Per Capita Water Use**
Year 1	2004	44,271	6,239	126
Year 2	2005	44,630	6,098	122
Year 3	2006	44,483	5,990	120
Year 4	2007	44,438	6,416	129
Year 5	2008	44,650	6,269	125
5-Year Average Baseline GPCD:				**124**
2020 Compliance Year GPCD:				
2020		45,920	4,817	94

TABLE 12: Confirmed 2020 Targets

5-Year Baseline GPCD	Maximum 2020 Target[1]	Calculated 2020 Target	Confirmed 2020 Target
124	118	117	117
Notes: 1. Maximum 2020 Target is 95% of the 5 Year Baseline GPCD 2. All values are in Gallons per Capita per Day (GPCD) 3. 117 GPCD is from Target Method 3			

TABLE 13: Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD*	Confirmed 2020 Target*
10-year	1997	2006	123	117
5-Year	2004	2008	124	
*Values are in Gallons per Capita per Day (GPCD)				

3.13 COMPLIANCE DAILY PER CAPITA WATER USE (GPCD)

In 2020, the SB X7-7 reduction target of 117 GPCD was met and surpassed by the City. Low potable water usage and gallons per capita per day figures in 2020 are a result of a continued focus on efficient water use, largely from measures implemented in during the 2012-2015 drought. Beginning in 2015, potable water usage and gallons per capita per day figures were significantly reduced due to conservation efforts, prolonged drought, and Governor Brown's April, 2015 drought declaration, requiring a statewide 25 percent reduction in potable water use.

TABLE 14: 2020 SB X7-7 Compliance

Actual 2020 GPCD	2020 Target GPCD	Optional Adjustments to 2020 GPCD					2020 GPCD	Did Supplier Achieve Targeted Reduction for 2020?
		Extraordinary Events	Economic Adjustment	Weather Normalization	TOTAL Adjustments	Adjusted 2020 GPCD		
94	117	0	0	0	0	94	94	Yes
NOTE: All values are in Gallons per Capita per Day (GPCD)								

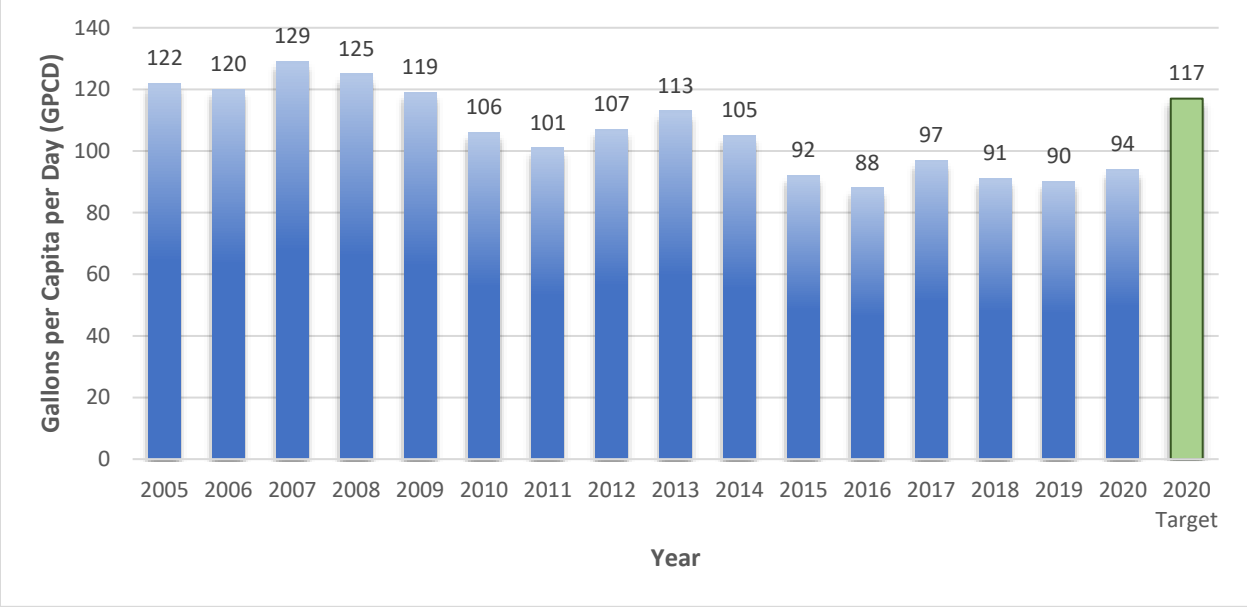
In accordance with statewide reduction efforts and Executive Order B-29-15, the City was required to reduce residential gallons per capita daily (RGPCD) consumption by 12 percent from 2013 usage levels. Due to a long history of successful conservation strategies, along with strong community support, the City surpassed both its drought reduction goals and its SB X7-7 water use reduction goals.

Actual 2020 per capita water demand is provided in Figure 4, along with per capita water demand from 2005 to 2020, which ranged from a high of 129 gpcd in 2007 to a low of 88 gpcd in 2016. Staff believes water demand will remain in line with the average use rate for the past five-year period (2016-2020). Table 15 provides five-year, ten-year, and pre-drought daily per capita averages.

TABLE 15: Average Gallons Per Capita Per Day (GPCD)

Timeframe	GPCD
10-Year Average (2011-2020)	98
5-Year Average (2016-2020)	92
Pre-drought Average (2006-2011)	117

FIGURE 4: 2005-2020 Water Use in Gallons per Capital Per Day Compared to 2020 Target



NOTE: Includes all water use (potable and recycled water).
Source: City of San Luis Obispo, Utilites Department, 2021.

3.14 INFLUENCE OF CLIMATE CHANGE ON WATER DEMAND

The potential influence of climate change on water demand is one of the factors that the City considers when using making its water demand projections, such as the potential for greater landscape irrigation demand due to a reduction in rainfall. The City recognizes the impact of rainfall variability on water demand. During years where the City receives less than average rainfall, irrigation can continue into late in the year (November and December) or resume early in the year (March and April). Table 16 provides the City's Calendar Year 2020 monthly potable and recycled water demand, illustrating the variability of monthly water demand due to landscape irrigation.

Climate change research suggest that water demand for agriculture will be affected more heavily than will demands in other sectors. However, the City does not supply any water for agricultural irrigation.

Although the City has seen increased water demand for landscape irrigation during years with less rainfall, the City has also seen a shift in the types of landscapes being installed as part of new development and landscape retrofits since the 2012-2015 drought. The use of drought-tolerant landscaping and more efficient landscape design should reduce year-to-year variations in water use that are driven by variations in weather.

Reference Chapter 6 for a detailed discussion of climate change considerations related to the City's water sources and the City's Drought Risk Assessment.

TABLE 16: Monthly Water Demand

Month	2020 Water Demand		%
	Potable	Recycled	
January	300	5	7%
February	333	14	8%
March	270	5	6%
April	292	14	7%
May	382	29	9%
June	410	30	10%
July	410	30	10%
August	431	37	10%
September	424	26	10%
October	421	26	10%
November	346	17	8%
December	329	12	7%
Total:	4,349	245	
Total 2020 Water Demand:		4,594	

Notes:
1. Water demand values are in acre-feet.
2. Water demand in this table is based on metered water deliveries.

Source: City of San Luis Obispo, Utilities Department, 2021.

3.15 REQUIRED UWMP STANDARDIZED TABLES:

Demands for Potable and Raw Water - Actual			
Use Type	2020 Actual		
	Additional Description	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	2,087
Multi-Family		Drinking Water	943
Landscape	Does not include recycled water	Drinking Water	397
Other	CII	Drinking Water	922
Losses		Drinking Water	469
Other	Unbilled Authorized	Drinking Water	0
		TOTAL	4,817
NOTES: Other "CII" contains commercial, industrial, and institutional account types UWMP Table 4-1 R (Retail).			

Potable and Non-Potable Water - Projected					
Use Type	Additional Description	Projected Water Use			
		2025	2030	2035	2040
Single Family		2,892	3,039	3,223	3,388
Multi-Family		1,345	1,414	1,499	1,576
Landscape	Includes all separately metered landscape / irrigation	538	565	600	630
Other	CII	1,278	1,343	1,424	1,497
Losses		666	700	742	780
Other	Unbilled Authorized	7	7	8	8
	TOTAL	6,725	7,068	7,496	7,879
NOTES: UWMP Table 4-2 R (Retail).					

Total Water Demands					
	2020	2025	2030	2035	2040
Potable and Raw Water *From Tables 4-1 and 4-2*	4,817	6,725	7,068	7,496	7,879
Recycled Water Demand *From Table 6-4*	245	445	645	695	745
TOTAL WATER DEMAND	5,062	7,171	7,713	8,191	8,624
NOTES: UWMP Table 4-3 R (Retail).					

Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (AF) [1]
01/2016	515.683
01/2017	557.908
01/2018	515.683
01/2019	339.544
01/2020	463.009
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.	
NOTES: UWMP Table 4-4 R (Retail). Values for 2020 are estimated, the 2020 Water Loss Audit is not yet complete/validated.	

Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections?	No
Are Lower Income Residential Demands Included In Projections?	Yes
NOTE: UWMP Table 4-5 R (Retail).	

Baselines and Targets Summary From SB X7-7 Verification Form				
Baseline Period	**Start Year**	**End Year**	**Average Baseline GPCD**	**Confirmed 2020 Target**
10-15 Year	1997	2006	123	117
5-Year	2004	2008	124	
NOTE: UWMP Table 5-1 R (Retail).				

2020 Compliance				
2020 GPCD			2020 Confirmed Target GPCD	Did Supplier Achieve Targeted Reduction for 2020
Actual 2020 GPCD	2020 Total Adjustments	Adjusted 2020 GPCD		
94	0	0	0	Yes
NOTE: UWMP Table 5-2 R (Retail).				

Chapter 4: Water Sources

As the sole water purveyor within the City limits, the City maintains control over water quality, distribution, and service to the community, as well as ensuring consistency with the General Plan policies and goals.

Whale Rock Reservoir, August 2019.

The City's *General Plan Water and Wastewater Management Element* (WWME) was originally adopted in 1987. Policy A2.2.1 states "The City shall utilize multiple water resources to meet its water supply needs." Having several sources of water avoids dependence on any one source that may not be available during a drought or other water supply reduction or emergency. There is generally greater reliability and flexibility if sources are of different types (such as surface water, recycled water, and groundwater) and if the sources of one type are in different locations (such as reservoirs in different watersheds). Consistent with the WWME, the City obtains water from Salinas Reservoir (Santa Margarita Lake), Whale Rock Reservoir, Nacimiento Reservoir, and recycled water from the City's Water Resource Recovery Facility (WRRF). Groundwater was utilized in the past and is considered an available supplemental water supply. The following sections discuss each of the City's water sources; the reliability of each water source is discussed in Chapter 6.

4.1 SALINAS RESERVOIR

The Salinas Reservoir (also known as Santa Margarita Lake) is located on the upper Salinas River, approximately nine miles southeast of the community of Santa Margarita. The project was originally built by the War Department to ensure an adequate water supply for Camp San Luis Obispo, as well as the City of San Luis Obispo. The dam and appurtenances were declared surplus by the War Department on April 14, 1947 and the U.S. Army Corps of Engineers assumed responsibility for the facilities. On July 11, 1947, the Corps entered into an agreement with the San Luis Obispo County Flood Control and Water Conservation District (District) for the operation and maintenance of the dam and related facilities. The City has an agreement with the Corps for use of the reservoir, as well as a water rights permit to divert water from the Salinas River for storage within the reservoir.

Operation and Distribution

Salinas Reservoir is formed by a concrete arched dam. Immediately following construction, the reservoir had an estimated storage capacity of 24,000 acre-feet, surface area of 793 acres, and a drainage area of 112 square miles. As a result of siltation since the original construction, the reservoir capacity has been reduced. A 1990 analysis conducted by the County of San Luis Obispo indicates that the siltation rate is on the order of 40 acre-feet per year. The estimated loss in storage capacity for Salinas Reservoir between 1990 and 2010 was 800 acre-feet.

Water is conveyed from Salinas Reservoir through 48,700 feet (9.2 miles) of 24-inch diameter reinforced concrete pipe to a three million gallon regulating reservoir at the Santa Margarita booster pump station near the northerly base of Cuesta Grade adjacent to Highway 101. The pipeline is designed to flow by gravity from the Reservoir to the regulating reservoir when the lake level is above the elevation of 1,267 feet. A booster pump station at the base of the dam, consisting of two horizontal centrifugal pumps, is capable of maintaining the rated flow of 12.4 cubic feet per second (cfs) when the water surface elevation falls below 1,267 feet. Three electrically driven, horizontal centrifugal pumps at the Santa Margarita booster station pump water through 6,810 feet of 24-inch diameter reinforced concrete pipe to the entrance portal of the Cuesta Tunnel, which runs 5,327 feet through the mountains near Cuesta Grade. From the outlet portal of the tunnel, water is conveyed through an 18-inch diameter steel pipeline a distance of 5,133 feet to the

City's turnout point. From the turnout, an 18-inch diameter pipe runs 4,180 feet to the site of Reservoir #2 on Stenner Creek Road. From there, a pipeline that varies from 24-inches to 30-inches in diameter conveys the water by gravity to the water treatment plant 5,930 feet downstream.

The operation and maintenance of the dam and water conveyance system (to the City's turnout) are the responsibility of San Luis Obispo County Flood Control and Water Conservation District. The City pays all operating, maintenance, and capital costs associated with the reservoir and transmission system (excluding costs associated with recreational activities at the Lake).

Salinas Dam spillway, February 2019.

4.2 WHALE ROCK RESERVOIR

Whale Rock Reservoir is located on Old Creek approximately one-half mile east of the community of Cayucos. The project was planned, designed, and constructed under the supervision of the State Department of Water Resources. Construction took place between October 1958 and April 1961. The reservoir is jointly owned by the City, the California Men's Colony, and the California Polytechnic State University at San Luis Obispo (Cal Poly). These three agencies form the Whale Rock Commission which is responsible for operation and administration of the reservoir and associated water deliveries. Day-to-day operation is provided by the City. The City owns 55.05 percent of the water storage rights at the reservoir. The remaining water storage rights are apportioned between the two State agencies with Cal Poly owning 33.71 percent and the California Men's Colony owning 11.24 percent.

Operation and Distribution

Whale Rock Reservoir is formed by an earthen dam and was able to store an estimated 40,662 acre-feet of water at the time of construction. The dam is 266 feet tall with a crest length of 850 feet and crest width of 30 feet. The top of dam elevation is 232.2 feet. The Reservoir covers an area of 600 acres. In 2021, the maximum storage capacity is 38,967 acre-feet. Over the life of the Whale Rock Reservoir and dam, the lake has filled to capacity and the spillway has been used 12 times, last spilling in 2005.

The project facilities consist of a 30-inch pipeline, two pumping stations, over two miles of trails and a fishing access facility, a maintenance facility and office, and a structure used as a private residence.

City staff is responsible for ongoing maintenance and operation of the reservoir, including the inlet and outlet structures, reservoir structural instrumentation, access roads, daily reservoir level readings and climatological data, reservoir patrol and security, pipelines and pumping stations, water meters, cathodic protection systems, and other associated duties. Staff also monitors public access to the lake.

The conveyance system delivers water from the reservoir to the Whale Rock Commission member agencies located between the reservoir and the City. Outlets from the pipeline exist for water deliveries to Chorro Reservoir and water treatment plant (operated by the California Men's Colony), Cal Poly State University, the Cayucos water treatment facility and the City's Water Treatment Plant. In addition, water can be delivered to the Dairy Creek Golf Course under terms of an agreement between the California Men's Colony and the County of San Luis Obispo.

The Whale Rock pipeline is approximately 17 miles long, connecting the reservoir to the member agencies, and terminating at the City's Water Treatment Plant. The design capacity of the pipeline is 18.94 cubic feet per second (approximately 8,500 gallons per minute). The line consists of modified pre-stressed concrete cylinder pipe at most locations. Cement mortar lined steel pipe is used at creek crossings and junctions.

The pipeline has surge protection consisting of eight-inch, globe type, diaphragm-actuated pressure relief valves which protect the line from excessive pressures. The cathodic protection system consists of sacrificial anodes and test stations located in areas subject to galvanic corrosion. Previous inspections made during routine maintenance and repairs indicate the pipeline to be in good condition.

Two pump stations transmit the water along the pipeline to member agencies. The first pump station is located in Cayucos at Chaney Way (elevation 44 feet). The second station is located near Camp San Luis Obispo, approximately six miles southeast of Morro Bay (elevation 181 feet). Each station has five-200 horsepower pumps capable of delivering various flow rates requested by member agencies. Upgrades to both pump stations, which included the addition of two pumps at each station, were completed in August 1993.

In 2018, the City contracted with HDR Engineering, Inc. for inspection and assessment of the 850-foot long Whale Rock Dam spillway. The investgation included:

1. Review of design, construction, inspection, analysis, operation and maintenance, and geologic information, as provided by City.
2. Detailed visual, non-destructive inspection of the spillway slabs and walls from upstream of the spillway crest to downstream of the stilling basin.
3. Video/camera inspection of accessible outfall drains and heel drains.
4. Geologic inspection of foundation material adjacent to the spillway.
5. Evaluation of original spillway design versus a modern spillway design.
6. Evaluation of operations, inspection, and surveillance practices.
7. Evaluation of performance of previous repairs.

Whale Rock Dam Spillway.

A report was completed in March 2019 with recommendations including maintenance and repair activities for the drainage system and further engineering investigations. The City and its Whale Rock partners, Cal Poly and the California Men's Colony, will implement corrections as recommended by the California Department of Water Resources, Division of Safety of Dams.

Whale Rock trail.

Operating Agreements

Several agreements establish policies for the operation of the Whale Rock system and actions of the member agencies. A brief description of the existing agreements follows:

30-inch Whale Rock Pipeline Repair Conducted in June 2017

A) Agreement for the construction and operation of the Whale Rock Project, 1957, set forth the project's capital cost distribution to the member agencies.

B) A supplemental operating agreement, 1960, established the Whale Rock Commission and apportioned the operating costs.

C) Downstream water rights agreement (original 1958 agreement was amended and replaced with a new agreement in April 1996) established water entitlements for adjacent and downstream water users. The downstream water users (Cayucos Area Water Organization or CAWO) affected by this agreement consist of three public water purveyors and the cemetery. In addition to the agencies, water entitlements were identified for separate downstream landowners; see Table 17.

TABLE 17: Whale Rock Reservoir Downstream Entitlement

Downstream Water Users	Allocation
Cayucos Area Water Organization	**600**
Paso Robles Beach Water Association	222
Morro Rock Mutual Water Company	170
County Water District #10A	190
Cayucos-Morro Bay Cemetery District	18
Mainini	**50**
Ogle	**14**
Total Downstream Entitlement:	**664**

NOTE: Allocations are in acre-feet per year.
Source: City of San Luis Obispo Utilities Dept., 2021.

D) A decision and order by the Fish and Game Commission of the State of California, October 24, 1964, required the Whale Rock Commission to stock the reservoir with 17,500 rainbow trout (between six and eight inches long) each year. The State Department of Fish and Game has directed that no fish be planted in the reservoir to protect the existing fish population in the reservoir (landlocked steelhead).

E) Superior Court decision #36101, 1977, required the Whale Rock Commission to allow public entry to the reservoir for fishing. In 1981, construction was completed on access trails and sanitary facilities at the reservoir, and public fishing began at the lake.

F) An agreement for water allocation and operational policy between the agencies forming the Whale Rock Commission. The agreement established the accounting procedures to allow each agency to carry over excess or deficit water each year. The operating policies were most recently amended in 2014 to allow agencies to utilize their water supplies in the reservoir as needed by their agency.

G) An agreement between the Whale Rock Commission and the California Men's Colony, 1990, to establish maintenance and operation criteria for the Chorro Booster pumps. The Chorro Booster pumps were installed by the Commission on the California Men's Colony turnout from the Whale Rock line to reduce system pressures required to provide full flow to the California Men's Colony water treatment plant. Pump station maintenance, per the agreement, is the responsibility of the California Men's Colony.

H) An agreement between the Whale Rock Commission and the County of San Luis Obispo for connection to the Whale Rock pipeline, 1995, allowed a pipeline connection to deliver water to the Dairy Creek Golf Course. Typically, the golf course uses reclaimed water from the California Men's Colony Wastewater Treatment Plant. Water from Whale Rock Reservoir can be delivered when reclaimed water is not available under the terms of the agreement.

I) A consent to common use agreement, 1996, between the Whale Rock Commission and the County of San Luis Obispo. The agreement allowed the installation of the State Water pipeline at seven locations within the existing Whale Rock pipeline easement.

J) An agreement, updated in 2018, for exchange of water between the City of San Luis Obispo and the San Luis Obispo County Service Area No. 10A. The agreement allows for the exchange of up to 50 acre-feet per year of Nacimiento water for water from Whale Rock Reservoir.

TABLE 18: Reservoir Attributes

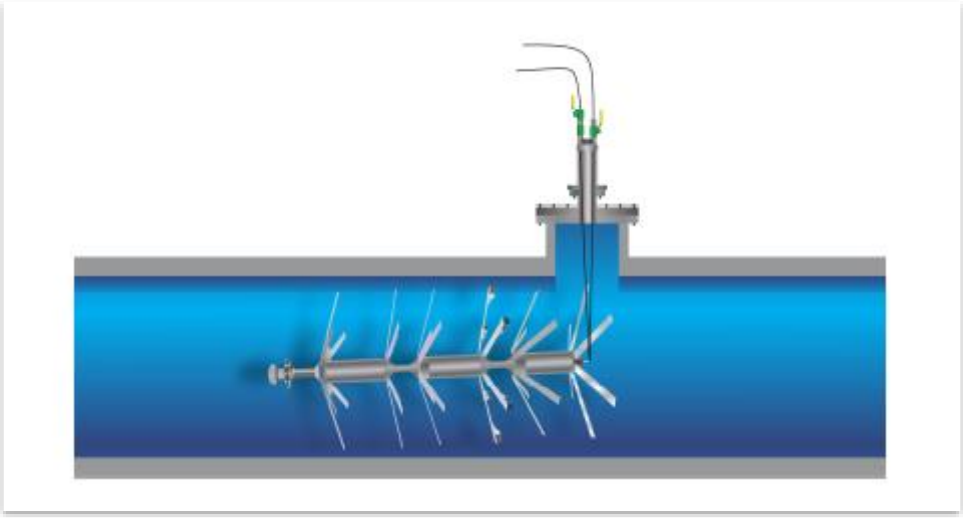
Reservoir	Watershed Size (Square Miles)	Storage Capacity (Acre-Feet)	Average Annual Precipitation (inches)	Average Annual Evaporation (Inches)
Salinas	112.0	23,843	22.1	85.4
Whale Rock	20.3	38,967	18.7	61.6
Nacimiento	361.5	377,900	35-55	-

Notes
1. Average annual precipitation and evaporation depths are based on the verified hydrologic data from the City's Safe Annual Yield Model, 2018. See Appendix IV.
2. Due to the size of Nacimiento Reservoir watershed area, average precipitation varies. Evaporation averages for Nacimiento Reservoir are not currently identified.

SOURCE: Nacimiento Water Project Initial Watershed Sanitary Survey, 2014.

Pipeline Condition Assessments

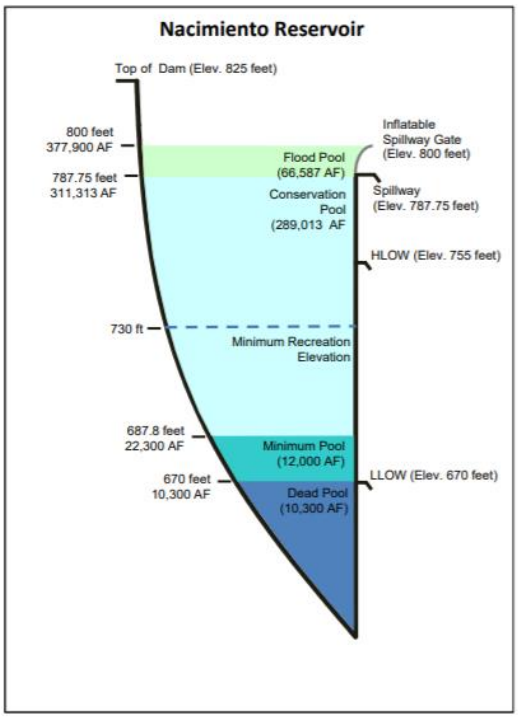
During 2019, pipeline condition assessments were completed for the Whale Rock Reservoir and Salinas Reservoir (Santa Margarita Lake) water transmission pipelines. The condition assessments used free-swimming electromagnetic inspection technology, shown in the image below, to locate and identify segments of the pipeline in need of repair. Over 16 miles of 30-inch transmission pipeline from Whale Rock Reservoir was analyzed. The assessment found that 2,610 segments had no abnormalities, and 25 segments had varying deficiencies (broken bar wraps or cylinder wall loss). The Salinas pipeline condition assessment analyzed 1.25 miles of pipeline originally installed in 1940s. Results of the assessment were described in a May 2019 report revealing 222 of the total 236 segments had no abnormalities, and 14 segments had varying deficiencies. Funding is programmed to address the identified pipeline deficiencies in the next few years.



Conceptual image of Electromagnetic Inspection Technology used to assess the Whale Rock and Salinas Reservoir transmission pipelines.

4.3 NACIMIENTO RESERVOIR

In 1959, the San Luis Obispo Flood Control and Watershed Protection District entered into an agreement with Monterey County Flood Control and Water Conservation District (now Monterey County Water Resources Agency) to secure rights to 17,500 acre-feet of water per year from Nacimiento Reservoir. Nacimiento Reservoir is located entirely within San Luis Obispo County, California (County), and was built by Monterey County Flood Control and Water Conservation District who continues to control reservoir ownership and operations. Nacimiento Reservoir has a storage capacity of 377,900 acre-feet and serves the purpose of abating seawater intrusion in the groundwater aquifers of the Salinas River Valley. The Nacimiento Reservoir also provides flood protection and is a source of water supply for groundwater recharge for the Salinas Valley. 1,750 AFY of the County's entitlement have been designated for uses around the lake, leaving 15,750 AFY for allocation to other areas within the County of San Luis Obispo.



Source: *Monterey County Water Resources Agency, Nacimiento Dam Operations Policy, 2018.*

The "dependable yield" from Nacimiento Reservoir is the contractual amount of water that the City has rights to from Nacimiento Reservoir. The original amount contracted for was 3,380 acre-feet per year. Engineering studies, environmental impact reports, dependable yield analyses, and preliminary design reports were undertaken in an effort to meet the various water needs within the County. In 2004, the County requested interested agencies to approve the contractual agreements for participation in the Nacimiento Project. The four initial project participants included the cities of San Luis Obispo and Paso Robles, the Atascadero Mutual Water Company, and the Templeton Community Services District. All of these agencies executed participation agreements with San Luis Obispo County for entitlements of water which totaled 9,630 acre feet. On June 29, 2004, the City Council authorized participation in the Nacimiento Water Project for the delivery of the original 3,380 acre-feet of water. In 2004, the County Service Area 10A in Cayucos became a project participant (25 AFY).

The County began construction in 2007 on a 45-mile pipeline project to deliver water from the Nacimiento Reservoir to participating agencies and cities. The facilities consist of a multi-port intake structure, three pump stations, three storage tanks, 45 miles of pipeline, four turnouts, a control center, and a Supervisory Control and Data Acquisition (SCADA) and Project control system. The Project budget was $176-million, including design, construction, construction management, environmental permitting, and right-of-way. Pipeline construction and related water delivery facilities were completed in the fall of 2010 with water deliveries to the City beginning in January of 2011.

In March 2016, the City Council approved the addition of 2,102 AFY from Nacimiento Reservoir to the City's secondary water supply. This addition brought the City's total Nacimiento Reservoir Allocation to 5,482 AFY. Secondary water supplies are used to meet short-term losses to the City's water supply due to events such as drought, pipeline maintenance, and repair of infrastructure. With uncertainty of future climatic conditions, regulation and aging infrastructure, the additional supply of Nacimiento water to the City's portfolio reduces pressure on use of water supplies in the Whale Rock and Salinas reservoirs. It would serve to extend these stored supplies during future critical water shortage periods.

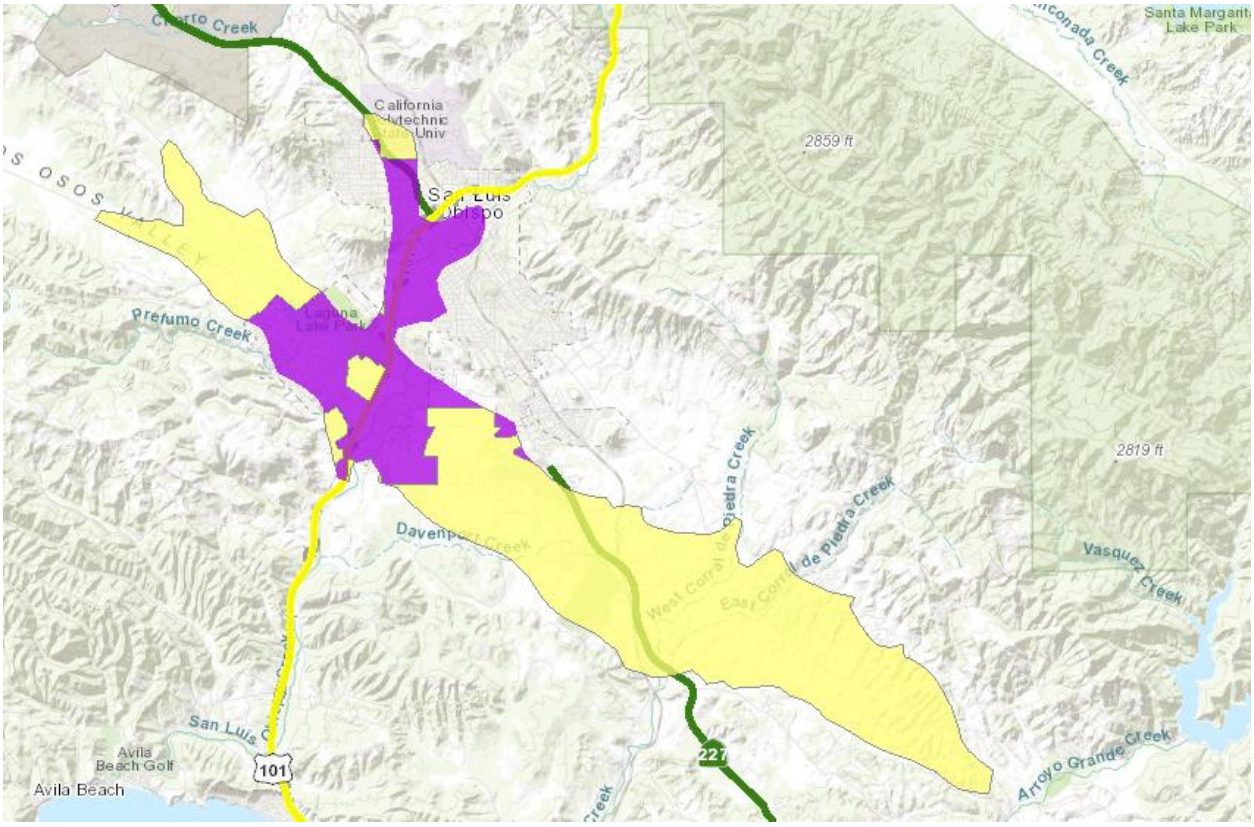
San Luis Obispo County operates, maintains, and administers capital improvement projects for the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento

Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives from each of the four founding agencies' governing boards and a County Representative who is a member of the County Board of Supervisors who also sits on the Board of Directors for the Flood Control District.

4.4 GROUNDWATER

The principal source of groundwater for the City is the San Luis Obispo Valley Groundwater Basin (Basin). The Basin is oriented in a northwest-southeast direction and is composed of unconsolidated or loosely consolidated sedimentary deposits. It is approximately 14 miles long and 1.5 miles wide. It covers a surface area of about 12,700 acres (19.9 square miles). The Basin is bounded on the northeast by the relatively impermeable bedrock formations of the Santa Lucia Range, and on the southwest by the formations of the San Luis Range and the Edna fault system. The bottom of the SLO Basin is defined by the contact of permeable sediments with the impermeable bedrock Miocene-aged and Franciscan Assemblage rocks. The Basin is commonly referenced as being composed of two distinct valleys, with the San Luis Valley in the northwest, providing water to the City of San Luis Obispo, and the Edna Valley in the southeast providing water to unincorporated areas of the county and large agricultural operations.

FIGURE 5: San Luis Obispo Valley Groundwater Basin



The City's major source of water was groundwater and surface water local creeks until 1944 when the City began to use water from Salinas Reservoir. In 1943, the City pumped 1,380 acre-feet of groundwater. Groundwater was used again during the summer of 1948, when 440 acre-feet was pumped. From that point on until 1989, most groundwater in the City was used by agriculture and very little was used for domestic consumption.

With the onset of the drought in 1986, resulting in decreasing surface water supplies, the City activated groundwater wells in 1989 to meet the City's water demand. In November 1992, nitrate levels in the Auto

Park Way Well exceeded State standards, so the well was taken out of service. In April 2015, the City stopped utilizing the Pacific Beach Well on Los Osos Valley Road for potable water purposes due to more stringent regulations for hexavalent chromium. The Fire Station #4 Well had been offline due to remediation of soil contamination at the adjacent Shell service station and is also currently offline due to hexavalent chromium.

Like surface water, groundwater must meet the standards set in the Safe Drinking Water Act. Water quality analysis in 1989 indicated that advanced treatment was needed on the now decommissioned Dalidio and Auto Park Way Wells due to unacceptable levels of tetrachloroethylene (PCE). Carbon adsorption units were placed on each well to provide necessary treatment and were granted approval for domestic consumption by the State of California, Department of Public Health (now the State Water Resources Control Board, Division of Drinking Water (DDW)).

The 1996 Amendments to the SDWA required the EPA to develop regulations that require disinfection of ground water systems to protect the public health. In 2006, the Groundwater Rule was adopted to further protect against waterborne illness due to fecal and E. Coli contamination in public water systems that use groundwater supplies.

In the 2010 update of the WWME, the City eliminated groundwater from the water supply calculation as a basis for meeting long-term water demands. The decision was based on the water quality and availability issues which deemed groundwater as a potentially unreliable source. Consistent with Policy A 3.2.3 from the City's WWME, the City does not rely on groundwater to meet long-term water demand. The City will utilize groundwater in the future, as the resource is needed, and plans to use well-head treatment to ensure the water quality is appropriate for potable purposes.

Current groundwater use includes one non-potable well located within the City's Corporation yard and two irrigation wells used at the City's Laguna Golf Course. The City's drinking water wells are offline and not used to meet any of the City's water needs. The Corp Yard well was established during the drought of 1987-91 to serve as an alternative source of water for construction-related activities prior to the City's recycled water program. The City placed limitations on the use of the Corp Yard well in 2015 and it is only available for municipal purposes, such as street sweeping and of City-owned trees. Table 19 shows the City's groundwater production for 2016 through 2020. These production amounts do not include agricultural and private groundwater pumping by non-City entities. Table 19 does not identify any City groundwater production in the term examined as part of this UWMP.

Sustainable Groundwater Management Act

In the future, the City plans to use groundwater to balance of its overall water supply portfolio as the use of groundwater would contribute to resiliency in the City's water supply portfolio. The Sustainable Groundwater Management Act (SGMA) is a statewide law that requires Groundwater Sustainability Agencies (GSA) to adopt groundwater management plans that outline actions needed to return groundwater basins to sustainable levels of pumping and recharge.

In May 2017, the City Council approved Resolution 10796 authorizing the City to become a Groundwater Sustainability Agency (GSA) for the San Luis Valley Groundwater Basin for the area that lies beneath and within the City's jurisdictional boundaries. In February 2019, the City Council, acting as the San Luis Valley Basin – City of San Luis Obispo Groundwater Sustainability Agency, approved the Notification of Intent to initiate development of a Groundwater Sustainability Plan (GSP) for the San Luis Obispo Valley Groundwater Basin.

While the Basin as a whole has been identified to be in overdraft and is listed as a high priority basin under SGMA, the basin has two distinct, largely hydrologically disconnected sub areas that are experiencing drastically different conditions from one another. The area underlying the City of San Luis Obispo, from which the City historically pumped groundwater, has experienced no ongoing groundwater level decline and is estimated to have a groundwater surplus of 700 AFY. The area to the southeast of the City, generally within the Edna Valley area, has experienced ongoing groundwater level decline and is estimated to have more than 1,000 AFY in over-pumping of groundwater resources. The San Luis Valley Groundwater Basin is not an adjudicated basin.

The City is working in collaboration with the County of San Luis Obispo GSA to create a single Groundwater Sustainability Plan (GSP) that provides full coverage of the San Luis Valley Groundwater Basin where each GSA is responsible for ensuring compliance with SGMA for their respective portions of the groundwater basin. To get additional information, to sign up for the interested stakeholder email list, or to see materials for past or upcoming meetings related to the GSP development, interested parties are encouraged to visit www.slowaterbasin.com. The San Luis Valley GSP must be submitted to California Department of Water Resources (DWR) by January 31, 2022.

TABLE 19: City Groundwater Production

Basin Name	2016	2017	2018	2019	2020
San Luis Obispo Valley (Basin 3-9)	0	0	0	0	0

NOTES:
1. Water volumes are in acre-feet per year.
2. Department of Water Resources, Table 6-1.

Source: City of San Luis Obispo Utilities Department, 2021.

4.5 FUTURE WATER PROJECTS AND DESALINATED WATER OPPORTUNITIES

The City has not identified the need for additional water supplies to meet potable water demand for the term of this UWMP. However, as described further in Chapter 5, construction of the upgrade of the WRRF is underway in 2021 to accommodate General Plan buildout and maximize recycled water production. The upgrade will enable the City to pursue potable reuse opportunities in the future, including opportunities to augment groundwater supplies with recycled water.

In July of 2020, the City received a nearly $2 million planning-phase grant, funded through Proposition 1, to study PCE contamination of the groundwater basin. A detailed understanding of the extent of PCE contamination and remediation options are necessary steps in fully utilizing the City's groundwater pumping opportunities. The planning phase work will continue into 2022. The City is planning to apply for an implementation-phase grant to fund necessary capital improvements to put an additional groundwater well into service. This work enhances the City's ability to extract, treat, and utilize groundwater to meet a portion of the City's potable water demand.

Desalination is a viable technology which is not rainfall dependent. Desalination activities can have significant negative environmental impacts and significant energy requirements which drive up the cost of desalinized water. The major disadvantages of desalination are the cost, potential for environmental impacts, and significant energy demand. Desalination is currently being used or considered for use by multiple agencies in California and could potentially be a water supply consideration in the future if the City's current supplies prove to be inadequate or insufficiently resilient. Advances in desalination technology and cost reductions may create opportunities to utilize this resource in the future.

4.6 WATER SUPPLY SUMMARY

Tables 20 and 21 provide information for each source of water utilized by the City in 2020. The City utilized water from its multi-source supply in a conjunctive manner. The City intends use its contractual water supply from Nacimiento Reservoir first, with Whale Rock and Salinas used as needed to meet the City's overall potable water demand. In the twenty years projected by this UWMP through 2040, the City assumes it will continue to use these water supplies in this coordinated manner. Recycled water was used at over 50 metered locations for landscape irrigation and construction water uses in 2020.

TABLE 20: 2020 Actual Water Supplies

Water Supply Sources	2020
Water purchased from:	
SLO County Flood Control and Water Conservation District (Nacimiento Reservoir)	2,065
Supplier-produced groundwater	0
Supplier-produced surface water (Salinas and Whale Rock Reservoirs)	2,752
Total (Potable Water):	4,817
Recycled Water	245
Total (Potable and Recycled Water):	5,062

NOTES:
1. Water volumes are in acre-feet per year and rounded to the nearest acre-foot.
2. Department of Water Resources, Table 6-8.

Source: City of San Luis Obispo Utilities Department, 2021.

TABLE 21: Actual and Projected Water Supplies

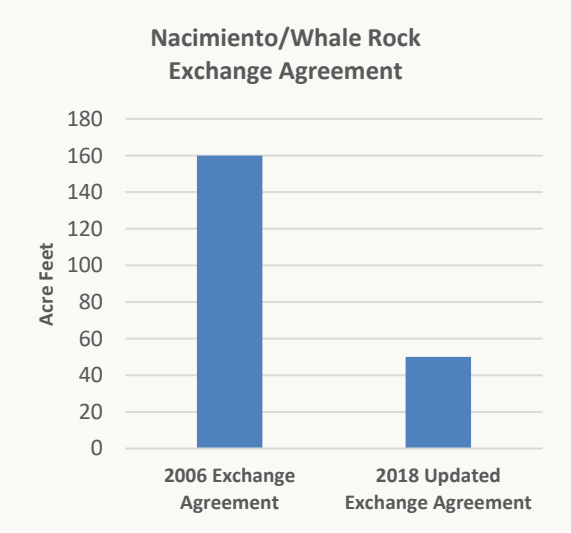
Water Supply Sources		2025	2030	2035	2040
Water purchased from:	**Wholesaler supplied volume (yes)**				
SLO County Flood Control and Water Conservation District	All	5,482	5,482	5,482	5,482
Supplier-produced groundwater		0	0	0	0
Supplier-produced surface water (not desalinated)		939	1,265	1,614	1,947
Recycled Water (City of SLO WRRF)		445	645	695	745
Total		**6,866**	**7,392**	**7,791**	**8,174**
Projected Population:		**51,317**	**53,934**	**57,200**	**60,118**

NOTES
1. Water volumes are projected using population projections from Table 2.
2. Water volumes are in acre-feet per year.
3. Department of Water Resources, Table 6-8 and 6-9.

Source: City of San Luis Obispo Utilities Department, 2021.

4.7 TRANSFERS AND EXCHANGES

The City of Morro Bay and the Whale Rock Commission (which the City of San Luis Obispo is a member agency) executed an agreement in June of 2000 which provides for Mutual Aid between the agencies during disruption of water deliveries or lack of available water supplies. The agreement provides a general framework for exchanging water between agencies in the event of emergencies or other water disruptions. The agreement is voluntary based on each agency's ability to assist at any point in the future. The City is also a member of the California Water/Wastewater Agency Response Network (CalWARN). This organization functions in coordination with the State Office of Emergency Services (OES) to support and promote statewide emergency preparedness, disaster response, and mutual assistance matters for public and private water and wastewater utilities.



The San Luis Obispo County Service Area No. 10 (Cayucos) and the City have a water exchange agreement which was originally executed in October of 2006. In 2018, Following the full allocation of Nacimiento Reservoir, City and County staff recognized the need to update the Exchange Agreement to align with the entitlements in the provisions of the full allocation of Nacimiento. The updated agreement reduces the amount of water that could potentially be delivered to CSA 10 from 160 acre-feet, identified in the 2006 agreement, to 50-acre feet per year, coinciding with the total County Service Area No. 10A and Bella Vista Mobile Home Park entitlement.

TABLE 22: Transfers and Exchanges

Transfer Agency	Transfer or Exchange	Short-term or long-term	Proposed Volume
City of Morro Bay (emergency supply)	Transfer	Short-Term	Not Identified
San Luis Obispo County Service Area No.10	Exchange	Long-Term	50
		Total	50

NOTE: Water volumes are in acre-feet per year.

Source: City of San Luis Obispo Utilities Department, 2021.

The updated Exchange Agreement, finalized in July 2018, facilitates a successful partnership between the City and County to meet regional water needs and minimizing cost and potential environmental issues.

4.8 ENERGY USE

The 2020 UWMP is required to include energy information. For purposes of analyzing the energy used by the City to deliver potable water to the community in 2020, potable water management is divided into raw water conveyance, water treatment, and water distribution. Because the City conveys, treats, and distributes water as a retail provider to Cal Poly by agreement, the energy consumed for each water management process is calculated as a percentage of the total energy use for the process, equal to the City's portion of the water. The energy used to provide potable water to the community is summarized in Table 23. The energy used to provide recycled water to the community is described in Chapter 5 and summarized in Table 29.

Raw Water Conveyance

As described earlier in this Chapter, the City utilizes raw water from three surface water reservoirs (Salinas, Whale Rock, and Nacimiento) to meet the community water demand. Water is conveyed from Salinas Reservoir through 9.2 miles of 24-inch diameter reinforced concrete pipe to a three-million gallon regulating reservoir at Santa Margarita booster pump station near the northerly base of Cuesta Grade adjacent to Highway 101. The pipeline is designed to flow by gravity from the Reservoir to the regulating reservoir when the lake level is above the elevation of 1,267 feet. A booster pump station at the base of the dam, consisting of two horizontal centrifugal pumps, is capable of maintaining the rated flow of 12.4 cubic feet per second (cfs) when the water surface elevation falls below 1,267 feet. Three electrically driven horizontal centrifugal pumps at the Santa Margarita booster station pump water through 6,810 feet of 24-inch diameter reinforced concrete pipe to the entrance portal of the Cuesta Tunnel, which runs 5,327 feet through the mountains near Cuesta Grade. From the outlet portal of the tunnel, water is conveyed through an 18-inch diameter steel pipeline a distance of 5,133 feet to the City's turnout point. In 2020, 676,580 kWh of energy were used to move 1,718 acre-feet (559.96 MG) from Salinas Reservoir to the WTP.

Conveyance of untreated, or “raw” water from Whale Rock Reservoir requires energy to power two pump stations. Each pump station has five-200 horsepower pumps capable of delivering water at various flow rates. The Whale Rock pipeline extends approximately 17 miles from the reservoir to the WTP. The design capacity of the pipeline is 18.94 cubic feet per second (approximately 8,500 gallons per minute). In 2020, 758,208 kWh of energy were used to move 1,305 acre-feet (425.12 MG) from Whale Rock Reservoir to the WTP.

Water is conveyed from Nacimiento Reservoir through 45 miles of pipeline using three pump stations. San Luis Obispo County operates and maintains the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The City pays a proportion of the costs, equal to the volume of

water allocated as a percent of the total volume released. In 2020, 1,893,991 kWh of energy were used to move 1,958 acre-feet (637.98 MG) from Nacimiento Reservoir to the WTP.

Potable Water Treatment

Raw water from Salinas, Whale Rock, and Nacimiento Reservoirs is treated at the WTP via a process including ozone treatment for disinfection and oxidation, mixing and settling, filtration, chlorination, fluoridation, and THM removal using an in-tank aeration system. Energy included under that WTP also includes the Transfer Pump Station that pumps water to Reservoir 2.

Potable Water Distribution

The City's water distribution system utilizes pump stations to move water through over 190 miles of water mains for distribution to the community. The majority of the City's water distribution system is fed by gravity from Reservoir 2.

TABLE 23: 2020 Energy Usage for Potable Water Management

	Water Management Process			
	Water Conveyance	**Water Treatment**	**Water Distribution**	**Total**
Volume of Water Entering Process (acre-feet)	4,981	4,981	4,981	4,981
Energy Consumed (kWh)	3,328,779	1,096,117	70,563	4,495,459
% of total Energy Consumed	74%	24%	2%	100%
Energy Intensity (kWh/vol.)	668	220	14	903

NOTES

1. The energy required for conveyance of water from Nacimiento Reservoir to the City is not individually metered and was calculated as a percentage of the total energy required to convey water to the San Luis Obispo County Flood and Water Conservation District member agencies.
2. Some meters report the energy consumption of equipment used in more than one water management process. To provide the most accurate data, the energy use was allocated to the process which required the greatest energy demand.
3. For 2020, community potable water demand was met using Nacimiento (39%), Salinas (34%), and Whale Rock (26%). Water quality, operations and maintenance, and climate influence the City's coordinated operation of the three water supplies.

Source: City of San Luis Obispo, Utilities Department, 2021.

4.9 REQUIRED UWMP STANDARDIZED TABLES:

Retail: Groundwater Volume Pumped						
Groundwater Type	**Location or Basin Name**	**2016**	**2017**	**2018**	**2019**	**2020**
Alluvial Basin	San Luis Obispo Valley	0	0	0	0	0
	TOTAL					
NOTES: Table 6-1 R.						

Retail: Water Supplies — Actual			
Water Supply	**Additional Detail on Water Supply**	**2020**	
		Actual Volume	**Water Quality**
Surface water	Nacimiento Reservoir	2,065	Drinking Water
Surface water	Whale Rock Reservoir	940	Drinking Water
Surface water	Salinas Reservoir	1,812	Drinking Water
Groundwater	San Luis Obispo Valley Basin	0	Drinking Water
Recycled Water	City of San Luis Obispo WRRF	245	Recycled Water
	Total	5,062	
NOTES: Table 6-8 R.			

Water Supplies — Projected					
Water Supply	**Additional Detail on Water Supply**	**Projected Water Supply**			
		2025	**2030**	**2035**	**2040**
		Reasonably Available Volume	**Reasonably Available Volume**	**Reasonably Available Volume**	**Reasonably Available Volume**
Surface water	Nacimiento Reservoir	5,482	5,482	5,482	5,482
Surface water	Salinas Reservoir and Whale Rock Reservoir	4,910	4,910	4,910	4,910
Recycled Water	City of San Luis Obispo WRRF	445	645	695	745
Other (siltation)		-500	-500	-500	-500
	Total	10,337	10,537	10,587	10,637
NOTES: Table 6-9 R (Retail).					

Chapter 5: Recycled Water

This chapter was prepared to fulfill the requirements of Section 10633 (a-g) of California Water Code Division 6, Article 2, Part 2.6 regarding the City's recycled water supply. As defined in Water Code Section 13050(n),

> *"Recycled Water" means water which as, a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefor considered a valuable resource.*

The City produces and distributes recycled water consistent with the regulatory requirements described below and therefore meets the minimum requirements to be classified as recycled water in this UWMP. These regulations, as set forth in Title 22, Division 4 of the California Code of Regulations, Wastewater Recycling Criteria (Title 22) and the conditions and requirements contained in the City's National Pollutant Discharge Elimination System (NPDES) Permit Number R3-2003-081 prescribed by the Regional Water Quality Control Board (RWQCB), establish specific criteria for treatment, distribution, and application of recycled water within the state. The RWQCB and Division of Drinking Water (DDW) have a memorandum of understanding in which DDW agrees the RWQCB will be the implementing agency responsible for permitting recycled water programs. The RWQCB Master Permit for Recycled Water is the guiding document for most of the City's requirements. In accordance with the Master Permit (WDR Order No. 03-2003-081, October 24, 2003), the City complies with the following:

1. Meter the total quantity of reclaimed water distributed daily,
2. Monitor and record chlorine residual concentration at a point after the final chlorine contact basin,
3. Provide guidance to recycled water users including a user manual and other guidance as needed,
4. Provide instruction to all City field staff to report incidents of unauthorized daytime irrigation activity or runoff,
5. Cooperate with County Environmental Department of Health Services to ensure backflow devices are present, tested and repaired or replaced if found defective,
6. Inspect the operation of reuse sites,
7. Perform cross connection testing,
8. Conduct site supervisor training and quarterly interviews to verify system operation, and
9. Quarterly review of monthly meter readings with follow-up on change in patterns of use.

The City also complies with minimum daily average discharge requirements from the Water Resource Recovery Facility (WRRF) to San Luis Obispo Creek for protection of downstream fish habitat as required by National Oceanic Atmospheric Association, National Marine Fisheries Service (NOAA NMFS).

5.1 WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

The City's wastewater collection system serves residential, commercial and industrial customers within the city limits. The City also provides service to Cal Poly State University and the County of San Luis Obispo Airport. The City's WRRF is located on Prado Road, adjacent to U.S. 101 in the southern portion of the City. The design flow rate at the WRRF is 5.1 million gallons per day (MGD), with a 2020 average daily flow of 2.9 MGD. The WRRF discharges to San Luis Obispo Creek. An upgrade is underway at the WRRF to expand the design flow rate to 5.4 MGD. That project is scheduled to be complete in 2023.

The City's Water Reuse Project, which included improvements at the WRRF and the construction of eight miles of recycled water distribution system, was completed in October of 2006. The recycled water pump station was designed to provide up to 1,750 gallons per minute (gpm) of recycled water at a pressure of approximately 130 pounds per square inch (psi). Maximum design capacity is approximately 2.5 MGD. The distribution system was designed to serve the City through one pressure zone. Recycled water storage is provided by one-600,000 gallon underground storage tank located at the WRRF. The existing recycled water pump station was designed to accommodate future expansion with space for two additional pumps at the WRRF. The upgrade will enable the City to consider potable reuse in the future. Potable reuse is discussed more in section 5.7 of this Chapter.

The City's recycled water distribution system extends to the east and west from the WRRF in the southern portion of the City. The distribution system was designed to supply irrigation water to several existing City parks, the City's Laguna Lake Golf Course, a middle school, and future development areas. Recycled water is provided to Caltrans from a metered connection near the WRRF, which is adjacent to U.S. Highway 101. Caltrans utilizes recycled water to irrigate landscape areas along the entire highway corridor through the City, which was previously supplied with potable water. Annual usage for 2016 through 2020 is provided in Table 23.

The City's WRRF produced over 3,000 acre-feet of disinfected tertiary-treated effluent in 2020. The City is required to maintain a minimum average daily release, year-round, of treated effluent to San Luis Obispo Creek at a rate of 2.5 cubic feet per second (cfs), or approximately 1.6 mgd, to provide a flow volume adequate to support habitat for anadromous fish species within San Luis Obispo Creek. This rate totals a minimum of 1,807 acre-feet per year of creek discharge. The City monitors the release of effluent through an effluent meter at the WRRF. The balance, approximately 1,250 acre-feet in 2020, makes up the City's available recycled water resource (See Table 24).

TABLE 24: Recycled Water Usage, 2016-2020

Year	Usage (in acre-feet)
2016	193.24
2017	239.60
2018	219.44
2019	215.26
2020	244.85

Source: City of San Luis Obispo Utilities Department, 2021.

5.2 CURRENT RECYCLED WATER USE

In 2020, recycled water was delivered to over 50 metered locations in the City for landscape irrigation. Additional sites will continue to be connected to the recycled water distribution system with new development in the City. Other notable recycled water demand figures:

- ***Average Daily Demand*** in July, August, and September 2020 was over 342,000 gallons.
- ***Peak Daily Demand*** was over 619,833 gallons on August 25, 2020.
- ***Peak Monthly Demand*** was over 11.5 million gallons during August 2020.

The City began issuing annual construction water permits in July 2009. During the 2019-20 fiscal year over 20 construction water permits were sold. Permit holders have access to an unlimited supply of recycled water for dust control and compaction on construction sites in the City. The City has metered wharf head hydrant filling stations on the recycled water distribution system, at the City's Corporation Yard, and within the WRRF.

TABLE 25: 2020 Influent Flow and Recycled Water Availability

Average Influent Flow to WRF		Treated Effluent Produced (AFY)	Minimum Average Daily Creek Release (MGD)[1]	Minimum Annual Creek Release (AFY)	Average Daily Recycled Water Availability (MGD)	Annual Recycled Water Availability (AFY) [1]
2020 Average Flow	2.9 mgd	3,248	1.6129	1,807	1.28	1,411
Future Flow at WRRF Design Capacity	5.4 mgd	5,966	1.6129	1,807	3.79	4,159

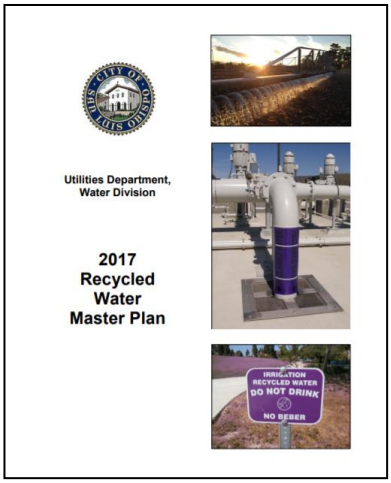
NOTES:

1. 2020 data was derived from WRRF average monthly influent data. Future annual recycled water volume is based on the design capacity of the WRRF of 5.4 mgd and is not an indication of actual volumes of available recycled water. The City's WRRF upgrade project is currently under construction in 2021.

Source: City of San Luis Obispo Utilities Department, 2021.

5.3 FUTURE SYSTEM EXPANSION

This section discusses the City's 2017 *Recycled Water Master Plan* (*2017 Master Plan*) including the potential for future expansion of the City's recycled water system, and projected recycled water usage in 2025, 2030, 2035, and 2040. The *2017 Master Plan* is part of a comprehensive strategy to efficiently manage the City's water resources. The scope included the following:



1. Plan for the strategic and beneficial use of recycled water, including the potential for future potable reuse.
2. Analyze recycled water production capability in the short- and long-term, ensuring the Master Plan reflects current wastewater generation rates.
3. Understand the City's expected growth patterns and recycled water demand.
4. Develop a hydraulic model for the recycled water distribution system that can be utilized for future infrastructure analysis.
5. Analyze the available recycled water supply, including surplus supply.
6. Confirm the long-term extent of the Master Plan area.
7. Provide a plan for incremental expansion of the recycled water distribution system.
8. Prioritize future retrofit opportunities based on defined criteria.
9. Identify future storage needs based on future peak day demand.
10. Evaluate infrastructure improvements needed to reach new customers and a prioritized Capital Improvement Project (CIP).

The *2017 Master Plan* covers the planning period to the year 2035 consistent with development projections in the City's *General Plan*. In Table 4 of the *2017 Master Plan*, the City estimated that demand existed for approximately 791 acre-feet of recycled water annually. This estimate includes serving approximately 400 AFY of recycled water for landscape irrigation to the Orcutt, Margarita, and Airport, San Luis Ranch, Avila Ranch, and Froom Ranch areas (some sites are actively using or under construction in 2021), as well as medium- and high-priority retrofits (63 AFY and 89 AFY, respectively) of existing irrigation systems to use recycled water.

Projected recycled water use for 2025 through 2040 is provided in Table 23. Table 24 revisits estimates made in the 2015 UWMP for 2020 and actual 2020 recycled water deliveries.

TABLE 26: Potential Future Recycled Water Use

Beneficial Use Type	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040
Landscape irrigation (excludes golf courses)	Irrigation at parks, school, medians, multi-family housing sites, etc.	Tertiary	208	410	610	660	710
Golf course irrigation	Laguna Lake Golf Course	Tertiary	9	10	10	10	10
Commercial use	Irrigation at commercial sites	Tertiary	0	0	0	0	0
Other: Construction Water	Construction Water Permit program	Tertiary	28	25	25	25	25
		Total:	**245**	**445**	**645**	**695**	**745**

NOTES:
1. Water volumes are in acre-feet per year.
2. Department of Water Resources, Table 6-4.
3. Projected recycled water usage for 2025 to 2040 is based on the City's knowledge of planned projects identified in the City's General Plan Land Use Element to be served with recycled water (including the Margarita, Orcutt, Airport, Avila Ranch, San Luis Ranch, and Froom Ranch areas).

Source: City of San Luis Obispo Utilities Department, 2021.

5.4 RECYCLED WATER PROGRAM INCENTIVES

In 2021, the City's metered rate charged for recycled water is 90 percent of the potable water rate. An annual Construction Water Permit is available to contractors for $1,260 for use on construction projects within the City.

TABLE 27: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual Deliveries

Use Type	2015 Projection for 2020[1]	2020 Actual Use
Agricultural irrigation	0	0
Landscape irrigation (excludes golf courses)[2]	135	208
Golf course irrigation	15	9
Commercial use[3]	30	0
Other: Construction Water	20	28
Total	**200**	**245**

NOTES:
1. Projection for 2020 identified in the City's 2015 UWMP.
2. "Landscape irrigation" includes irrigation at commercial plazas and parking lot areas, parks, schools, medians and streetscape, and common area landscape with residential homeowners associations.
3. For the 2020 UWMP, "commercial use" is interpreted as recycled water use interior to a dual plumbed commercial building.
4. Water volumes are in acre-feet per year.
5. Department of Water Resources, Table 6-5 (R).

Source: City of San Luis Obispo Utilities Department, 2021.

The City adopted a mandatory use ordinance for recycled water in 2004. The policy, codified in the Municipal Code as Chapter 13.24, allows the City to require the use of recycled water on parcels when considered feasible. The code language is as follows:

> ***13.24.010 Statement of Policy***
> *When in the judgment of the city, reclaimed water service can be feasibly provided to a particular parcel for particular uses, the utilities director shall require the use of reclaimed water in lieu of potable water for those uses. As used herein, the term "feasible" means reclaimed water is available for delivery to the property in compliance with all applicable federal, state, and local laws, ordinances and regulations and such reclaimed water can be delivered to the property at an overall cost to the user which does not exceed the overall cost of potable water service (Ord. 1403 § 1,2001).*

For areas within the recycled water expansion area that are not subject to the mandatory use ordinance defined above, funding mechanisms or incentives may be required to achieve user site retrofits.

5.5 SEASONAL SURPLUS

The City has identified a "seasonal surplus" of recycled water available in excess of required discharge to San Luis Obispo Creek (1.6129 million gallons per day or mgd as required by the National Oceanic and Atmosopheric Association, National Marine Fisheries Service in 2005) and recycled water for landscape irrigation. The primary use of recycled water in the City is for landsacpe irrigation with 73 percent of the City's recycled water demand occuring from May through October. During 2020, 245 acre feet of recycled water was used for landscape irrigation and construction water. As only a limited amount of landscape irrigation takes place from November to April (seasonal off-peak period), more than 2 mgd of recycled water

is available during the seasonal off-peak period. Related to this seasonal surplus, the following goal and program was added to the *General Plan*, *Water and Wastewater Management Element* in 2010:

Goal A7.1.2 *Maximize the use of the City's available recycled water supply for approved uses.*

Program A 7.3.4 *Consider the potential to deliver available recycled water supplies to customers outside the city limits, including analysis of policy issues, technical concerns, and cost recovery, provided it is found to be consistent with the General Plan.*

With the update to the *General Plan*, *Land Use Element* in 2014, Policy 1.13.2 was added. This policy was broadened in 2020 to also include non-potable water:

1.13.2. Recycled Water
Provision of non-potable or recycled water outside of City limits may only be considered in compliance with Water and Wastewater Element Policy A 7.3.4 and the following findings:

A. Non-potable/recycled water is necessary to support continued agricultural operations.
B. Provision of non-potable/recycled water will not be used to increase development potential of property being served.
C. Non-potable/recycled water will not be further treated to make it potable.
D. Prior to provision of non-potable/recycled water, the property to be served will record a conservation, open space, Williamson Act, or other easement instrument to maintain the area being served in agriculture and open space while non-potable/recycled water is being provided.
E. Provision of non-potable and recycled water will not impair the City's ability to maintain an adequate water supply that meets projected water demand at buildout under the General Plan including the required reliability reserve.

TABLE 28: Methods to Expand Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Mandatory Use	Ordinance adopted	2004	450 acre-feet
Sale of Seasonal Surplus	Under study	Unknown	Unknown
Recycled Water Rate Restructuring	Not currently under consideration	Not currently under consideration	Unknown
Potable Reuse	Under study	Unknown	Unknown
		Total	450 acre-feet

NOTES:
1. Department of Water Resources, Table 6-6.

Source: City of San Luis Obispo Utilities Department, 2021.

5.6 POTABLE REUSE

The construction phase for the upgrade of the WRRF is underway in 2021 to accommodate the City's buildout and maximize recycled water production. The upgrade will enable the City to consider either direct or indirect potable reuse in the future.

Direct potable reuse is the planned introduction of recycled water either directly into a public water system (treated drinking water augmentation), as defined in Section 116275 of the Health and Safety Code, or into a raw water supply immediately upstream of a water treatment plant (raw water augmentation). Direct potable reuse is a practice which is not currently occurring in California; however, Assembly Bill (AB) 574 (Water Code, Division 7, Chapter 7.3) requires the State Water Board to adopt uniform water recycling criteria for direct potable reuse through raw water augmentation on or before December 31, 2023.

Additionally, the State Water Board Division of Drinking Water (DDW) published a Proposed Framework of Regulating Direct Potable Reuse in California in 2018 and updated the Framework in 2019.

Indirect potable reuse occurs when tertiary or advanced treated wastewater augments drinking water resources. The two types of indirect potable reuse are:

- Indirect potable reuse for groundwater recharge - where recycled water recharges a groundwater basin and groundwater is later extracted from the basin.
- Reservoir water augmentation – where recycled water is added into a surface water reservoir used as a source of domestic drinking water supply.

Indirect potable reuse does not actually occur until the water is subsequently pumped from the ground or withdrawn from the reservoir, treated, and added to the drinking water distribution system. Indirect potable reuse through groundwater recharge has occurred in California since 1962. Title 22, Division 4, Chapter 3, Article 5.1 (CCR §60320 *et seq*) describes the permitting and monitoring process required to obtain a RWQCB permit for groundwater recharge.

Title 22, Division 4, Chapter 3, Article 5.3 (CCR §60320 *et seq*) describes the regulations governing reservoir augmentation. These regulations set requirements for the quality of treated recycled water that can be added to an augmented reservoir, the percentage of recycled water that can be added, and the required residence time before treatment at a drinking water facility. Like groundwater recharge with recycled water, reservoir water augmentation would only occur with a permit and monitoring requirements from the RWQCB.

5.7 ENERGY USE

This section describes the City's energy usage to produce and deliver recycled water to the community. Energy consumption data was acquired from PG&E for the meters associated with the recycled water process. As shown in Table 29, the process includes energy use for each of the following:

- Wastewater collection conveyance,
- Wastewater treatment,
- Discharge and recycled water distribution.

The City's wastewater collection system includes 138 miles of gravity sewer line ranging from six-inch to 48-inch pipe. The system includes 2.4 miles of force main ranging from four- to 16-inch pipe. Wastewater generally flows by gravity to the City's WRRF for treatment. Seven sewer lift stations (Airport, Laguna, Margarita, Prefumo, Silver City, Tank Farm) serve areas in the southern portion of the City down gradient from the WRRF. One lift station (Foothill) is located in the northern portion of the City serving approximately 70 parcels. All lift stations are monitored/controlled with a SCADA system.

For 2020, influent flow is established from both metered flow and an estimation of unmetered internal recycled flow. Effluent flow is a calculation of multiple flow meters. The City's WRRF is undergoing a comprehensive facility upgrade to address regulatory compliance and replace aging infrastructure. More accurate data will be available in the future when the upgrade is complete.

The City's recycled water pump station was designed to provide up to 1,750 gallons per minute (gpm) of recycled water at a pressure of approximately 130 pounds per square inch (psi). Maximum design capacity is approximately 2.5 MGD. The distribution system was designed to serve the City through one pressure zone. Recycled water storage is provided by one- 600,000 gallon underground storage tank located at the WRRF. The existing recycled water pump station was designed to accommodate future expansion with space for two additional pumps at the WRRF.

TABLE 29: 2020 Energy Usage for Recycled Water Management

	Recycled Water Management Process			
	Wastewater Collection	Wastewater Treatment	Discharge / Recycled Water Distribution	Total
Volume of Wastewater Entering Process (acre-feet)	3,272	3,272	3,449	3,272
Wastewater Energy Consumed (kWh)	0	3,932,217	0	3,932,217
Wastewater Energy Intensity (kWh/volume)	0.0	1,202	0.0	1,202
Volume of Recycled Water Entering Process (volume units selected above)	237	237	250	250
Recycled Water Energy Consumed (kWh)	0	0	301,649	301,649
Recycled Water Energy Intensity (kWh/volume)	0.0	0.0	1,206	1,206

SOURCE: City of San Luis Obispo, Utilities Department, 2021.

5.7 Required UWMP Standardized Tables:

Wastewater Collected Within Service Area in 2020						
100	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
100	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated?**	**Volume of Wastewater Collected in 2020**	**Name of Wastewater Treatment Agency Receiving Collected Wastewater**	**Treatment Plant Name**	**Is WWTP Located Within UWMP Area?**	**Is WWTP Operation Contracted to a Third Party?**
City of San Luis Obispo	Metered	3,248	City of San Luis Obispo	City of San Luis Obispo	Yes	No
Total Wastewater Collected from Service Area in 2020:		3,248				
NOTES: Table 6-2 R.						

Wastewater Treatment and Discharge Within Service Area in 2020										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2020 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
City of San Luis Obispo Water Resource Recovery Facility	San Luis Obispo Creek	San Luis Obispo Creek outfall	R3-2014-0033	River or creek outfall	Yes	Tertiary	3,248	3,003	245	0
						Total	3,248	3,003	245	0
NOTES: Table 6-3 R.										

Wastewater Treatment and Discharge Within Service Area in 2020							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2020**	**2025**	**2030**	**2035**	**2040**
Agricultural irrigation	None		0	0	0	0	0
Landscape irrigation (excludes golf courses)	Irrigation at parks, school, medians, etc.	Tertiary	208	410	610	660	710
Golf course irrigation	Laguna Lake Golf Course	Tertiary	9	10	10	10	10
Commercial use	Irrigation at commercial sites	Tertiary	0	0	0	0	0
Other: Construction Water	Construction Water Permit program	Tertiary	28	25	25	25	25
		Total:	**245**	**445**	**645**	**695**	**745**
NOTES: Table 6-4 R.							

2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
Use Type	**2015 Projection for 2020**	**2020 Actual Use**
Agricultural irrigation	0	0
Landscape irrigation (excludes golf courses)	135	208
Golf course irrigation	15	9
Commercial use	30	0
Other: Construction Water	20	28
Total	**200**	**245**
NOTES: Table 6-5 R.		

Retail: Methods to Expand Future Recycled Water Use			
Page 5-3, 5-4, 5-5, 5-6	Provide page location of narrative in UWMP		
Name of Action	**Description**	**Planned Implementation Year**	**Expected Increase in Recycled Water Use**
Mandatory Use	Ordinance adopted	2004	500 acre-feet
Sale of Seasonal Surplus	Under study	Unknown	Unknown
Recycled Water Rate Restructuring	Not currently under consideration	Not currently under consideration	Unknown
Potable Reuse	Under study	Unknown	Unknown
		Total	**500**
NOTES: Table 6-6 R.			

Expected Future Water Supply Projects or Programs	
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.
Page 5-6	Provide page location of narrative in the UWMP
NOTES: Table 6-7 R.	

Chapter 6: Water Supply Reliability & Drought Risk Assessment

Chapter 4 discussed how the City uses multiple water sources to meet projected short- and long-term potable water demands. This chapter focuses on the reliability of those sources. This chapter also discusses the projected supplies available during a single dry water year and during multiple-dry water years to assess overall drought risk. As required by Water Code Section 10635 for the 2020 UWMP, this chapter provides an assessment of water supplies and water uses under an assumed drought period that lasts five consecutive years.

Chapter 7 will discuss the water efficiency and demand management measures implemented by the City to maintain long-term water supply reliability. Actions that would be undertaken during a short-term water supply emergency, such as drought or a catastrophic supply interruption, are addressed in the City's 2020 Water Shortage Contingency Plan (available under separate cover).

6.1 SALINAS AND WHALE ROCK RESERVOIRS

Salinas and Whale Rock Reservoirs

- ✓ Potable Water Supplies
- ✓ Located in Different Watersheds
- ✓ Coordinated Operation
- ✓ 4,910 acre-feet Annually
- ✓ Reliable during 5-Year Drought

For Salinas and Whale Rock Reservoirs, the City uses a computer model to simulate the combined operation of these two water supply sources over a historical period to determine the "safe annual yield" or the quantity of water which can be safely withdrawn every year without causing impacts to long- or short-term water availability, to accommodate City water demand.

Salinas Reservoir and Whale Rock Reservoir are in geographically and climatologically distinct watersheds. Salinas Reservoir has a higher evaporation rate and larger watershed than Whale Rock Reservoir, but smaller storage capacity -- about 60 percent of the storage capacity of Whale Rock Reservoir. Whale Rock Reservoir has a smaller watershed, as compared to Salinas Reservoir, but greater storage capacity. Whale Rock experiences a lower evaporation rate as it is close to ocean. Coordinated operation of the two reservoirs results in maximization of safe annual yield. This approach increases the long-term water supply from these two sources when compared to operation of the two reservoirs independently.

General Plan, Water and Wastewater Management Element, policy A3.3.2 states:

> *The City will update the safe annual yield computer model for Salinas and Whale Rock Reservoirs following severe drought periods to determine if any changes are necessary to the safe annual yield amount.*

In 2018 to understand the impacts of climate change, the City updated to the safe annual yield model following the addition of data from the most recent drought that ended in 2016 and analysis of three independent climate change models by the U.S. Environmental Protection Agency (EPA), San Luis Obispo Council of Governments (SLOCOG) as part of the 2014 Regional Transportation Plan, and Nature Communications.

The EPA climate assessment tool (Climate Resilience Evaluation and Awareness or "CREAT") was created by the federal agency monitoring climate change. Changes identified in CREAT were derived from an evaluation of 38 global climate models recognized by the Intergovernmental Panel on Climate Change (IPCC). The SLOCOG model was recommended by City Council as it reflected a summary of work previously performed to examine impacts in the local area and is focused on three IPCC global climate models. The work by Nature Communications was selected as it is a preeminent peer-reviewed scientific publication.

Each climate projection was applied to the City's historical dataset for Whale Rock and Salinas reservoir's inflow, precipitation, and evaporation. The City's 2018 model was then used to calculate a revised safe annual yield assuming these conditions had prevailed during the historical period of record. Complete information on the analysis is included in the Technical Memo provided in Appendix V.

On May 15, 2018, the City Council adopted Resolution 10893 amending the General Plan, Water and Wastewater Management Element to reflect a 2,030-acre-foot reduction in the safe annual yield, reducing the available volume from 6,940 acre-feet annually to 4,910 acre-feet annually from the coordinated operation of Salinas and Whale Rock Reservoirs. This reduction in safe annual yield results in a reduction of 2,030 acre-feet of water availability to the community annually.

6.2 RECYCLED WATER

With a 2020 average influent flow of 2.9 million gallons per day, the City's WRRF produces over 3,200 acre-feet of disinfected tertiary-treated effluent per year. A minimum of 1,807 acre-feet is discharged to San Luis Obispo Creek annually to provide satisfactory habitat and flow volume for fish species (steelhead trout) within the Creek environment. The balance makes up the City's available recycled water resource which is available for approved uses.

A consistent flow of wastewater to the WRRF enables the City to produce a volume of recycled water that exceeds identified seasonal demand for landscape irrigation. The distribution/delivery of recycled water is via a pump station located within the WRRF. The pump station does not have backup power during a power outage. Power outage events have been infrequent. Therefore, the City's recycled water supply is considered a reliable water supply. Additional information on the City's recycled water supply is provided in Chapter 5.

Recycled Water Supply

- ✓ Tertiary Treated Wastewater
- ✓ Over 1,000 acre-feet Annually
- ✓ Reliable during 5-Year Drought

6.3 NACIMIENTO RESERVOIR

In 2002, the San Luis Obispo County Flood Control and Water Conservation District (District) retained the services of Boyle Engineering Corporation to assess the ability of the Nacimiento Reservoir to reliably provide the District's entitlement of 17,500 AFY to the District contractors. As part of the analysis, the study took into account the agreement with the Monterey County Water Resources Agency (MCWRA), which owns and operates the Nacimiento Reservoir facilities, that stipulates that the District entitlement through operational procedures will be "preserved" in the reservoir due to MCWRA being contractually obligated to maintain a "minimum pool" for the benefit of the District. This enables the District to maintain deliveries to the participating agencies even when reservoir levels are low, meaning that unless the water storage capacity drops below the "dead pool" of the reservoir, the District's entitlement will always be available. The 2002 study took into account the following factors:

- Short-term power outages
- Delivery facility failure
- Energy costs
- Drought
- Contamination of supply
- Environmental restrictions

Upon completion of the analysis relating to drought conditions, the 2002 study summarized that even though there have been several periods of drought, both short-term and long-term, the total annual entitlement for the District could be delivered consistently, even in periods of extended drought.

Nacimiento Reservoir

- ✓ Potable Water Supply
- ✓ 5,482 acre-feet Annually
- ✓ Contractual Supply
- ✓ Reliable during 5-Year Drought

During the worst-case drought on record in the region (2011 to 2015), Nacimiento Reservoir remained a resilient water supply capable of providing a consistent and reliable source of water for San Luis Obispo County, which includes the City's contractual amount of 5,482 acre-feet per year. To confirm the prior analysis with more recent data, the City reviewed rainfall and inflow data from 2013 which was the driest year on record. Over that year, Nacimiento Reservoir received 35,000 acre-feet of inflow. Though this is significantly below the average inflow into the reservoir, the District's entitlement could still be met if inflow remained at this level.

Interlake Tunnel Project

An Interlake Tunnel Project has been proposed by Monterey County to create a connection between Nacimiento Reservoir and Lake San Antonio. The goal of the project is to redirect water from Nacimiento Reservoir into San Antonio Lake to fill the excess capacity typically available in the lake. While the Interlake Tunnel Project has the potential to increase water storage up to 60,000 acre-feet per year in Lake San Antonio, it is unclear if the diversion from Lake Nacimiento would result in any positive or negative changes in reliability to water availability of the County's 17,500 ace-feet per year entitlement. Lake San Antonio and Nacimiento Reservoir both discharge water to the Nacimiento River to support agriculture within the Salinas Valley, increasing storage within Lake San Antonio by diverting excess water from Nacimiento Reservoir during periods in which it was at full capacity could offer the opportunity to reduce downstream discharges from Nacimiento Reservoir during dry periods. Increased operational flexibility of the two reservoirs, if strategically implemented, could benefit all involved parties. The City will be closely monitoring the project to ensure its water rights are protected.

According to the Monterey County Water Resource Agency website in 2021, the Interlake Tunnel *"requires a detailed engineering analysis; but is generally planned to consist of an 11,000 foot gravity flow tunnel with an intake structure in Nacimiento Reservoir and an exit structure in San Antonio."*

6.4 GROUNDWATER

Consistent with Policy A 3.2.3 from the City's General Plan, Water and Wastewater Management Element, the City will continue to use groundwater for domestic purposes when available. As described in Chapter 4, groundwater may also be utilized by the City as a supplemental supply during a water shortage emergency. The City has utilized a number of wells in the past, with most in the southern portion of the City, especially during the drought period in the late 1980's and early 1990's when up to 50 percent of the City's water demand was met utilizing groundwater.

Groundwater

- ✓ Potable Water Supply
- ✓ Wells offline in 2020
- ✓ Available during 5-Year Drought

A study completed for the City in 2004 determined that up to 1,390 acre-feet of groundwater could be utilized annually. However, by the 2000 to 2009 period, the City's ten-year average reduced to 156 acre-feet of groundwater use annually as the groundwater in the area of higher production wells was contaminated with nitrates and tetrachloroethylene (PCE). Though the City suspended using groundwater for potable purposes in April 2015, groundwater wells remain in an operable, stand-by position should the use of groundwater be needed.

In July of 2020, the City received a nearly $2 million planning-phase grant, funded through Proposition 1, to study PCE contamination of the groundwater basin. A detailed understanding of the extent of PCE contamination and remediation options are necessary steps in fully utilizing the City's groundwater pumping opportunities. The planning phase work will continue into 2022. The City is planning to apply for an implementation-phase grant to fund necessary capital improvements to put an additional groundwater well into service. This work enhances the City's ability to extract, treat, and utilize groundwater to meet a portion of the City's potable water demand.

TABLE 30: Water Quality Current and Projected Water Supply Impacts

Water Source	Water Quality
Nacimiento Reservoir	Drinking Water
Salinas Reservoir	Drinking Water
Whale Rock Reservoir	Drinking Water
Groundwater	Drinking Water
Recycled Water	Title 22, Tertiary Treated Recycled Water

Source: City of San Luis Obispo Utilities Department, 2021.

6.5 WATER QUALITY

A summary of the water quality from the City's various water sources is provided in Table 29. The City has no known water quality constraints that would make a water source unavailable for potable water use. The City's 2020 Annual Water Quality Report is provided in Appendix V.

6.6 WATER SUPPLY RELIABILITY ANALYSIS / DROUGHT RISK ASSESSMENT

A regulatory requirement of the UWMP is to perform a water supply reliability analysis applying different worst-case drought years according to stringent guidelines set forth in the UWMP plan documentation. The following tables provide data on the reliability of the City's water supply during normal, single-dry, and a severe drought period lasting five consecutive years. The City remains confident in the reliability of its multi-source water supply portfolio.

Table 30 lists the years which correlate to the guidelines for the specific water year type and are based on rainfall information. The City's average water year was determined to be 2020 based on review and update of the City's average rainfall total. The City's single dry water year was determined to be 2013 as the rainfall total that year was the lowest on record. The City's multiple dry year scenario was determined to be 2011 to 2015 as the combined rainfall total for those five years was the lowest on record.

The City makes projections of future water demand using a conservative per capita potable water use rate of 117 gpcd which is the City's SB X7-7 target, actual water use within the community is currently 94 gpcd and not anticipated to increase beyond minor year-to-year variations over time. Table 31 summarizes the results of that analysis which, based on the City's available water supplies and estimates of future water demand, indicates the City's water resources are reliable during extended drought periods.

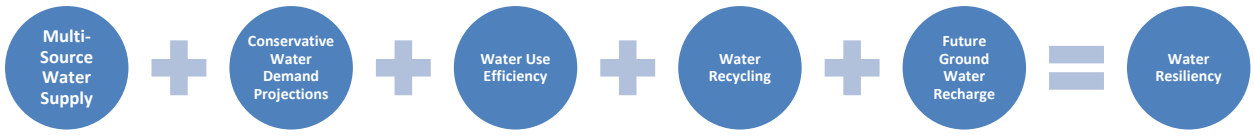
TABLE 31: Basis of Water Year Data

Year Type	Base Year(s)	Volume Available (in AFY)
Average Year	2020	10,143
Single-Dry Year	2013	10,143
Consecutive-Dry Years, 1st year	2011	10,143
Consecutive -Dry Years, 2nd year	2012	10,143
Consecutive -Dry Years, 3rd year	2013	10,143
Consecutive -Dry Years, 4th year	2014	10,143
Consecutive -Dry Years, 5th year	2015	10,143

NOTES

1. Department of Water Resources, Table 7-1.
2. Volume available includes the City's contractual supply to Nacimiento Reservoir, Safe Annual Yield from Salinas and Whale Rock Reservoirs, and recycled water.

Source: City of San Luis Obispo Utilities Department, 2021.



Formula for Water Resiliency

TABLE 32: Supply and Demand Comparison - Normal Year

	2020 (actual)	2025	2030	2035	2040
Supply totals	10,143	10,337	10,537	10,587	10,637
Demand totals	4,817	7,272	7,713	8,191	8,624
Difference	5,326	3,166	2,824	2,396	2,013

NOTES
1. Department of Water Resources, Table 7-2.
2. Units are in acre-feet per year.
3. Water demand projections for 2025 through 2040 were derived using 117 gpcd and population growth levels identified in the City's General Plan Land Use Element. Both factors are higher than the City's 2020 population and gpcd (92 gpcd).
4. Supply total includes the City's contractual supply to Nacimiento Reservoir, Safe Annual Yield from Salinas and Whale Rock Reservoirs, and the projected increase in recycled water deliveries.

Source: City of San Luis Obispo Utilities Department, 2021.

Table 32 and Table 33 summarize the City's water supplies in a single dry year and a multiple dry year scenario. To address Water Code Section 10635 (b), Table 34 includes available water supply and demand estimate for 2021 through 2025. The water demand projections were derived using 117 gpcd and on population growth to levels identified in the City's General Plan. Both of these factors are higher than current gpcd and the City's current population. As the City does not project a supply shortfall due to conservative water planning, the City does not anticipate a water shortage necessitating any water supply augmentation or requiring water use restrictions.

TABLE 33: Single Dry Year Supply and Demand Comparison

	2020 (actual)	2025	2030	2035	2040
Supply totals	10,143	10,337	10,537	10,587	10,637
Demand totals	4,817	7,272	7,713	8,191	8,624
Difference	5,326	3,166	2,824	2,396	2,013

NOTES
1. Department of Water Resources, Table 7-3.
2. Units are in acre-feet per year.
3. Water demand projections for 2025 through 2040 were derived using 117 gpcd and population growth levels identified in the City's General Plan Land Use Element. Both factors are higher than the City's 2020 population and gpcd (92 gpcd).
4. Supply total includes the City's contractual supply to Nacimiento Reservoir, Safe Annual Yield from Salinas and Whale Rock Reservoirs, and the projected increase in recycled water deliveries.

Source: City of San Luis Obispo Utilities Department, 2021.

Accounting for Siltation

Siltation at reservoirs is a natural occurrence that can reduce the storage capacity over long periods. The reduction of available storage reduces the safe annual yield of the reservoirs. Siltation at reservoirs varies depending on factors such as rainfall intensity and watershed management practices. Climate change could have an impact on future water availability in the form of increased siltation in reservoirs resulting from wildland fires which could affect the safe annual yield of the City's reservoirs.

Numerous studies and reports addressing siltation at Salinas Reservoir have been completed. The Whale Rock Reservoir Bathymetric Survey and Volumetric Study was completed in May 2013.

The City has policies and programs in the WWME to anticipate the loss of storage at Whale Rock and Salinas Reservoirs. WWME Policy A 4.2.2 relates to Accounting for Future Siltation. The policy states:

> *The City will account for estimated safe annual yield losses at Salinas and Whale Rock Reservoirs through 2060 by deducting 500 acre-feet of available water supplies to account for these future losses. The siltation rate will be updated as information becomes available from subsequent siltation analyses.*

Accounting for siltation of reservoirs contributes to the overall reliability of the City's water supply portfolio as it ensures that the City is planning for this occurrence.

TABLE 34: Multiple Dry Year Supply and Demand Comparison

		2020 (actual)	2025	2030	2035	2040
First year	Supply totals	10,143	10,337	10,537	10,587	10,637
	Demand totals	4,817	7,272	7,713	8,191	8,624
	Difference	5,326	3,166	2,824	2,396	2,013
Second year	Supply totals	10,143	10,337	10,537	10,587	10,637
	Demand totals	4,817	7,272	7,713	8,191	8,624
	Difference	5,326	3,166	2,824	2,396	2,013
Third year	Supply totals	10,143	10,337	10,537	10,587	10,637
	Demand totals	4,817	7,272	7,713	8,191	8,624
	Difference	5,326	3,166	2,824	2,396	2,013
Fourth year	Supply totals	10,143	10,337	10,537	10,587	10,637
	Demand totals	4,817	7,272	7,713	8,191	8,624
	Difference	5,326	3,166	2,824	2,396	2,013
Fifth year	Supply totals	10,143	10,337	10,537	10,587	10,637
	Demand totals	4,817	7,272	7,713	8,191	8,624
	Difference	5,326	3,166	2,824	2,396	2,013

NOTES

1. Department of Water Resources, Table 7-4.
2. The urban water targets determined in this UWMP were considered when developing the 2020 water demands included in this table.
3. Water demand projections for 2025 through 2040 were derived using 117 gpcd and population growth levels identified in the City's General Plan Land Use Element. Both factors are higher than the City's 2020 population and gpcd (92 gpcd).
4. Supply total includes the City's contractual supply to Nacimiento Reservoir, Safe Annual Yield from Salinas and Whale Rock Reservoirs, and the projected increase in recycled water deliveries.

Source: City of San Luis Obispo Utilities Department, 2021

Reliability Reserve and Secondary Water Supply

The City's WWME, includes policies to maintain a "Reliability Reserve" and "Secondary Water Supply" in an effort to reduce the impacts of a water shortage on the community. The "Reliability Reserve", identified in the City's Charter, provides a twenty percent buffer beyond the City's projected water demand at build out to account for future unforeseen or unpredictable long-term impacts to the City's available water resources such as loss of yield from an existing water supply source and impacts due to climate change. The City's Secondary Water Supply is the amount needed to meet peak water demand periods or short-term loss of City water supply sources. The City's "Secondary Water Supply" is identified as any water supply resources above those needed to meet the Primary Water Supply and Reliability Reserve.

Water and Wastewater Management Element Policies

Policy A 5.2.3 Reliability Reserve. *The City will establish a reliability reserve that is 20-percent of the water use rate established in Policy A 5.2.1 multiplied by the current population. The water supply designated as the reliability reserve may not be used to serve future development.*

Policy A 5.2.4 Secondary Water Supply. *After accounting for primary water supply and a reliability reserve, any remaining water supplies shall be utilized for meeting short-term water supply shortages or peak water demands.*

TABLE 35: Five Year Drought Risk Assessment (2021-2025)

2021	Total
Total Water Use	6,276
Total Supplies	10,177
Surplus/Shortfall w/o/ WSCP Action	3,901
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,901
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	6,528
Total Supplies	10,217
Surplus/Shortfall w/o/ WSCP Action	3,689
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,689
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	6,593
Total Supplies	10,257
Surplus/Shortfall w/o/ WSCP Action	3,664
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,664
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	6,659
Total Supplies	10,297
Surplus/Shortfall w/o/ WSCP Action	3,638
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,638
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	6,725
Total Supplies	10,337
Surplus/Shortfall w/o/ WSCP Action	3,612
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,612
Resulting % Use Reduction from WSCP action	0%

NOTES

1. Department of Water Resources, Table 7-5.
2. Water demand projections for 2025 through 2040 were derived using 117 gpcd and population growth levels identified in the City's General Plan Land Use Element. Both factors are higher than the City's 2020 population and gpcd (92 gpcd).
3. Supply total includes the City's contractual supply to Nacimiento Reservoir, Safe Annual Yield from Salinas and Whale Rock Reservoirs, and the projected increase in recycled water deliveries.

Source: City of San Luis Obispo Utilities Department, 2021.

6.7 PRECAUTIONARY POWER OUTAGES

In an effort to protect communities from wildfire, Pacific Gas & Electric (PG&E) notified its municipal and private customers in 2019 of its plans to implement precautionary measures during fire season. If extreme fire danger conditions threaten a portion of the PG&E electrical system, high-risk transmission lines may be turned off, resulting in widespread power outages to San Luis Obispo County. PG&E refers to this as a Public Safety Power Shutoff (PSPS). According to PG&E, a PSPS may be necessitated by strong winds, low humidity levels, and critically dry vegetation. These outages will not be localized; and regional solutions will be limited (one city may not be able to borrow from another neighboring city needed equipment and/or resources).

In the past, the City has been able to continue to provide uninterrupted water service during short-duration power outages and when limited areas of the City are affected by outages utilizing the existing storage in the water system along with limited back-up power generation. With the potential for a PSPS, the City is working to prepare for the potential for power outages lasting up to seven days or more. The City provides water service to critical facilities such as the City's Emergency Operations Center, area hospitals, as well as the SLO County Emergency Operations Center, the Cal Poly campus, and the SLO County airport.

As the driver for the PSPS is climatic conditions which could result in the higher likelihood of catastrophic fire in the County, it is imperative that the City's water system remain operable in the event that such a fire starts.

The City has four portable generators that are mobilized as needed to various locations in the City's water conveyance system, including Pump Station A and B on the Whale Rock pipeline, and water distribution system pump stations. A permanent back-up generator is planned to be in service in 2021 at the Salinas Booster Station. A temporary back-up generator is in place at the City's Water Treatment Plant as a permanent on-site water treatment plant generator currently being designed. Back-up power is not currently planned for the Nacimiento Water Project pump stations. However, with generators available to provide water from both Whale Rock and Salinas reservoirs, staff is confident it can maintain water service during a PSPS event.

6.8 REQUIRED UWMP STANDARDIZED TABLES:

Basis of Water Year Data			
Year Type	Base Year	Available Supplies if Year Type Repeats	
		Agency may provide volume only, percent only, or both	
		Volume Available	% of Average Supply
Average Year	2020	10,143	100%
Single-Dry Year	2013	10,143	100%
Multiple-Dry Years 1st Year	2011	10,143	100%
Multiple-Dry Years 2nd Year	2012	10,143	100%
Multiple-Dry Years 3rd Year	2013	10,143	100%
Multiple-Dry Years 4th Year	2014	10,143	100%
Multiple-Dry Years 5th Year	2015	10,143	100%
NOTES: Table 7-1(R)			

Normal Year Supply and Demand Comparison				
	2025	2030	2035	2040
Supply totals (*autofill from Table 6-9)*	10,337	10,537	10,587	10,637
Demand totals *(autofill from Table 4-3)*	7,272	7,713	8,191	8,624
Difference	3,166	2,824	2,396	2,013
NOTES: Table 7-2(R)				

Single Dry Year Supply and Demand Comparison				
	2025	2030	2035	2040
Supply totals	10,337	10,537	10,587	10,637
Demand totals	7,272	7,713	8,191	8,624
Difference	3,166	2,824	2,396	2,013
NOTES: Table 7-3(R)				

Multiple Dry Years Supply and Demand Comparison					
		2025	2030	2035	2040
First year	Supply totals	10,337	10,537	10,587	10,637
	Demand totals	7,272	7,713	8,191	8,624
	Difference	3,166	2,824	2,396	2,013
Second year	Supply totals	10,337	10,537	10,587	10,637
	Demand totals	7,272	7,713	8,191	8,624
	Difference	3,166	2,824	2,396	2,013
Third year	Supply totals	10,337	10,537	10,587	10,637
	Demand totals	7,272	7,713	8,191	8,624
	Difference	3,166	2,824	2,396	2,013
Fourth year	Supply totals	10,337	10,537	10,587	10,637
	Demand totals	7,272	7,713	8,191	8,624
	Difference	3,166	2,824	2,396	2,013
Fifth year	Supply totals	10,337	10,537	10,587	10,637
	Demand totals	7,272	7,713	8,191	8,624
	Difference	3,166	2,824	2,396	2,013
NOTES: Table 7-4(R)					

Five Year Drought Risk Assessment	
2021	**Total**
Total Water Use	6,463
Total Supplies	10,147
Surplus/Shortfall w/o/ WSCP Action	3,684
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,684
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	6,528
Total Supplies	10,157
Surplus/Shortfall w/o/ WSCP Action	3,629
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,629
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	6,593
Total Supplies	10,167
Surplus/Shortfall w/o/ WSCP Action	3,574
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,574
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	6,659
Total Supplies	10,177
Surplus/Shortfall w/o/ WSCP Action	3,518
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,518
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	6,725
Total Supplies	10,187
Surplus/Shortfall w/o/ WSCP Action	3,462
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	0
WSCP – use reduction savings benefit	0
Revised Surplus/(shortfall)	3,462
Resulting % Use Reduction from WSCP action	0%
NOTES: Table 7-5(R)	

Chapter 7: Water Conservation & Demand Management Measures

7.1 HISTORY

Water conservation is an integral part of the City's overall water management strategy and was first referenced as a part of the water management policies in 1973. In 1985, the City adopted the Annual Water Operational Plan policy that established water conservation as a means of extending water supplies during projected water shortages. Many technological and philosophical changes have occurred since that time, proving that water conservation can be used for both a short-term corrective measure to address immediate water supply shortages, and as a long-term solution to water supply reliability.

Demand management measures are those **water** conservation **measures**, programs, and incentives that prevent the waste of **water** and promote the reasonable and efficient use and reuse of available supplies. Brief summaries of the City's demand management measures are provided below to provide additional detail about the City's water conservation program.

7.2 WATER CONSERVATION PROGRAM HIGHLIGHTS (2016-2020)

The Utilities Department's Water Resources section implemented the City's core water conservation programs from 2016 to 2020. Examples of successful program activities during this timeframe were:

1. Enforcement of all water conservation related municipal codes
2. Monthly site inspections of properties with suspected leaks and inefficient uses of water
3. Enforcement of the toilet retrofit upon sale program
4. Proactive enforcement of water waste prohibitions
5. Facilitation of the Utilities Department's school education contract
6. Implementation of the Utilities Department's water conservation-related public outreach and communication programs, including a quarterly newsletter, public events, and social media
7. Implementation of high-efficiency fixture giveaway program
8. No-cost residential and non-residential water use surveys, audits, and inspections
9. Implementation of conservation rebate programs (toilets & washing machines)
10. Management of the City's recycled water program
11. Use of consumption-based water rates
12. Monthly billing audits to identify and contact high water use account holders
13. Enforcement of Model Water Efficient Landscape Ordinance (MWELO)

Through the City's water conservation programs and policies, water demand over the five-year period ranged from a high of 97 gpcd in 2017 to a low of 88 gpcd in 2016, as shown in Figure 5. Annual per capita water use for that period was well below the City's SBX7-7 compliance year goal of 117 gpcd. With the continuation of the demand management measures listed above, the City anticipates ongoing compliance with state conservation mandates into the future.

FIGURE 5: 2016 to 2020 Annual Per Capita Water Demand Compared to 2020 Target

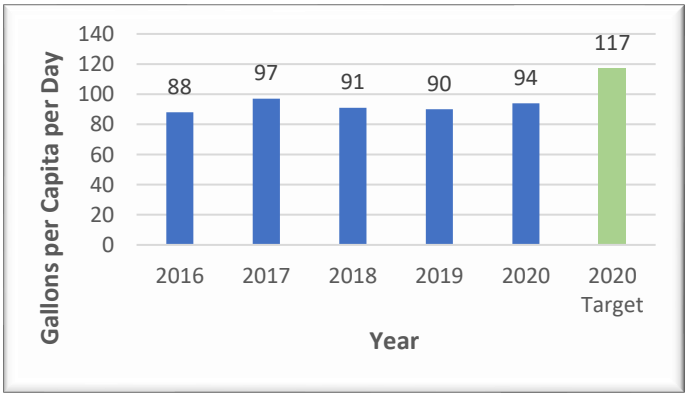


TABLE 36: Demand Management Measures/Conservation Program Implementation Schedule

Weekly / Ongoing	Monthly	Annually	Other Frequency
Enforcement of all water conservation related municipal codes	Monthly billing audits to identify and contact high water use account holders	Water Resource Status Report	Social media use (Facebook, Twitter, Instagram) and streaming videos
Site inspections of properties with suspected leaks and inefficient uses of water	High water use account holders outreach	Water loss audit	Billing inserts / Direct mail
Update reservoir level data on the City's webpage	Monthly urban water supplier reporting to the State	Booth at annual public events	Use of acoustic correlation equipment to detect water leaks
Review of planning submittals for compliance with water efficient landscape ordinance	Booth at Thursday downtown Farmers Market (26 times a year)	Funding for SLO Waterwise Landscaping website	Communication with local news and print media for featured stories and articles
No-cost residential and non-residential water use surveys, audits, and inspections		School education programs (K-12)	Meetings with local homeowners' associations and local businesses
Water supply and demand modelling	**Quarterly**	Water meter performance testing	Enforcement of the toilet retrofit upon sale program
Implementation of volumetric/consumption-based water rates	Communication with Site Supervisors and Recycled Water Reporting	Calibrate meters at the Water Treatment Plant	Maintenance of Drought/water conservation portal on City website
Management of the City's recycled water program	Publication of Resource Newsletter		

7.3 STATE AND LOCAL EMERGENCY DROUGHT DECLARATION

In response to the State's emergency drought declaration and restrictions on water use, on September 16, 2014 the City Council adopted a resolution limiting outdoor irrigation of ornamental landscape or turf with potable water to three days a week. On June 2, 2015, the City Council adopted resolutions declaring a local drought emergency and requiring the deferral of new landscape installation or the use of modified landscape plans during the drought emergency. On June 16, 2015, the City Council adopted a resolution further limiting outdoor irrigation of ornamental landscaping or turf with potable water to two days a week. These measures remained in place through 2016.

A 2016 Executive Order (B-37-16), approved by Governor Brown on May 9, 2016, bolstered California's drought resilience and preparedness by establishing longer-term water conservation measures that include permanent monthly water use reporting, new urban water use targets, reducing system water loss, eliminating clearly wasteful practices, and strengthening urban drought contingency plans. These measures aim to not only reduce immediate water use but to establish a long-term change in the way Californians think about water.

This conservation measure that originated with the drought became a permanent requirement under the 2016 Executive Order

Following abundant rainfall, on April 7, 2017 Governor Brown issued an Executive Order ending the state of emergency in California and eliminating statewide water use reduction requirements, including the City's 12 percent water use reduction requirement. The City Council rescinded the local emergency drought declaration and restrictions on water use on June 20, 2017.

7.4 WATER WASTE PREVENTION ORDINANCES

According to the DWR 2020 UWMP Guidebook, a water waste ordinance that explicitly states the waste of water is to be prohibited must be adopted. To promote responsible use of water and minimize water waste, the City's water waste prohibitions are included in Chapter 13.07 of the City's Municipal Code, which defines water waste as follow:

13.07.020 – Water runoff prohibited.

A. No person shall cause any water delivered by the city water system to flow away from property owned, occupied or controlled by such person in any gutter, ditch or in any other manner over the surface of the ground, so as to constitute water waste runoff.
B. "Water waste runoff" means water flowing away from property and which is caused by excessive application(s) of water beyond reasonable or practical flow rates, water volumes or duration of application. (Ord. 1089 § 1 (part), 1987)

In accordance with City Municipal Code 13.07.030, when deemed necessary in the judgment of the City Council to conserve water during critical water periods, the City Council may also by resolution declare an emergency condition and do any or all of the following which in its judgment is deemed advisable after publication of notice thereof in a newspaper of general circulation distributed in the City or after reasonable notice thereof is otherwise given by the City to users:

1. Limit irrigation within the City water service area to specified hours, or prohibit irrigation entirely within the service area or any portion or portions thereof;
2. Limit all customers inside the City water service area to specified maximum usages of water for each category of users;
3. Implement other water conservation measures as deemed appropriate.

7.5 WATER METERING

In accordance with the 2020 UWMP guidebook and CWC 527 (a) (1), the City has metered all of its service connections. Having all service connections metered encourages water conservation by effectively billing customers for the quantity of water consumed, forming a relationship between water consumed and total cost of the water bill. The City also continues to implement effective metering requirements for new development requiring separate water meters for residential, non-residential, and landscape uses.

There are approximately 450 dedicated landscape water meters in the City, which represents approximately three percent of the total number water meters. In 2020, 8.3 percent of potable water consumption was to dedicated landscape meters. An additional 4.4 percent of total water consumption was recycled water for landscape irrigation.

City Municipal Code Section 17.70.220 (B) Water Efficient Landscape Standards states:

For the efficient use of water, a landscape shall be designed and planned for the intended function of the project.

In the City, separate landscape water meters are required for new commercial, institutional, and multi-unit residential development projects that have greater than 1,000 square feet of landscaping. The City does not allow submeters in place of a dedicated landscape meter for landscape irrigation. As the sewer charges are based on a customer's water usage in the City, commercial, institutional, and multi-unit residential customers often opt to install a separate water meter to avoid paying sewer charges on water used for landscape irrigation.

Use of recycled water for landscape irrigation is required for customers in the City's Recycled Water Master Plan area. Recycled water is discussed in Chapter 6.

The City's water meter replacement program is implemented by the Water Distribution section of the Utilities Department. Under the program, water meters are replaced based on age of meter and as defective or under-registering meter are identified. Water meter replacement ensures accurate consumption data is provided to both the customer and the utility.

The City offers a downloadable tool on its website (Microsoft Excel file) to calculate a project's Estimated Total Water Use (ETWU) and Maximum Applied Water Allowance (MAWA). The calculator is pre-populated with the City's reference evapotranspiration for consistency.

Table 37: Water Meters (2016 to 2020)

Year	Total Water Meters in the City	Total Water Meters Replaced
2016	15,222	236
2017	15,353	156
2018	15,430	458
2019	15,651	311
2020	15,846	907
Five-Year Average of Water Meters Replaced		414

Source: City of San Luis Obispo Utilities Department, 2021.

Annually, the Utilities Department calibrates the effluent meters at the City's Water Treatment Plant to ensure accurate accounting of the water going to the water distribution system. Additionally, the City tests approximately 1 to 2 percent of its retired water meter inventory annually for a baseline of performance of the existing metering infrastructure.

The City is currently piloting a cellular based automatic metering infrastructure (AMI) system in partnership with Cal Poly. The pilot is designed to monitor all water used by Cal Poly both on campus and at offsite facilities in 15-minute increments, to better understand the impact of the University's demand on the City's potable water system.

7.6 WATER RATE STRUCTURE AND COST OF SERVICE

According to the DWR 2020 UWMP Guidebook, retail water agencies need to describe the pricing structure that is used by the water agency. The City's water rates were developed as part of a comprehensive cost-of-service methodology that fairly apportions costs to all customers prepared by HDR Engineering, Inc. (HDR) in 2017. HDR developed the City's water rates based on the American Water Works Association M1 Manual methodology to meet the requirements of California constitution article XIII D, section 6, commonly referred to as Proposition 218 (Prop 218).

The City's Cost of Service Study describes customer class characteristics, identifies unit costs, and equitably allocates costs among the City's customer classes to establish the cost-basis of the water rates. This analysis looked at water consumption, seasonal usage patterns, water meter sizes, and other factors to determine service-related cost factors.

City Council 2018 Water Rate Structure Goals

- ✓ Revenue Stability and Predictability
- ✓ Discourage Wasteful Use
- ✓ Stability and Predictability of the Rates
- ✓ Fair Allocation of Total Cost of Service Among Customer Classes
- ✓ Reflect all Present and Future Costs

Subsequent water rate confirmation studies were completed by HDR for the City in 2019 and 2021 to support proposed rate increases.

7.7 PUBLIC EDUCATION AND OUTREACH

The City has used public education and outreach as a mechanism for decreasing water use in the City and for promoting water conservation since the 1970s. The City's public outreach and education programs currently include the following:

1. Annual Water Resource Status Report
2. Publication of the quarterly Resource Newsletter
3. Social media use (Facebook, Twitter, Instagram)
4. Billing inserts
5. Streaming “how-to” videos
6. Direct mail
7. High water use outreach
8. Water conservation portal on City website
9. Weekly reservoir level updates on the City’s webpage
10. Funding for SLO Waterwise Landscaping website
11. Various newspaper articles
12. Booth at public events such as Earth Day and the SLO Preparedness Expo
13. Booth at Thursday downtown Farmers Market (26 times a year)
14. School education programs (K-12)
15. Meetings with local homeowners associations
16. Meetings with local business groups

The City is committed to reviewing and modifying the public education and outreach program to ensure that messaging stays effective and relevant.

7.8 PROGRAMS TO ASSESS AND MANAGE DISTRIBUTION SYSTEM REAL LOSS

The City has been conducting annual AWWA water loss audits since 2009. Water loss statistics identified from the AWWA water audits can be viewed in detail in Chapter 3 and Appendix IV.

To continue to reduce water loss, the City conducts service line replacement projects based on service line age and condition, along with extensive programs to replace defective polybutylene service lines that have been identified to have a high likelihood of failure. Water meter replacement programs exist to replace meters based on age, consequence of failure, and likelihood of failure. Along with these maintenance programs, the City also implements a valve exercising program that ensures water mains can be isolated during repairs to minimize the amount of water lost during water main breaks and repairs.

In 2015, the City completed its *Potable Water Distribution System Operations Master Plan* which identifies and prioritizes future maintenance and capital improvement projects which will reduce future water loss due to infrastructure failure. That work effort included development of a comprehensive hydraulic model of the City’s water distribution system. The hydraulic model is used to determine available service pressure and is maintained annually to keep it current with waterline replacement project, new water main installations, zone consolidations, etc.

In 2019, the City began using acoustic correlation equipment where acoustic sensors are attached to water valves to measure the speed at which sounds waves travel along the pipe. These sensors effectively listen to water flowing through the pipe and can detect when water is escaping through a leak. The location can then be pinpointed within about two feet, which helps reduce excavation costs. Using this tool regularly the City can:

- More accurately locate small leaks, resulting in less damage to surrounding infrastructure
- Further optimize its capital spending

- Minimize water main breaks, water loss, and damage from leaks
- Better manage aging water infrastructure

The City will continue to work to reduce real and apparent water losses by:

- ✓ Replacing aging infrastructure to prevent pipe breaks and leaks.
- ✓ Implementing a comprehensive meter testing and calibration program to ensure water meters are functioning per manufacturers' specifications.
- ✓ Continuing with its comprehensive meter replacement strategy to ensure water used at homes and businesses is correctly recorded.
- ✓ Performing routine billing audits to reduce data handling errors.

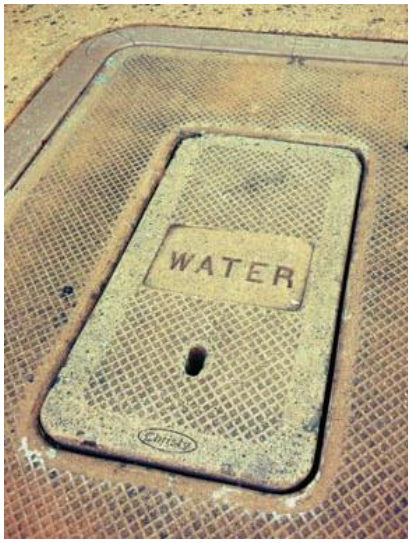
Real Water Loss		***Apparent Water Loss***		***Total Water Loss***
Leaks in distribution system infrastructure, pipeline breaks, and water tank overflows.	**+**	*Unauthorized consumption (water theft), water metering inaccuracies, and data handling errors.*	**=**	

7.9 WATER CONSERVATION PROGRAM COORDINATION AND STAFFING SUPPORT

The Water Resources section of the Utilities Department manages and implements water conservation programs for the City. This section consists of a manager who coordinates the conservation programs, two full time Water Resource Technicians, and temporary staffing as needed. Many support services such as the school education program and elements of the public outreach program are provided by professional services contract to ensure the City meets its conservation goals and promotes responsible water use.

7.10 OTHER DEMAND MANAGEMENT MEASURES

For over twenty years, the City has implemented cost-effective programs to increase water efficiency citywide. The City implemented the following demand management measures and plans to continue implementing these measures into the future. The following is a description of these additional programs.



Customer Water Audits

The Utilities Department's Water Resources section offers no-cost indoor and outdoor water audits to customers who have high water use or would like to reduce their water consumption. Water resource technicians examine the property with the customer to identify potential water saving opportunities and provide information about irrigation reduction methods, proper property maintenance, low flow fixtures installation, and general information on methods for reducing water use. This service is often offered proactively to customers who have unexplained high use, water waste violations, or other instances where audits could provide potential water savings. Customers can also request a water audit on the City's website.

Rebate Programs

During the past drought in 2015, the City Council authorized $100,000 in support of effective rebate programs. $100 dollar rebates were provided for qualified toilet and washing machine replacements. Going forward, staff will be examining effective rebate programs to offer the community in the future.

Retrofit Upon Sale Program

The City's *Retrofit Upon Sale Program* requires the replacement of high flow indoor water fixtures when a home has a change of ownership or had a major remodel. This program has been in place since the early 1990's and, along with several other fixture replacement programs, has reduced the City's long-term water demand by an estimated 1,500 acre-feet per year. All properties that have been certified to have low-flow fixtures are shown via a user-friendly online mapping tool at slowater.org, shown below in Figure 6. This tool also provides the City with a database that can be used to help project the effectiveness of future indoor water fixture rebate, offset, and replacement programs.

FIGURE 6: Online Toilet Retrofit Certification Mapping Tool

Source: City of San Luis Obispo Utilities Department website, 2021.

Appendix I: Notification to Agencies, Public Hearing Notice, and Plan Adoption

Public Utilities
879 Morro Street, San Luis Obispo, CA 93401-2710
805.781.7215
slocity.org

March 31, 2021

Mr. John Diodati
Department Administrator
Department of Public Works
County of San Luis Obispo
County Government Center, Room 207
San Luis Obispo, CA 93408

RE: City of San Luis Obispo, 2020 Urban Water Management Plan

Dear Mr. Diodati:

The City of San Luis Obispo is in the process of updating its *Urban Water Management Plan* as required by California state law. There are two provisions in the law which requires the City to 1) notify the County at least 60 days prior to the public hearing to adopt the plan and 2) provide a wholesale agency which supplies water to the City with water use projections from that water supply for at least 20 year period. The County of San Luis Obispo is considered a wholesale agency based on the contractual agreements between the City of San Luis Obispo and the San Luis Obispo County Flood Control and Water Conservation District relative to deliveries of Nacimiento water supplies.

Per section 10642 of the Urban Water Management Planning Act (Act), a public hearing to adopt the Urban Water Management Plan has been scheduled for Tuesday, June 15, 2021 at 6:00 p.m. in the City Council chamber located 990 Palm Street. The text from the Act related to this requirement is as follows:

> *Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision (10621(b)),*

The second provision of the law requires that the City provide to a wholesale water agency the projected amount of water the City will use from the wholesaler's water supply in five year increments for at least 20 year period. The following table is the projected amount of water that the City will request from the County to the year 2040.

Wholesale Source	Contracted Volume	2025	2030	2035	2040
Nacimiento Reservoir	5,482 AF	5,482 AF	5,482 AF	5,482 AF	5,482 AF

The text from the Act related to this requirement is as follows:

> *Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c) (10631(k)).*

As indicated in this subsection, the County will need to respond to the City with information that verifies the County's intent to deliver the identified quantity of water in the table over the same planning period. Please send the County's response to this request to:

City of San Luis Obispo Utilities Department
Attn: Mychal Boerman
879 Morro Street
San Luis Obispo, CA. 93401

Or via email at: mboerman@slocity.org

A reply by April 15, 2021 would be greatly appreciated. If you have any questions or would like to discuss further, please contact me at 805-781-7237.

Sincerely,

Mychal Boerman
Utilities Deputy Director - Water

Cc: File
Jennifer Metz
Via email to: jdiodati@co.slo.ca.us
kballantyne@co.slo.ca.us

COUNTY OF SAN LUIS OBISPO
Department of Public Works
John Diodati, *Interim Director*

April 15, 2021

City of San Luis Obispo Utilities Department
Attn: Mychal Boerman, Utilities Deputy Director Water
879 Morro Street
San Luis Obispo, CA 93401
Email: mboerman@slocity.org

Subject: The City of San Luis Obispo, 2020 Urban Water Management Plan

Dear Mychal Boerman:

The purpose of this letter is to address the District's requirement to respond to the wholesale supplier's water supply demand request, in accordance with the Urban Water Management Planning Act.

The District is in receipt of City of San Luis' projected Nacimiento Water Project demand through the year 2040. In accordance with the Urban Water Management Planning Act and the District's contractually obligation to the City, the District intends to deliver the identified quantity of water in the table below, consistent with the attached letter from the City dated March 31, 2021.

Wholesale Source	Contracted Volume	2025	2030	2035	2040
Nacimiento Reservoir	5,482 AFY	5,482 AFY	5,482 AFY	5,482 AFY	5,482 AFY

Please feel free to contact me if you have any questions.

Sincerely,

LAURA HOLDER
Utilities Division Program Manager

File: 622.300.01

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Appendix II: Water Resource Status Reports (2016-2020)

CITY OF SAN LUIS OBISPO

2016 Water Resources Status Report

This Report Covers October 1, 2015 through September 30, 2016

Whale Rock Reservoir. 2016
Photo credit: City of San Luis Obispo

PREPARED BY:

Jennifer Metz, Utilities Projects Manager
Aaron Floyd, Utilities Deputy Director-Water
Mychal Boerman, Water Resources Program Manager

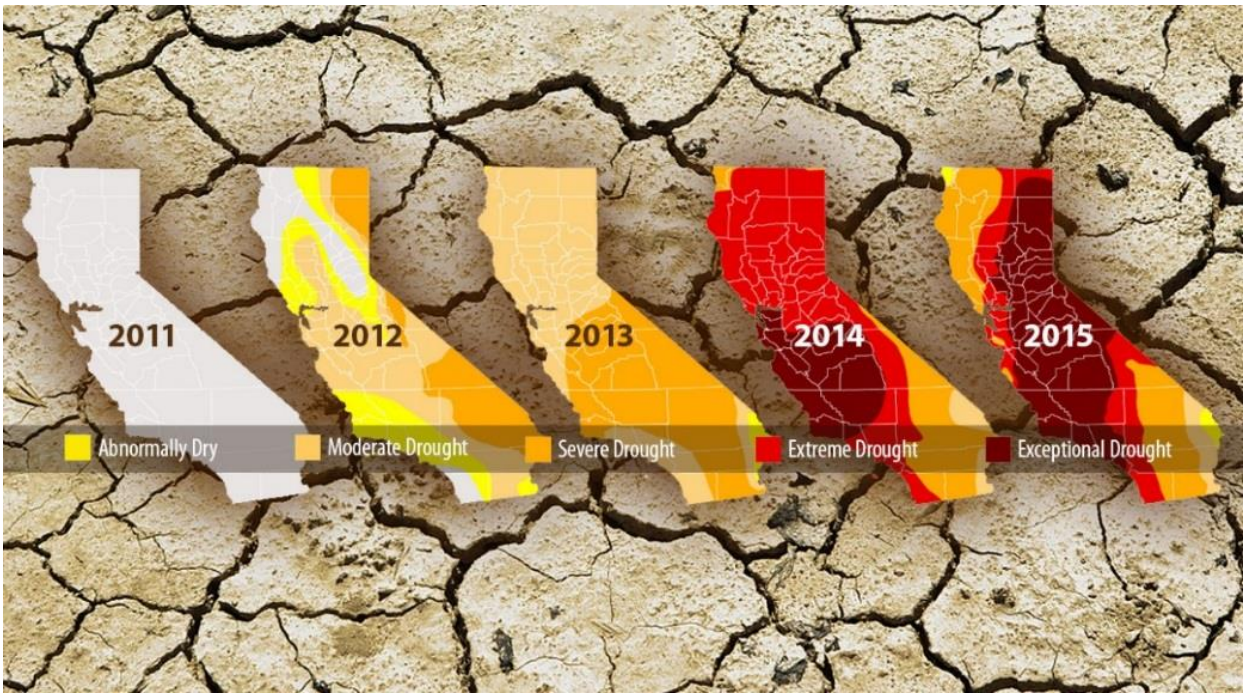
The City of San Luis Obispo 2016 Water Resources Status Report includes water production and water consumption data for October 1, 2015 through September 30, 2016 and was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The reporting period corresponds to the Water Year (October 1 through September 30), the 12-month period for which precipitation totals are measured. The water year is designated by the calendar year in which it ends. This report covers Water Year 2016. The Report is organized as follows:

I. Drought Update
II. Water Policy Update
III. Water Supply
IV. Water Demand
V. Water Resource Availability
VI. Water Supply Accounting
VII. Water Demand Management

I. DROUGHT UPDATE

The statewide drought emergency continued during the 2016 Water Year, with the drought now into its fifth year during 2016. State drought regulations that began in 2014, were expanded in 2015, and continued through the 2016 Water Year. On May 9, 2016, the Governor issued an Executive Order that directed the State Water Resources Control Board to adjust and extend its emergency water conservation regulations through the end of January 2017 in recognition of the differing water supply conditions for many communities, and to develop proposed emergency water restrictions for 2017 if the drought persists.

The Governor's latest drought-related Executive Order (B-37-16) established a new water use efficiency framework for California by aiming to "Make Conservation a California Way of Life."



The 2016 Executive Order bolsters the state's drought resilience and preparedness by establishing longer-term water conservation measures that include:

- Permanent monthly water use reporting,
- New urban water use targets,
- Reducing system water loss,
- Eliminating clearly wasteful practices, and
- Strengthening urban drought contingency plans.

These updated measures aim to not only reduce immediate water use but to establish a long-term change in the way Californians think about water.

LOCAL RESPONSE

The drought brought about unprecedented regulatory action from the State of California which required a mandatory 12 percent reduction in City water use when compared with 2013 water use. To comply with this mandate, the City Council adopted a drought response strategy in June 2015. This strategy is still in place and includes the following:

- Adoption of a resolution declaring a drought emergency;
- Adoption of a resolution to defer new landscape installation or the use of modified landscape plans during the drought emergency;
- Adoption of an ordinance amending Chapter 13.07 of the City's Municipal Code to include two-day-a-week and time-of-day restrictions for outdoor watering;
- Approval of an incentive program for high efficiency toilets and washing machines; and
- Adoption of a resolution establishing a permit fee for the use of the Corporation Yard groundwater well.

The community continues to do an outstanding job in reducing water consumption in response to the regulations. The City is on target to meet State requirements, as shown in the table below, achieving an average 21 percent reduction in the 2016 Water Year over 2013 water usage.

	2015 Water Year Reduction	**2016 Water Year Reduction**
Total Water Year Reduction from 2013 Usage	16%	21%

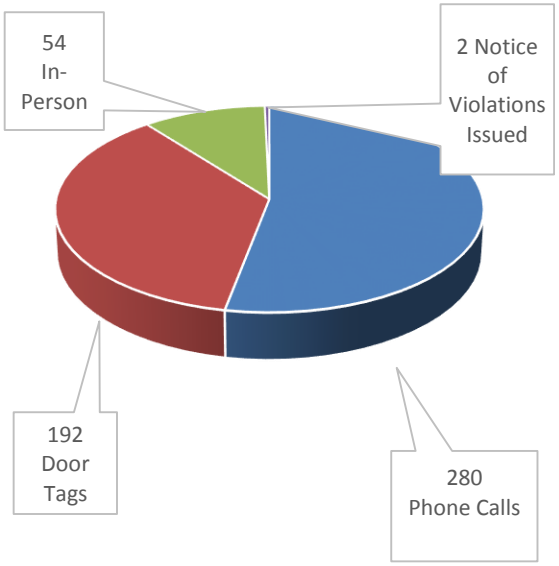
Note: The *reduction* represents the total water reduction achieved in the Water Year from water usage in 2013. The City's mandatory 12 percent reduction went into effect in June 2015, so were not in place during the full 2015 Water Year. Data does not include recycled water.
Source: City of San Luis Obispo, 2016.

The City's enforcement strategy has relied on active enforcement of water waste prohibitions, with a focus on providing information and resources to the public in order to encourage the correction of existing violations and to encourage voluntary compliance.

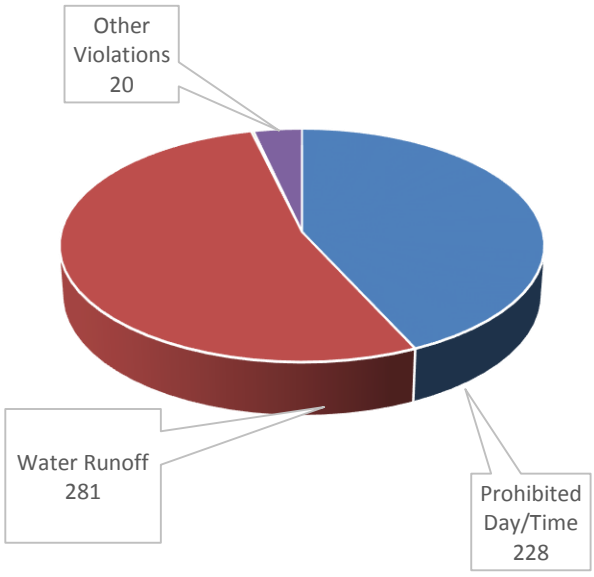
During Water Year 2016, City staff issued 528 formal and informal violation notifications. Of the 528 violations recorded, only 55 were repeat violations with only 12 total properties being contacted more than two times throughout the course of the year. Violations throughout the year were predominantly related to issues with irrigation systems. 281 of the violations recorded were related to water runoff from irrigation systems while another 228 violations were due to irrigating on a prohibited day or during prohibited hours. The remaining 20 violations were related to issues such as watering within 48-hours of measurable rainfall, washing a vehicle without a shutoff nozzle, and using a hose to wash down a driveway or sidewalk.

Given the strong relationship between irrigation and water waste violations, most violations occur during peak irrigation season (from May through October) and become nearly non-existent during winter months. As shown in the Violations Heat Map, there are several areas of town where violations occur most frequently. Given advanced reporting and tracking efforts, efforts are focused on areas of town with high likelihood of violations. When violations occur they are geocoded and permanently recorded with information such as type of violation, customer contact method, and outcome of contact. This recording of data helps track frequency of violation and if response to violations needs to be escalated due to repeated violations.

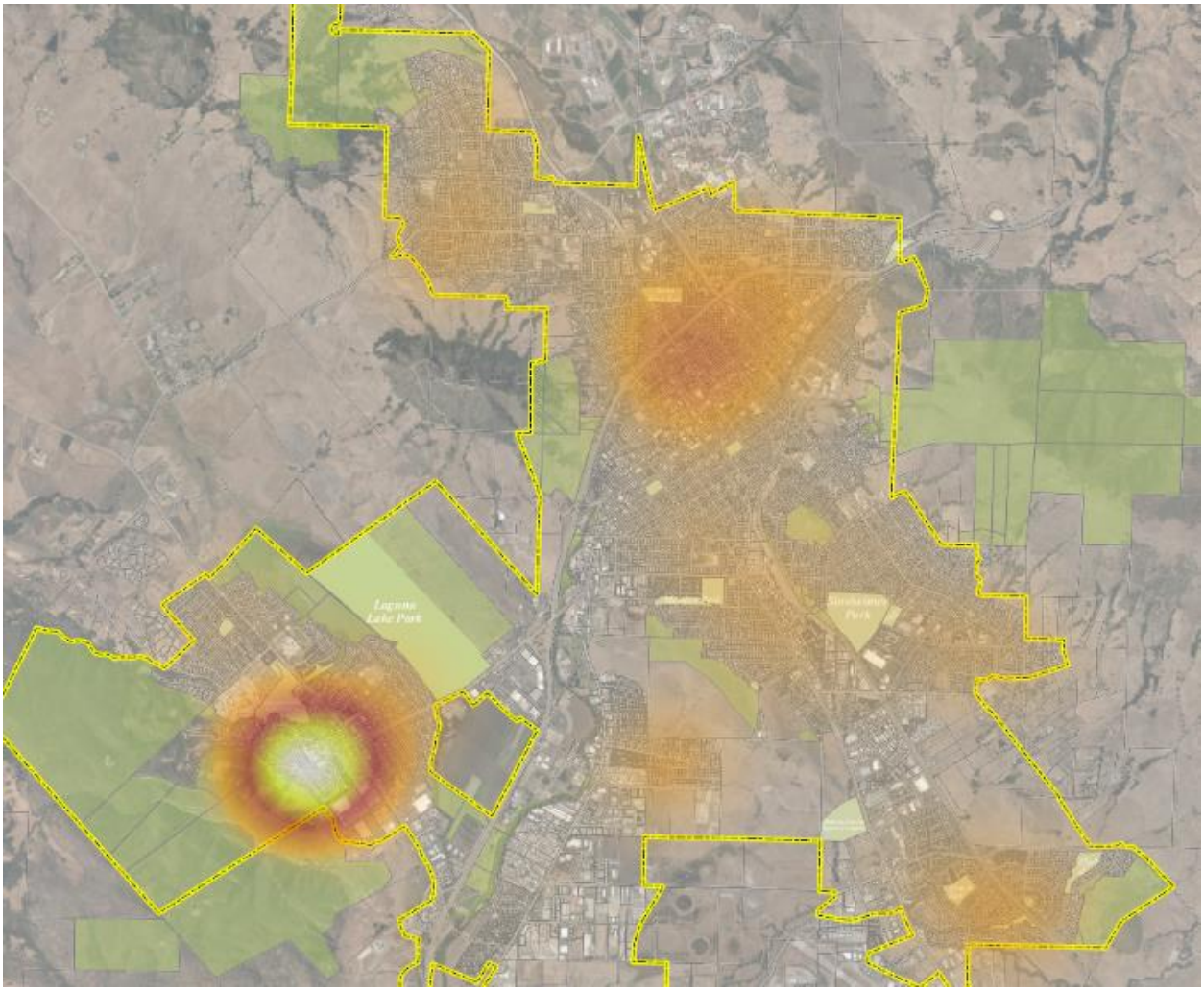
Violation Response Methods



Violation Types



Water Waste Violations Heat Map



Source: City of San Luis Obispo, 2016.

The Water Waste Violations Heat Map shows locations in the City that experienced the highest number of water waste violations during the 2016 Water Year. These violations include watering within 48-hours of measurable rainfall, washing a vehicle without a shutoff nozzle, and using a hose to wash down a driveway or sidewalk.

II. WATER POLICY UPDATE

The City's guiding water policy document for water resource planning is the General Plan *Water and Wastewater Management Element (WWME)*. The *WWME* was updated on June 16, 2016 along with the *2015 Urban Water Management Plan*. As part of the 2016 update, the City changed the factor used in water supply accounting and demand projections to use the per capita potable water use rate allowed under Senate Bill X7-7 (Water Conservation Act of 2009) of 117 gallons per capita per day (gpcd).

The updated policy language reads as follows:

> *The City will utilize the per capita water use rate allowed by SB X7-7 for projecting future potable water demand established as 117 gallons per capita per day.*

Prior to this update, the City used a water use rate based on a 10-year running average of gpcd. Using 117 gpcd is a more conservative approach as a 10-year average can be influenced by drought years where the City can experience a significant reduction in potable water demand.

In June of 2016, the City updated its Urban Water Management Plan. This update is required by the State of California Urban Water Management Planning Act to occur every five years. The preparation of the *2015 Urban Water Management Plan* (*2015 Plan*) was unique in that it took place during unprecedented drought conditions statewide. As part of the *2015 Plan*, changes were made to the City's Water Shortage Contingency Plan. Water shortage contingency planning allows for the City to be prepared for and respond to water shortages such as a drought or a catastrophic supply interruption such as a break in a transmission pipeline. To provide more time to respond to water shortages, a six-staged demand management response was included in the plan with a "Monitoring" stage in place at all times.

The update to the Water Shortage Contingency Plan in the *2015 Urban Water Management Plan* includes implementation of mandatory water conservation measures when the City's water supplies are projected to last five years or less. This change from the prior plan's three year or less plan allows for more time to incrementally implement water shortage response strategies. The policy language is as follows:

> *Mandatory water conservation measures as described in the City's Water Shortage Contingency Plan will be implemented when the City's water supplies are projected to last <u>five</u> years or less.*

III. WATER SUPPLY

Per WWME Policy A2.2.1, the City uses multiple water sources to meet its water supply needs. The city has four primary water supply sources including Whale Rock Reservoir, Salinas Reservoir, Nacimiento Reservoir, and recycled water (for landscape irrigation and construction water), with groundwater serving as a fifth supplemental source. The supply per source for Water Year 2016 (October 1, 2015 to September 30, 2016) is summarized below.

City of San Luis Obispo Water Supply Sources

- ✓ Nacimiento Reservoir
- ✓ Whale Rock Reservoir
- ✓ Recycled Water
- ✓ Salinas Reservoir
- ✓ Groundwater

2016 City Water Supply by Source (Acre Feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Recycled Water	Salinas Reservoir	Groundwater [3]	Total City Water Demand
3,834.5	685.92	201.92	8.19	0	4,730.53
81.06%	14.50%	4.27%	0.17%	0 %	100%

Notes:
1. All Values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand.
3. Groundwater was not used for potable purposes during the 2016 Water Year.

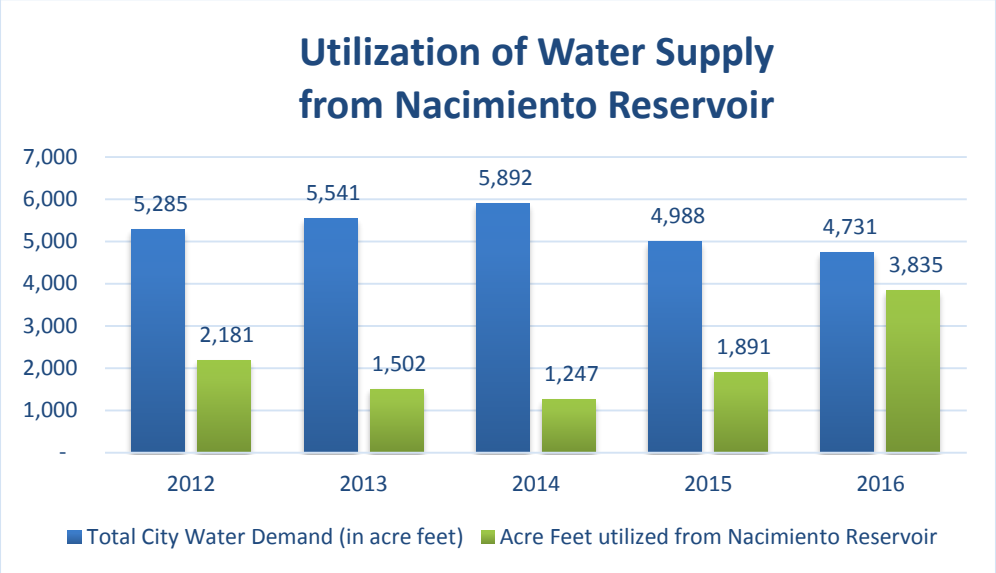
NACIMIENTO RESERVOIR

Water deliveries to the City of San Luis Obispo from Nacimiento Reservoir began in January 2011. San Luis Obispo County operates and maintains the delivery of water from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives from each of the four agencies' governing boards and a County Representative who is a member of the County Board of Supervisors which also sits as the Board of Directors for the Flood Control District.

In March 2016, the City Council approved the addition of 2,102 afy from Nacimiento Reservoir to the City's secondary water supply, referred to as the "full allocation" of Nacimiento. This addition brought the City's contractual right to Nacimiento Reservoir from 3380 afy to 5,482 afy. The City uses secondary water supplies to meet short-term water supply losses due to events such as drought, pipeline maintenance, and repair of infrastructure. With uncertainty of future climatic conditions, regulation and aging infrastructure, the additional supply of water from Nacimiento Reservoir to the City's portfolio reduces pressure on use of water supplies in Whale Rock and Salinas reservoirs serving to extend these stored supplies during future critical water shortage periods.

Nacimiento Reservoir, 2016.
Photo credit: City of San Luis Obispo.

Since the full allocation was approved in March 2016 and the budget amendment to cover the expense associated with the additional pumping costs was approved in June, the City has significantly increased the volume of water it utilized from Nacimiento to serve the community's water demand. During the 2016 Water Year, over 81 percent of the City's total water demand was met by Nacimiento Reservoir. The City utilized twice as much water from Nacimiento Reservoir during the 2016 Water Year than the prior year.



SALINAS & WHALE ROCK RESERVOIRS

Salinas and Whale Rock Reservoirs served as the City's primary water supplies for over 50 years. The City pays the County of San Luis Obispo Flood Control and Water Conservation District (County) to provide oversight, operations, and maintenance of the Salinas Dam and related water delivery facilities. The City provides the oversight, operations, and maintenance of the Whale Rock Reservoir for the benefit of the Whale Rock Commission, a joint powers agency made up of Cal Poly State University, California Men's Colony, and the City.

During the 2016 Water Year, the City utilized a total of 694.11 acre feet from Salinas and Whale Rock reservoirs.

RECYCLED WATER

For the 2016 Water Year, the City delivered 202 acre feet of recycled water, up from 168 acre feet for the 2015 Water Year. The biggest increase in recycled water use during the 2016 Water Year was construction water. Total construction water use in the 2016 Water Year was 20 acre feet, up from 10 acre feet during the 2015 water year. The City has had a Construction Water Permit Program since 2010.

The design phase for the City's Water Resource Recovery Facility (WRRF) Project is underway in 2016 which is planned to maximize recycled water production. The upgrade will enable the City to consider potable reuse, part of a *One Water* concept, in the future.

The City is currently updating to the 2004 Water Reuse Master Plan which is scheduled to be complete in 2017. The City is also reviewing the rate it charges for recycled water, which has been set at 90 percent of the City's potable rate since the program's inception.

The upgrade of the Water Resource Recovery Facility will enable the City to consider potable reuse in the future, part of a One Water concept.

GROUNDWATER

The City transitioned from utilizing groundwater for potable purposes with the last withdrawal occurring in April 2015. The City's groundwater wells remain in an operable, stand-by position should the use of groundwater be required. Other existing well casings are being revitalized to provide greater drought resiliency. The City is also working with a hydrogeologist to site a future well field for a potential groundwater program expansion and for siting of the withdrawal of highly treated wastewater for an indirect potable reuse system.

With the emergency drought declaration in 2015, the City established a permit fee and procedures for use of the Corporation Yard groundwater well. The program was started in recognition of the drought and the importance of the groundwater resources and the management of this resource to community and others within the San Luis Groundwater Basin. During the 2016 water year, that permit program entered its second year and has 40 participants.

Non-potable well water is also used at the Laguna Lake Golf Course for landscape irrigation.

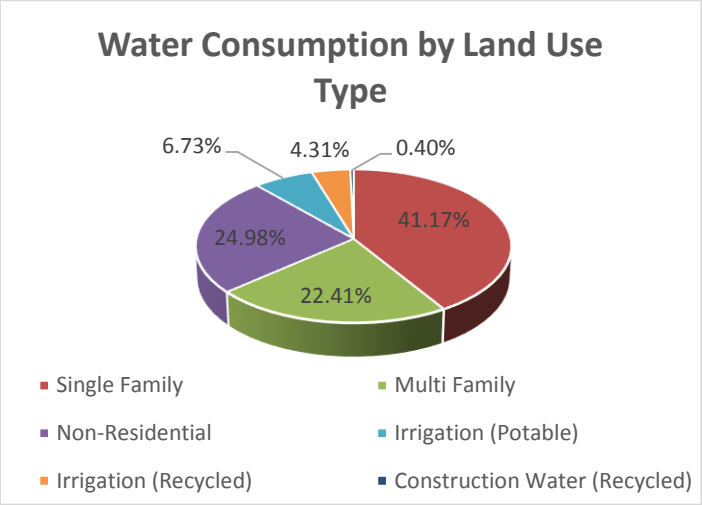
WATER MODELING

The City performs water planning through the use of different models. The Water Projection Model, or Wet Water Model, is used to inform the amount of water the City has available during the water year. This model inputs include an annual one percent population increases, current total water demand (in gallons per capita per day), current levels of Salinas and Whale Rock Reservoir, contractual water received from Nacimiento Reservoir, and climate data associated with each reservoir in terms of lack of precipitation and increase in evaporation for the worst years of the drought (2012-14). These drought-year climate impacts are assumed for every year moving forward, even in more "normal" years such as 2015 and 2016. With this model, the City is able to analyze the effects of more severe climatic conditions, such as increased evaporation and decreased precipitation, in our stored water reservoirs.

In March 2016, the model was updated to include the additional water supply from the full allocation of Nacimiento Reservoir. While the last model run shows the City having more than five years of available water, the uncertainty of when the drought will end and what impact future climate change may have still remain.

IV. WATER DEMAND

During Water Year 2016, over 63 percent of total water use in the City was to support single and multi-family residential uses. Historical water use is summarized below, as well as corresponding population, per capita use rate, and precipitation. The 2016 per capita water use was 91.6 gallons per capita per day (gpcd). Based on WWME policies, the City uses 117 gpcd to project water required to serve build-out population.



Population, Water Use & Rainfall

Year	Population	Total Water Use (acre feet)	Per Capita (gpcd)	Rainfall[1,2,3] (inches)
2007	44,433	6,493	130.5	12.7
2008	44,579	6,359	127.3	18.1
2009	44,829	6,134	122.2	18.9
2010	44,948	5,489	109.0	36.0
2011	45,418	5,285	103.9	18.9
2012	45,308	5,541	109.2	21.5
2013	45,541	5,892	115.5	3.8
2014	45,473	5,524	108.5	14.2
2015	45,802	4,990	97.3	11.8
2016	**46,117 [4]**	**4,731**	**91.6**	**17.8**

Notes:

1. Rainfall amounts for 2005–2012 calendar year source: Cal Poly CIMIS Weather Station.
2. Rainfall amount for calendar year 2013-2015: SLO Reservoir.
3. Data for 2007 through 2014 presents calendar year rainfall data. 2015 and 2016 rainfall data covers the Water Year (October through September).
4. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

With the City's multi-source water supply, its reservoirs are in different watersheds, therefore rainfall throughout San Luis Obispo County can benefit the City. Average rainfall at various sites within San Luis Obispo is described below.

Location	Annual Average Rainfall (in inches)	2016 Water Year Total Rainfall (in inches)
Rock Butte	39	26.89
Hwy 46 and W 7 Mile Road in Cambria, CA	30	19.93
SLO Reservoir	25	17.80
Salinas Dam	23	13.46

Source: http://www.slocountywater.org/site/Water%20Resources/Data/maps/precipitation-real-time.htm

V. WATER RESOURCE AVAILABILITY

The following table summarizes the Water Resource Availability based on WWME Section 3. Water availability for 2016 is 12,109 acre feet, an increase of 2,124 acre feet over 2015 due to the full allocation of Nacimiento Reservoir and increased recycled water usage.

2016 Water Resource Availability

Water Resource	Acre Feet	Description	2016 Increase
Salinas & Whale Rock Reservoirs	6,940	Safe Annual Yield [1]	-
Nacimiento Reservoir	5,482	Dependable Yield [2]	2,102 acre feet
Recycled Water	187	2015 Annual Usage [3]	22 acre feet
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]	-
	12,109	**2016 Annual Availability**	**2,124 acre feet**

NOTES:

1. Safe Annual Yield determined from computer model, which accounts for siltation loss through 2010 (per WWME Policy A 4.2.1).
2. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
3. The quantity of recycled water included is the actual prior year's recycled water usage (calendar year 2015) per WWME Policy A 7.2.2.
4. Reservoir siltation is a natural occurrence that reduces storage capacity over long periods, resulting in the reduction of safe annual yield.

Source: City of San Luis Obispo, 2015. *View of San Luis Obispo from Tassajara Peak.*

VI. WATER SUPPLY ACCOUNTING

Per WWME Section 5, the City accounts for water supplies necessary to meet three specific community needs:

- Primary water supply
- Reliability reserve
- Secondary water supply

The City's primary water supply is defined as the amount of water needed to serve the build-out population identified in the *General Plan*, *Land Use Element (2014)*. Table 3 in the *Land Use Element* identifies an urban reserve capacity of 57,200 people. The quantity of water needed for the primary water supply is calculated per WWME Policy A 5.2.2, using 117 gallons per capita per day (gpcd).

The reliability reserve provides a buffer for future unforeseen or unpredictable long-term impacts to the City's water supply. The quantity of water for the reliability reserve is established using 20 percent of the existing City population (46,117, 2016 population) at 117 gpcd, thus the reliability reserve will increase over time as population increases. The reliability reserve concept is included in the City's Charter (Section 909) which identifies that the water may not be used to serve future development, and is defined per WWME Policy A 5.2.3.

Primary Water Supply

= 117 gpcd x City Build-out Population

= 117 gpcd x 57,200 x 365 day/year x Acre-Ft/325,853 gal

7,496 Acre-Ft/year

Reliability Reserve

= 117 gpcd x 2015 City Population x 20%

= 117 gpcd x 46,117 x 365 day/year x Acre-Ft/325,853 gal x 20%

1,499 Acre-Ft/year

Secondary Water Supply

= Current Annual Availability – Primary Water Supply – Reliability Reserve

= 12,109 Acre-Ft/year [A] – 7,496 Acre-Ft/year – 1,499 Acre-Ft/year

3,114 Acre-Ft/year

[A] 2016 Annual Availability

The secondary water supply is the amount of water remaining from the City's available water resources above those needed to meet the primary water supply and reliability reserve. The secondary supply is identified to meet peak water demand periods or short-term loss of City water supply sources, per WWME Policy A 5.2.4.

Water supply accounting is summarized in the table below.

2016 Water Supply Accounting (acre feet)

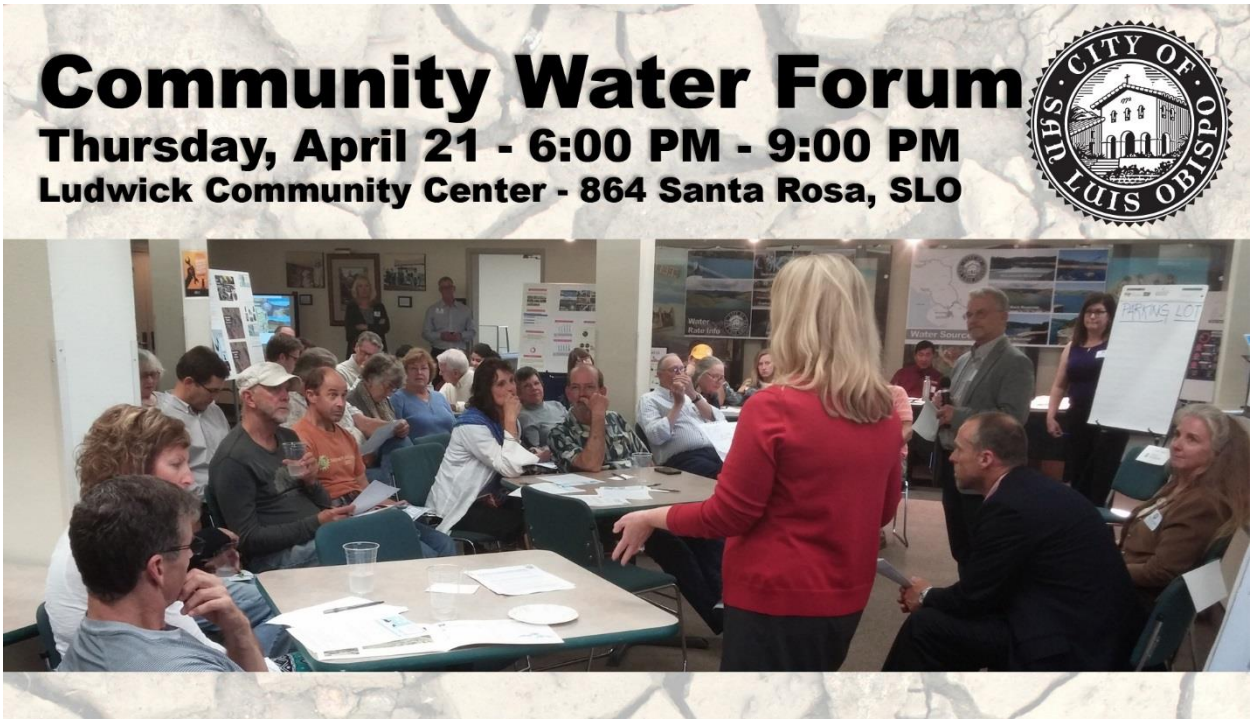
Total	Primary Water Supply	Reliability Reserve	Secondary Water Supply
12,109	7,496	1,499	3,114

VII. WATER DEMAND MANAGEMENT

The City's water conservation program is an integral part of its overall water management strategy. In the late 1980's, the City implemented effective water efficiency programs and policies that allowed for continued community growth and economic development during water-constrained periods. Through strong conservation efforts, the community has reduced its annual average per capita water use from over 180 gallons in 1987 to 91.6 for the 2016 Water Year.

With the lack of local drought relief from El Nino, the City continued its message related to water conservation while much of the media was declaring the drought "over" due to high quantities of rainfall in the northern half of the state. Along with its continued face-to-face contact with customers, the City continued to implement water conservation rebate programs, school education programs, and increased public outreach related to the ongoing drought. The outreach program currently consists of messaging on the City's social media platforms and website along with traditional printed media such as the quarterly Resource Newsletter.

In order to reach all local demographics, City staff diversified outreach efforts by attending local events such as Farmers Market, the SLO Home Expo, the Disaster Preparedness Expo, and the Community Water Forum. Adding to traditional media outlets, staff was interviewed on local radio, advertised on broadcast media, and created a video explaining the history of the City's water resource and conservation programs.



REGIONAL WATER RESOURCE PLANNING

Beyond the involvement in the Nacimiento Water Project, the City continues to participate as a member of the Water Resources Advisory Council and Regional Water Management Group, which promotes collaborative, integrated management of water resources within San Luis Obispo County and provides policy recommendations to the County Board of Supervisors. In addition, the City participates in the regional water conservation group *Partners in Water Conservation*.

The Sustainable Groundwater Management Act (SGMA) is a statewide policy that empowers local agencies to adopt groundwater management plans that relate to the needs and resources of their communities. In the future, the City sees groundwater continuing to play an important and useful role in the balancing of its overall water supply portfolio. Associated with SGMA is the requirement to form a Groundwater Sustainability Agency by mid-2017 and create a Groundwater Sustainability Plan by 2022.

2017
Water Resources Status Report

For the Time Period October 1, 2016 through September 30, 2017

Salinas Reservoir (2015)

Salinas Reservoir (2017)

Photo Credit: City of San Luis Obispo.

PREPARED BY:

Jennifer Metz, Utilities Projects Manager
Aaron Floyd, Utilities Deputy Director - Water
Mychal Boerman, Water Resources Program Manager

The City's 2017 Water Resources Status Report includes water production and water consumption data for October 1, 2016 through September 30, 2017 and was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The reporting period corresponds to the Water Year (October 1 through September 30), the 12-month period for which precipitation totals are measured designated by the calendar year in which it ends. This report for Water Year 2017 is organized as follows:

I. Drought Declaration Rescinded and Water Policy Update
II. Water Supply
III. Water Demand
IV. Water Resource Availability
V. Water Supply Accounting
VI. Water Demand Management

I. DROUGHT DECLARATION RESCINDED AND WATER POLICY UPDATE

Following abundant rainfall this past winter, on April 7, 2017 Governor Brown issued Executive Order B-40-17 ending the drought state of emergency in California and eliminating the City's mandated 12 percent water use reduction. The City Council adopted resolutions to rescind the drought emergency locally on June 20, 2017.

A 2016 Executive Order (B-37-16), approved by Governor Brown on May 9, 2016, bolsters California's drought resilience and preparedness by establishing longer-term water conservation measures that include permanent monthly water use reporting, new urban water use targets, reducing system water loss, eliminating clearly wasteful practices, and strengthening urban drought contingency plans. These measures aim to not only reduce immediate water use but to establish a long-term change in the way Californians think about water.

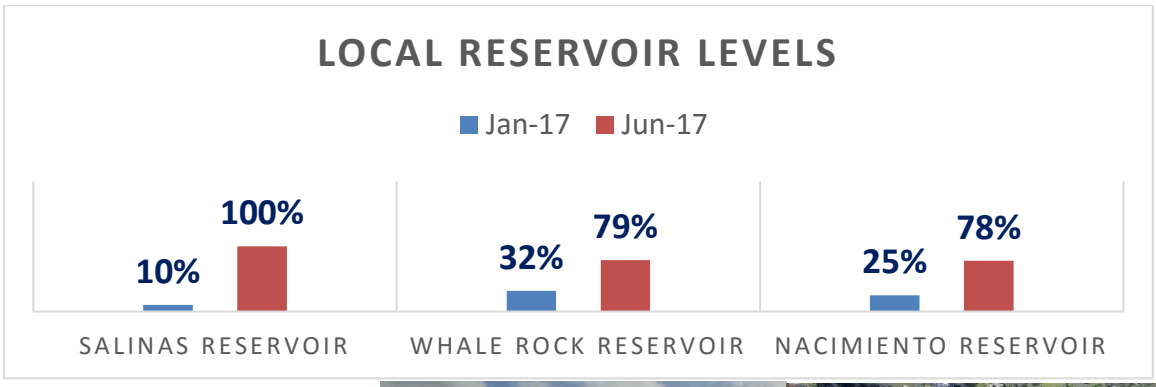
This conservation measure that originated with the drought became a permanent requirement under the 2016 Executive Order

What a Difference a Year Makes – For California and San Luis Obispo

The California Department of Water Resources Water Year 2017 report, subtitled "What a Difference a Year Makes," noted that the water year *"dramatically illustrated the variability in California's annual precipitation, ending the state's 5-year drought and coming in at second place for statewide runoff, behind the wettest year of 1983."* On the hydrologic impacts of a wet 2017, the statewide report states:

> *Many of the hydrologic impacts of California's prior five-year drought were remedied by the wet conditions. For the first time since 2011, runoff in major river basins exceeded 150 percent of average, in some cases exceeding 200 percent of average. The abundant runoff replenished depleted soil moisture. Depleted surface water storage in most of the state's major reservoirs was refilled (excepting Lake Oroville, due to emergency repairs and reconstruction of its spillways).*

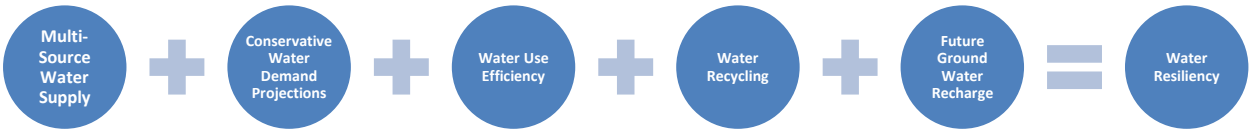
Locally, the City saw its surface water reservoirs recover between January and June of 2017. Since the end of the drought the City has seen a slight increase in overall consumption from 2016 to 2017, from 92 gallons per capita day (gpcd) in Water Year 2016 to 95 gpcd in Water Year 2017. For potable water only, the increase was from 88 gpcd in Water Year 2016 to 91 gpcd in Water Year 2017.



Water Resiliency Planning

The City declared Climate Action a top priority during its January 2017 major city goal-setting workshop and identified objectives focused on energy efficiency and greenhouse gas reductions within City facilities, such as the City's Water Treatment Plant. The City is in the study phase of an energy efficiency project at the Water Treatment Plant to utilize photovoltaic panels and install a hydropower turbine that would convert the energy in the high-pressure water line from Nacimiento Reservoir into electricity. The electricity generated on-site would offset the Water Treatment Plant's overall power demand. Concurrently, the energy efficiency project will assess several projects identified in the adopted 2015 Potable Water Master Plan such as: pump efficiencies within plant, the primary disinfection system, water quality in storage tanks, distribution main inter-ties between service zones, and settings of related controls needed for control system (SCADA-Supervisory Control and Data Acquisition) integration. The assessment will make recommendations to replace aging infrastructure in a holistic manner from the surface water source, to the treatment plant, and within the distribution system.

Although it is not clear exactly how San Luis Obispo and its watersheds will be affected, climate change will impact future water supplies. To ensure water supply resiliency under worse-case scenarios, the City utilizes a multi-source water supply discussed further in this report, makes conservative water demand projections, and continues to pursue increased water use efficiency, increased water recycling, and groundwater recharge.



Formula for Water Resiliency

Water Loss Audit Regulation

Even the most efficiently managed water systems across the country experience unavoidable water loss from leaks, water main breaks, meter inaccuracies, and a variety of other causes. Despite efforts to minimize water loss, according to the US Environmental Protection Agency, the average water system sees a difference of about 15 percent between water produced and water sold each year. The City is working to reduce both real and apparent water losses. Senate Bill 555, approved by Governor Brown in October 2015, requires retail water suppliers in California with 3,000 or more connections, or an annual water demand of over 3,000 acre-feet, to conduct an annual audit of their distribution system to quantify water loss. The standardized audit must be validated by a certified third party to ensure data accuracy and consistency in reporting. The City submitted its first annual water loss audit to the Department of Water Resources in October 2017

Calendar Year 2016 Water Loss	
Apparent Losses	102.8 AF
Real Losses	412.9 AF
Water Losses	**515.7 AF**
Non-revenue water as percent by volume of water supplied	11.7%
Non-revenue water as percent by cost of operating system	2.8%

By "benchmarking" this data and setting water loss efficiency goals, the City will continue to work to reduce real and apparent water losses by:

- ✓ Installing a computer system to monitor water system data such as pressure, flow, and tank levels for early detection of abnormalities in the water distribution system.
- ✓ Replacing aging infrastructure to prevent pipe breaks and leaks.
- ✓ Implementing a comprehensive meter testing and calibration program to ensure water meters are functioning per manufacturers' specifications.
- ✓ Implementing a comprehensive meter replacement strategy to ensure water used at homes and businesses is correctly recorded.
- ✓ Performing routine billing audits to reduce data handling errors.

Real Water Loss *Leaks in distribution system infrastructure, pipeline breaks, and water tank overflows.*	**+**	***Apparent Water Loss*** *Unauthorized consumption (water theft), water metering inaccuracies, and data handling errors.*	**=**	***Total Water Loss***

Sustainable Groundwater Management Act and Formation of a Groundwater Sustainability Agency

The Sustainable Groundwater Management Act (SGMA) is a statewide law that empowers local agencies to adopt groundwater management plans that relate to the needs and resources of their communities. Although currently banking its groundwater resources, the City envisions groundwater playing an important role in ensuring continued resiliency in its water supply portfolio.

During the 2017 Water Year, the City became a Groundwater Sustainability Agency over the area of the San Luis Obispo Valley Groundwater Basin that lies beneath and within its jurisdictional boundaries. The San Luis Obispo Valley Groundwater Basin "eligible entities" (City, County, Golden State Water Company, Edna Ranch Mutual Water Company-East, Varian Ranch Mutual Water Company, and Edna Valley Growers Mutual Water Company) are all working collaboratively to comply with SGMA requirements for the entire

groundwater basin. The GSA structure includes a Groundwater Sustainability Commission which is an advisory body to the City Council and the Board of Supervisors. The Commission consists of one member from the City Council, one County Supervisor and a representative of each of the identified water companies. The City, County, and eligible entities are required by SGMA to work together to create Groundwater Sustainability Plans by January 31, 2022.

II. WATER SUPPLY

Per the *General Plan Water and Wastewater Management Element*, Policy A2.2.1, the City uses multiple water sources to meet its water supply needs. The City has four primary water supply sources including Whale Rock Reservoir, Salinas Reservoir, Nacimiento Reservoir, and supplies recycled water for landscape irrigation and construction water. Groundwater serves as a fifth supplemental source. The supply per source for Water Year 2017 (October 1, 2016 to September 30, 2017) is summarized below.

City of San Luis Obispo Water Supply Sources

- ✓ Nacimiento Reservoir
- ✓ Whale Rock Reservoir
- ✓ Recycled Water
- ✓ Salinas Reservoir
- ✓ Groundwater

2017 City Water Supply by Source (Acre Feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Recycled Water	Salinas Reservoir	Groundwater [3]	Total City Water Demand
3,383	1,150	229	213	0	4,975
68%	23%	5%	4%	0 %	100%

Notes:
1. All values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand.
3. Groundwater was not used for potable purposes during the 2017 Water Year.

NACIMIENTO RESERVOIR

Water deliveries to the City from Nacimiento Reservoir began in January 2011. During the 2017 Water Year, 68 percent of the City's total water demand was met by Nacimiento Reservoir. San Luis Obispo County operates and maintains the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives from each of the four agencies' governing boards and a County Representative who is a member of the County Board of Supervisors which also sits as the Board of Directors for the Flood Control District.

Since 2010, San Luis Obispo County Flood Control District, the Nacimiento Regional Water Management Advisory Committee, Monterey County Parks, and Monterey County Water Resources Agency have worked together to plan, advise, and organize a Mussel Prevention Program at Lake Nacimiento. On July 29, 2017, an inspector noticed hundreds of invasive mussels attached to a boat and prevented the owner from launching at the Heritage Ranch boat ramp. Inspections are conducted as part of the on-going

program. Invasive mussels have not been found in any local San Luis Obispo County lakes to-date, due in part to inspection program efforts, along with responsible boat owners' prevention efforts.

SALINAS & WHALE ROCK RESERVOIRS

Prior to receiving water from Nacimiento Reservoir, Salinas and Whale Rock Reservoirs served as the City's primary water supplies for over 50 years. The City pays the County of San Luis Obispo Flood Control and Water Conservation District (County) to provide oversight, operations, and maintenance of the Salinas Reservoir and related water delivery facilities. The City provides the oversight, operations, and maintenance of the Whale Rock Reservoir for the benefit of the Whale Rock Commission, a joint powers agency made up of Cal Poly State University, California Men's Colony, and the City. During the 2017 Water Year, the City utilized 1,373-acre feet from Salinas and Whale Rock reservoirs, meeting 27 percent of total City water demand.

Safe Annual Yield Update

Safe annual yield analyses of available water supply sources are based on rainfall, evaporation, and stream flow experienced during a historical period. Although future conditions are unlikely to occur in the precise sequence and magnitudes as have occurred historically, this technique provides a conservative estimate of the future water supply capability of the existing sources, and provides a tool for observing the impacts of increased temperature, evaporation, and decreased precipitation.

Whale Rock Reservoir Level Gauge.

In 1988, the City contracted with engineering firm Leedshill-Herkenhoff, Inc., to prepare a detailed analysis of the coordinated operation of Salinas and Whale Rock Reservoirs and create a model to determine the safe annual yield. The report was completed in 1989 and utilized data from 1943 through 1991 including drought periods in 1946-51, 1959-61, and 1976-77. Key assumptions used in the model were that the "controlling drought period" was from 1946 to 1951, that the City only used Whale Rock Reservoir when Salinas Reservoir was below minimum pool or could not meet the City's monthly demand, and that minimum pool at Salinas and Whale Rock of 400 and 500 acre-feet, respectively. The minimum pool at each lake is the amount of water that must be left in the lake for fishery and habitat resources (in 2017, minimum pool for each lake is 2,000-acre feet). Under those assumptions, the study estimated the City's total safe annual yield from the two reservoirs to be 9,080 acre-feet per year.

In 1991, staff updated the safe annual yield model to examine the impact of the 1986-91 drought and revise the assumptions on the amount of water used from Whale Rock Reservoir each year to more accurately reflect the way the City used that resource. The analysis determined that the 1986-91 drought was the critical drought of record for the two reservoirs. When siltation is included, these revised assumptions resulted in a reduction in the safe annual yield estimate to the 6,940-acre feet recognized today.

The most recent drought data is currently being analyzed and peer-reviewed to determine if reductions to the City's current safe annual yield will be necessary going forward. Reductions are anticipated as the recent drought is now the critical drought of record. Revisiting the safe annual yield model will also

consider revision to the assumptions on the amount of water used from Salinas and Whale Rock Reservoirs each year to accurately reflect the way the City uses its available water resources.

Spillway Assessment

As a result of the spillway failure at Oroville Dam, the Department of Water Resources (DWR) is requiring detailed analyses of dams that have large spillways at high hazard dams. Though there are no known deficiencies in the Whale Rock spillway, in May 2017, the City received a letter from the DWR requesting preparation of a work plan for a comprehensive spillway condition assessment by August 1, 2017. By conducting an analysis of design, current conditions, and underlying or adjacent geology, any deficiencies in the spillway will be identified. If required, corrective action will be planned and projects implemented to ensure the ability of Whale Rock Reservoir's spillway to function as designed.

Whale Rock Reservoir Spillway

The Work Plan for Whale Rock Reservoir's Comprehensive Spillway Condition Assessment was approved in September. The intent of the assessment is to evaluate the ability of the spillway to function as intended during normal operations as well as during a flood event. The tasks listed in the work plan include:

- Review of the spillway's design features using available as-built drawings, design and construction records
- Evaluation of the existing conditions of the spillway
- Geologic inspection
- Evaluation of all inspection and repair records

The City's Utilities Department staff is developing a scope of work for the comprehensive spillway analysis based on the approved Work Plan. The scope of work will be the basis for a request for proposals to identify qualified consultants to perform the spillway analysis.

Pipeline Reliability Analysis

The 18-mile long Whale Rock pipeline was constructed in the late 1950s and has served the City well since 1960, requiring minimal maintenance and repairs. A pipeline reliability analysis was prioritized as part of the Whale Rock Reservoir capital improvement program for 2017-19. The analysis is expected to be completed during the 2018 Water Year. By determining the true condition of the pipeline utilizing modern technology, it is expected the Commission will be able to focus resources on needed point repairs to the pipeline and avoid full-scale replacement based on pipe age.

30-inch Whale Rock Pipeline Repair Conducted in June 2017

RECYCLED WATER

For the 2017 Water Year, the City delivered 229-acre feet of recycled water, up from 202-acre feet for the 2016 Water Year. The City Council adopted a resolution approving the *2017 Recycled Water Master Plan* on March 21, 2017 and authorized staff to negotiate an agreement for delivery of recycled water outside the city limits consistent with policies and findings identified in the City's *General Plan*.

The design phase for the City's Water Resource Recovery Facility (WRRF) Project continued through Water Year 2017. Construction is planned to begin in October 2018 and continue through 2021. When complete, the WRRF Project will maximize recycled water production. The project will also enable the City to consider potable reuse, part of a *One Water* concept, in the future.

As part of a larger property upgrade, the Irish Hills Hamlet, a 146-unit apartment complex on Los Osos Valley Road originally constructed in the 1970s, retrofitted its landscape and irrigation system to utilize recycled water. The property has almost 76,000 square feet of landscaped area and is estimated to offset five-acre feet of potable water use with the retrofit.

Irish Hills Hamlet became the City's latest recycled water customer in August 2017

GROUNDWATER

The City stopped using groundwater for potable purposes in April 2015. The City's groundwater wells remain in an operable, stand-by position should the use of groundwater be required. During the 2017 Water Year, the City continued its work with a hydrogeologist to site a future well field for a potential groundwater program expansion.

III. WATER DEMAND

During Water Year 2017, 67 percent of total water use in the City was to support single and multi-family residential uses, 25 percent was to support commercial and other non-residential development, and eight percent was to support landscape irrigation (separately metered). Historical water use is summarized below, as well as corresponding population, per capita use rate, and precipitation. The 2017 per capita water use was 95 gallons per capita per day (gpcd). Based on the City's General Plan Water and Wastewater Management Element policies, the City uses 117 gpcd to project water required to serve build-out population.

Population, Water Use & Rainfall

Year	Population	Total Water Use (acre feet)	Per Capita Water Use (gpcd)	Rainfall[1,2,3] (inches)
2008	44,579	6,359	127	18.1
2009	44,829	6,134	122	18.9
2010	44,948	5,489	109	36.0
2011	45,418	5,285	104	18.9
2012	45,308	5,541	109	21.5
2013	45,541	5,892	116	3.8
2014	45,473	5,524	109	14.2
2015	45,802	4,990	97	11.8
2016	46,117	4,731	92	17.8
2017	**46,724** [4]	**4,975**	**95**	**35.1**

Notes:

1. Rainfall amounts for 2005–2012 calendar year source: Cal Poly CIMIS Weather Station.
2. Rainfall amount for calendar year 2013-2015: SLO Reservoir.
3. Data for 2008 through 2014 presents calendar year rainfall data. 2015 and 2016 rainfall data covers the Water Year (October through September).
4. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

As the City's reservoirs are located in different watersheds, described below, rainfall at various sites within San Luis Obispo County benefits us. All locations exceeded the annual average during the 2017 water year.

2017 Water Year Rainfall Totals

Rainfall Measurement Location	Watershed	Annual Average Rainfall (in inches)	2017 Water Year Total Rainfall (in inches)
Rocky Butte	Nacimiento Reservoir	39	87.1
Hwy 46 and W 7 Mile Road in Cambria, CA	Whale Rock Reservoir	30	38.0
SLO Reservoir	City	25	35.1
Salinas Dam	Salinas Reservoir	23	33.6

Source: http://www.slocountywater.org/site/Water%20Resources/Data/maps/precipitation-real-time.htm

San Luis Obispo and surrounding watersheds experienced impressive rainfall totals during the 2017 Water Year

IV. WATER RESOURCE AVAILABILITY

The following table summarizes the Water Resource Availability based on *Water and Wastewater Management Element,* Section 3. Water availability for 2017 is 12,115-acre feet, an increase of six-acre feet over 2016 due to increased recycled water usage.

2017 Water Resource Availability

Water Resource	Acre Feet	Description
Salinas & Whale Rock Reservoirs	6,940	Safe Annual Yield [1]
Nacimiento Reservoir	5,482	Dependable Yield [2]
Recycled Water	193	2016 Annual Usage [3]
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]
	12,115	**2017 Annual Availability**

NOTES:

1. Safe Annual Yield determined from computer model, which accounts for siltation loss through 2010 (per WWME Policy A 4.2.1).
2. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
3. The quantity of recycled water included is the actual prior year's recycled water usage (calendar year 2016) per *General Plan Water and Wastewater Management Element* Policy A 7.2.2.
4. Reservoir siltation is a natural occurrence that reduces storage capacity over long periods, resulting in the reduction of safe annual yield.

V. WATER SUPPLY ACCOUNTING

Per *General Plan Water and Wastewater Management Element,* Section 5, the City accounts for water supplies necessary to meet three specific community needs:

- Primary water supply
- Reliability reserve
- Secondary water supply

The City's primary water supply is defined as the amount of water needed to serve the build-out population identified in the *General Plan*, *Land Use Element (2014)*. Table 3 in the *Land Use Element* identifies an urban reserve capacity of 57,200 people. The quantity of water needed for the primary water supply is calculated per WWME Policy A 5.2.2, using 117 gallons per capita per day (gpcd).

The reliability reserve provides a buffer for future unforeseen or unpredictable long-term impacts to the City's water supply. The quantity of water for the reliability reserve is established using 20 percent of the existing City population (46,724, 2017 population) at 117 gpcd, thus the reliability reserve will increase over time as population increases. The reliability reserve concept is included in the

Primary Water Supply

= 117 gpcd x City Build-out Population

= 117 gpcd x 57,200 x 365 day/year x Acre-Ft/325,851 gal

7,496 Acre-Ft/year

Reliability Reserve

= 117 gpcd x City Population x 20%

= 117 gpcd x 46,724 x 365 day/year x Acre-Ft/325,851 gal x 20%

1,225 Acre-Ft/year

Secondary Water Supply

= Current Annual Availability – Primary Water Supply – Reliability Reserve

= 12,115 Acre-Ft/year [A] – 7,496 Acre-Ft/year – 1,225 Acre-Ft/year

3,394 Acre-Ft/year

[A] 2017 Annual Availability

City's Charter (Section 909) which identifies that the water may not be used to serve future development, and is defined per WWME Policy A 5.2.3.

The City's secondary water supply is the amount of water remaining from available water resources above those needed to meet the primary water supply and reliability reserve. The secondary supply is identified to meet peak water demand periods or short-term loss of City water supply sources, per *General Plan Water and Wastewater Management Element,* Policy A 5.2.4. Water supply accounting is summarized in the table below.

2017 Water Supply Accounting (acre feet)

Total	Primary Water Supply	Reliability Reserve	Secondary Water Supply
12,115	7,496	1,225	3,394

VI. WATER DEMAND MANAGEMENT

The water conservation program is an integral part of the City's overall water management strategy. In the late 1980's, the City implemented effective water efficiency programs and policies that allowed for continued community growth and economic development during water-constrained periods. It is estimated that 90 percent of residential toilets in the City have been retrofitted to 1.6 gallons per flush or more efficient. The City's Toilet Retrofit Program is still active, requiring replacement of inefficient toilets upon change of ownership of a home. Through strong conservation efforts, the community has reduced its annual average per capita water use from over 180 gallons in 1987 to 95 for the 2017 Water Year.

To reach all local demographics, outreach efforts were expanded by attending local events such as Farmers Market, Earth Day, and the Disaster Preparedness Expo. Conservation messaging also continued through traditional media sources as well as new avenues such as on-line "How To" videos available at the City's website (slowater.org) explaining common areas around the house where leaks occur and unnecessarily consume water.

During the 2017 Water Year, the City's Water Efficient Landscape Ordinance was updated with new climate data which reduced the acceptable amount of irrigation demand at newly constructed and landscaped properties.

Utilities Department information booth at 2017 Disaster Preparedness Expo.

REGIONAL WATER RESOURCE PLANNING

The City continues to participate as a member of the Water Resources Advisory Committee and Regional Water Management Group, which promotes collaborative, integrated management of water resources within San Luis Obispo County and provides policy recommendations to the County Board of Supervisors. In addition, the City participates in the regional *Partners in Water Conservation* group which is made up of water conservation professionals from local agencies. The group meets every other month to discuss trends in the industry, upcoming changes to regulations, and to work together on regional messaging related to water conservation and water use efficiency.

2018 Water Resources Status Report

For the Time Period October 1, 2017 through September 30, 2018

Prepared by the Water Division of the City of San Luis Obispo, Utilities Department

The City's 2018 Water Resources Status Report was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The reporting period corresponds to the Water Year (October 1, 2017 through September 30, 2018), the 12-month period for which precipitation totals are measured designated by the calendar year in which it ends. This report for Water Year 2018 is organized as follows:

I. Water Projects and Policy Update
II. Water Supply
III. Water Demand
IV. Water Resource Availability
V. Water Supply Accounting

I. WATER PROJECTS AND POLICY UPDATE

2018 Update to General Plan, Water and Wastewater Management Element

In May 2018, the City Council approved text amendments to the City's Water and Wastewater Management Element (WWME) of the General Plan. The primary focus of the amendment was to provide updated water supply information from the City's safe annual yield model. No policy changes were made as part of the amendment.

The City defines the terminology "safe annual yield" as the amount of water which can be reliably withdrawn annually from coordinated operation of Salinas and Whale Rock Reservoirs. A previous key assumption used in the model was the "controlling drought period" from 1986-1991. The 2018 update to the safe annual yield model added data from the most recent drought that ended in 2016 consistent with WWME program A 3.3.2 and analyzed three climate change scenarios. Based on the updated modeling and analysis of climate change scenarios, safe annual yield from Salinas and Whale Rock Reservoirs was reduced from 6,940-acre feet to 4,910-acre feet as part of the amendment.

Change in Annual Water Supply Availability

	2017 Annual Availability	2018 Annual Availability
Salinas Reservoir and Whale Rock Reservoir	6,940 AF	**4,910 AF**[1]
Nacimiento Reservoir	5,482 AF	**5,482 AF**
Recycled Water	193 AF	**238 AF**
Siltation to 2060	(500 AF)	**(500 AF)**
TOTAL	12,115 AF	**10,130 AF**

NOTES:
1. Reflects reduction in Safe Annual Yield as determined by the City's model.
2. Water supply accounting data is in "AF" or acre feet.

Although this is a significant reduction in the safe annual yield from these reservoirs, the City has a multi-source water supply to meet the City's future water demand. Data provided in Section IV of this report on Water Resource Availability, reflects the updated WWME.

Water Resiliency Planning – Water Energy Efficiency Project

The City declared Climate Action a Major City Goal in the 2017-19 Financial Plan and identified objectives focused on energy efficiency and greenhouse gas reductions within City facilities, such as the City's Water Treatment Plant. In April, the City Council approved Resolution 10878 authorizing participation in Pacific Gas and Electric's Sustainable Solutions Turnkey Program for the Water Energy Efficiency Project. The Project is analyzing both the use of photovoltaic panels and a hydropower turbine that would convert the energy in the high-pressure water line from Nacimiento Reservoir into electricity. The electricity generated would offset the Water Treatment Plant's overall power demand (Water = Energy). The Project is also assessing pump efficiencies within the Water Treatment Plant, the primary disinfection system, water quality in storage tanks, water distribution main inter-ties between service zones, and settings of related controls needed for control system (SCADA-Supervisory Control and Data Acquisition) integration. Recommendations will be presented to the City Council in 2019 on alternative energy generation opportunities as well as replacing aging infrastructure in a holistic manner from the surface water source, to the treatment plant, and within the distribution system.

Water = Energy
Water Energy Efficiency Project, 2018.

2018 State Legislation on Water Conservation and Drought Planning

The California State Legislature (Legislature) enacted two policy bills in 2018 – Senate Bill (SB) 606 and Assembly Bill (AB) 1668 – to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. These two bills amend existing law to provide expanded and new authorities and requirements to enable permanent changes and actions for those purposes, improving the state's water future for generations to come.

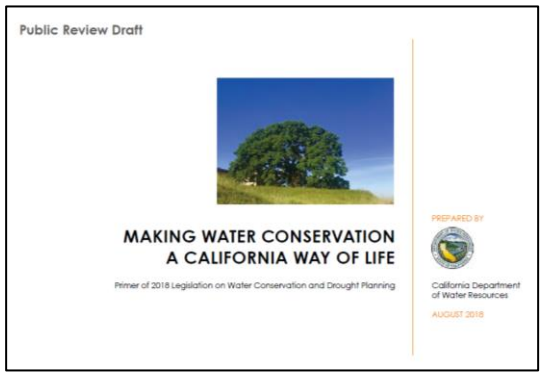
In August 2018, the State made the Public Review Draft of *Making Water Conservation a California Way of Life* available addressing the four primary goals in Executive Order B-37-16 and the 2017 Framework:

(1) use water more wisely,
(2) eliminate water waste,
(3) strengthen local drought resilience, and
(4) improve agricultural water use efficiency and drought planning.

Goals 1 through 3 will apply to the City's water planning. The bills include changes in Urban Water Management Plan (UWMP) preparation requirements as well as schedule and content provisions for the most critical reporting requirement – the annual water use report. Under the new authorities and requirements, the City would be required to prepare, adopt, and submit a Water Shortage Contingency Plan (WSCP) and conduct a Drought Risk Assessment (DRA) every five years in addition to conducting an annual water supply and demand assessment. The City already has adopted a WSCP and prepares this WRSR annually. However, these documents will need to align with new State requirements with the 2020 update to the City's UWMP.

Making Water Conservation a California Way of Life is available at the following link:

https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Primer-of-2018-Legislation-on-Water-Conservation-and-Drought-Planning.pdf



II. WATER SUPPLY

Per the *General Plan Water and Wastewater Management Element*, Policy A2.2.1, the City uses multiple water sources to meet its water supply needs. The City has four primary water supply sources including Whale Rock Reservoir, Salinas Reservoir, Nacimiento Reservoir, and supplies recycled water for landscape irrigation and construction water. Groundwater serves as a fifth supplemental source. The supply per source for Water Year 2018 (from October 1, 2017 to September 30, 2018) is summarized below.

City of San Luis Obispo Water Supply Sources

- ✓ Nacimiento Reservoir
- ✓ Whale Rock Reservoir
- ✓ Recycled Water
- ✓ Salinas Reservoir
- ✓ Groundwater

2018 City Water Supply by Source (Acre Feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Recycled Water	Salinas Reservoir	Groundwater [3]	Total City Water Demand
3,848	410	244	723	0	5,225
73%	8%	5%	14%	0%	**100%**

Notes:
1. Values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand.
3. Groundwater was not used for potable purposes during Water Year 2018.

During Water Year 2018, 73 percent of the City's total water demand was met by Nacimiento Reservoir. San Luis Obispo County operates and maintains the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives from each of the four agencies' governing boards and a County Representative who is a member of the County Board of Supervisors which also sits as the Board of Directors for the Flood Control District.

During Water Year 2018, the City utilized a total of 1,133-acre feet from Salinas and Whale Rock reservoirs, meeting 22 percent of total City water demand. The City pays the County of San Luis Obispo Flood Control and Water Conservation District (County) to provide oversight, operations, and maintenance of the Salinas Reservoir and related water delivery facilities. The City provides the oversight, operations, and maintenance of the Whale Rock Reservoir for the benefit of the Whale Rock Commission, a joint powers agency made up of Cal Poly State University, California Men's Colony, and the City.

For Water Year 2018, the City delivered 244-acre feet of recycled water for landscape irrigation and construction water, up from 229-acre feet in Water Year 2017 and five percent of total City water demand. New recycled water customers include the Homeless Services Center located on Prado Road and the new Park and Ride located on Calle Joaquin. Construction water use increased from 19-acre feet in Water Year 2017 to 36-acre feet in Water Year 2018.

Recycled Water for Construction
(in acre feet)

2017	2018
19	36

Note: Values are rounded.

The design phase for the City's Water Resource Recovery Facility (WRRF) Project continued through Water Year 2018. Construction of the Project is planned to begin in 2019 and will take approximately three years. When complete, the new technology used at the WRRF will reduce overall treatment time from approximately 28 hours to eight hours.

With increasing demand for recycled water, the City has developed a recycled water production model to simulate future recycled water supply and demand. This model will assist in developing parameters for how much recycled water is available for in-City customers and excess recycled water that may be available for outside-City deliveries.

Although the City stopped using groundwater for potable purposes in April 2015, groundwater wells remain in an operable, stand-by position should the use of groundwater be required. During Water Year 2018, the City continued its work with a hydrogeologist to site a future well field for a potential groundwater program expansion. The City submitted a Concept Proposal in August 2018, to be considered for the Proposition 1 Groundwater Grant Program. The City received notice from the State Water Resources Control Board inviting the City to submit a full proposal for consideration in 2019.

The City's permit program for the use of the Corporation Yard well expired December 31, 2018 and the well will be closed to the public starting January 1, 2019. After several years of close coordination with County of San Luis Obispo Public Works staff, a County-owned potable water filling station is scheduled to open to the public on January 1, 2019. This filling station is intended to supply the needs of those currently utilizing the City's Corporation Yard well.

III. WATER DEMAND

During Water Year 2018, 62 percent of total water use in the City was to support single and multi-family residential uses, 24 percent was to support commercial and other non-residential development, and 14 percent was to support landscape irrigation that is separately metered. Historical water use is summarized below, as well as corresponding population, per capita use rate, and rainfall. The 2018 per capita water use was 100 gallons per capita per day (gpcd). Per capita water use is calculated by dividing total water use in the City by the City's population. Total water use includes residential and daytime population needs for all uses such as restaurants, hotels, industrial/manufacturing, government/schools, and irrigation. Based on the City's *General Plan Water and Wastewater Management Element* policies, the City uses a factor of 117 gpcd to project water required to serve the General Plan's estimated population in 2035.

Population, Water Use, and Rainfall

Year	Population[3]	Total Water Use (acre feet)	Per Capita Water Use (gpcd)	Rainfall[1,2] (inches)
2009	44,829	6,134	122	18.9
2010	44,948	5,489	109	36.0
2011	45,418	5,285	104	18.9
2012	45,308	5,541	109	21.5
2013	45,541	5,892	116	3.8
2014	45,473	5,524	109	14.2
2015	45,802	4,990	97	11.8
2016	46,117	4,731	92	17.8
2017	46,424	4,975	95	35.1
2018	**46,548**	**5,225**	**100**	**12.9**

NOTES:

1. Rainfall for 2009 through 2012 calendar year source was from Cal Poly CIMIS Weather Station. Rainfall for calendar year 2013 through 2018 was from SLO Reservoir.
2. Rainfall data for 2009 through 2014 is for the calendar year; 2015 through 2018 data covers the Water Year (October through September).
3. Population data is available at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

The City's water supply reservoirs are in different watersheds, therefore rainfall at various locations within San Luis Obispo County benefits the City. During Water Year 2018, the majority of area rainfall occurred in March. All reservoir locations received less than the annual average during Water Year 2018.

Water Year 2018 Rainfall Totals

Rainfall Measurement Location	Watershed	Annual Average Rainfall (in inches)	Water Year 2018 Total Rainfall (in inches)
Rocky Butte	Nacimiento Reservoir	40	29.4
Hwy 46 and W 7 Mile Road, Cambria, CA	Whale Rock Reservoir	30	16.9
SLO Reservoir	City	24	12.9
Salinas Dam	Salinas Reservoir	22	12.3

Source: https://wr.slocountywater.org/list.php?sensor_class=11&mode=sensor&cache=1&refresh=off

IV. WATER RESOURCE AVAILABILITY

The following table summarizes the Water Resource Availability based on *Water and Wastewater Management Element,* Section 3. Water availability for 2018 is 10,130-acre feet.

2018 Water Resource Availability

Water Resource	Acre Feet	Description
Salinas & Whale Rock Reservoirs	4,910	Safe Annual Yield [1]
Nacimiento Reservoir	5,482	Dependable Yield [2]
Recycled Water	238	2017 Annual Usage [3]
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]
	10,130	**2018 Annual Availability**

NOTES:

1. The City's Safe Annual Yield model was updated in 2018.
2. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
3. The quantity of recycled water included is the actual prior year's recycled water usage (calendar year 2017) per *General Plan Water and Wastewater Management Element* Policy A 7.2.2.
4. Reservoir siltation is a natural occurrence that reduces storage capacity over long periods, resulting in the reduction of safe annual yield.

V. WATER SUPPLY ACCOUNTING

Per *General Plan Water and Wastewater Management Element,* Section 5, the City accounts for water supplies necessary to meet three specific community needs:

- Primary water supply
- Reliability reserve
- Secondary water supply

The City's primary water supply is defined as the amount of water needed to serve the build-out population identified in the *General Plan*, *Land Use Element (2014)*. Table 3 in the *Land Use Element* identifies an urban reserve capacity of 57,200 people. The quantity of water needed for the primary water supply is calculated per WWME Policy A 5.2.2, using 117 gallons per capita per day (gpcd).

The City's reliability reserve provides a buffer for future unforeseen or unpredictable long-term water supply impacts. The quantity of water for the reliability reserve is defined in WWME Policy A 5.2.3, using 20 percent of the existing City population (46,548, 2018 population) at 117 gpcd. The reliability reserve will change over time as the City's population changes. The reliability reserve concept is included in the City's Charter (Section 909) which identifies that the water may not be used to serve future development.

Primary Water Supply

= 117 gpcd x City Build-out Population

= 117 gpcd x 57,200 x 365 day/year x Acre-Ft/325,851 gal

7,496 Acre-Ft/year

Reliability Reserve

= 117 gpcd x City Population x 20 percent

= 117 gpcd x 46,548 x 365 day/year x Acre-Ft/325,851 gal x 20 percent

1,220 Acre-Ft/year

Secondary Water Supply

= Current Annual Availability – Primary Water Supply – Reliability Reserve

= 10,130 Acre-Ft/year[A] – 7,496 Acre-Ft/year – 1,220 Acre-Ft/year

1,414 Acre-Ft/year

[A] 2018 Annual Availability

The City's secondary water supply is the amount of water remaining from available water resources above those needed to meet the primary water supply and reliability reserve. The secondary supply is identified to meet peak water demand periods or short-term loss of City water supply sources, per *General Plan Water and Wastewater Management Element,* Policy A 5.2.4. The amendment to the City's WWME to reflect the update to the City's Safe Annual Yield model, discussed in Section I of this report, led to the reduction in the City's available secondary water supply for Water Year 2018.

Water supply accounting is summarized in the table below.

2018 Water Supply Accounting (acre feet)

Total	Primary Water Supply	Reliability Reserve	Secondary Water Supply
10,130	7,496	1,220	1,414

In summary, despite a significant reduction in safe annual yield from the combined operation of Whale Rock and Salinas Reservoirs, the City maintains a robust water supply portfolio with greater than five years of water available. Per capita water use (obtained from adding up all water used by visitors, residents, commercial uses, etc.) has increased to 100 gallons per capita per day (gpcd) from 95 gpcd the prior year. Recycled water use continues to rise over time.

2019 Water Resources Status Report

For the Time Period October 1, 2018 through September 30, 2019

Whale Rock Reservoir, August 2019.

Prepared by the Water Division of the City of San Luis Obispo, Utilities Department

The City's 2019 Water Resources Status Report was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The reporting period corresponds to the Water Year (October 1, 2018 through September 30, 2019), the twelve-month period for which precipitation totals are measured designated by the calendar year in which it ends. This report for Water Year 2019 is organized as follows:

I. Regulatory and Water Projects Update
II. Water Supply
III. Water Demand
IV. Water Resource Availability
V. Water Supply Accounting

I. REGULATORY AND WATER PROJECTS UPDATE

America's Water Infrastructure Act

America's Water Infrastructure Act of 2018 (AWIA) was signed on October 23, 2018. AWIA is an update to the Bioterrorism Act of 2002 of the Safe Drinking Water Act. AWIA outlines that community water systems serving 3,300 persons must:

- Conduct a Risk and Resilience Assessment (RRA),
- Revise Emergency Response Plans (ERP),
- Submit a certification letter to EPA,
- Review and update at least every five years.

The Act requires the City to certify the RRA by June 30, 2021 and the ERP December 30, 2021.

Preparation for PSPS Events

To protect communities from wildfire, Pacific Gas & Electric (PG&E) notified its customers of its plans to implement precautionary measures during fire season. If extreme fire danger conditions threaten a portion of the PG&E electrical system, high-risk transmission lines may be turned off, resulting in potentially widespread power outages to San Luis Obispo County. PG&E refers to this as a Public Safety Power Shutoff, or PSPS event. According to PG&E, a PSPS event may be necessitated by strong winds, low humidity levels, and critically dry vegetation. PG&E advises these outages will not be localized; regional solutions will be limited because resources are likely going to be scarce on a local, regional and possibly a statewide scale. Nearby communities have already experienced similar PSPS events from their power supplier.

Electrical power is the greatest dependency of water systems, with heavy reliance on electricity to run pumps and other system components.

Since being informed by PG&E of the potential for PSPS events, the City has worked to prepare for power outages lasting up to seven days or more. In the past, the City has been able to continue to provide uninterrupted water and wastewater service during short-duration power outages and when limited areas were affected by utilizing existing water storage tanks with limited emergency power generation - some of the City's water and wastewater facilities have permanent emergency generators in place, while others utilized a limited number of mobile generators. With the PSPS notification from PG&E and the changing climate, staff identified additional emergency power resources for the City's water and wastewater systems to meet this increased duration.

With the support of the City Council in August, the Utilities Department worked to quickly acquire additional temporary emergency generators and make necessary electrical improvements for the Water Treatment Plant, Whale Rock Reservoir, and other water pump stations and sewer lift stations. The City has also been working closely with the County of San Luis Obispo to acquire a generator for the Salinas Booster station that provides water from Salinas reservoir to the City. Installation of permanent generators are planned for 2020. These efforts will bolster the resiliency of the City's water and wastewater services from any event that could result in loss of electricity.

Temporary Generator and the City's Stenner Canyon Water Treatment Plant.

Whale Rock Dam Spillway Assessment

The Whale Rock Reservoir and dam are located in San Luis Obispo County at the east boundary of the town of Cayucos. The dam is 266 feet tall with a crest length of 850 feet and crest width of 30 feet impounding Whale Rock Reservoir. The top of dam elevation is 232.2 feet. The Reservoir covers an area of 600 acres and has a maximum storage capacity of 38,967 acre-feet. Dam construction was completed in 1961. Whale Rock was constructed to provide municipal and agricultural water supplies, and fish and wildlife preservation. Over the 58-year life of the Whale Rock Reservoir and dam, the lake has filled to capacity and the spillway has been used 12 times, last spilling in 2005.

In 2018, the City contracted with HDR Engineering, Inc. for inspection and assessment of the Whale Rock Dam 850-foot long spillway. The investgation included:

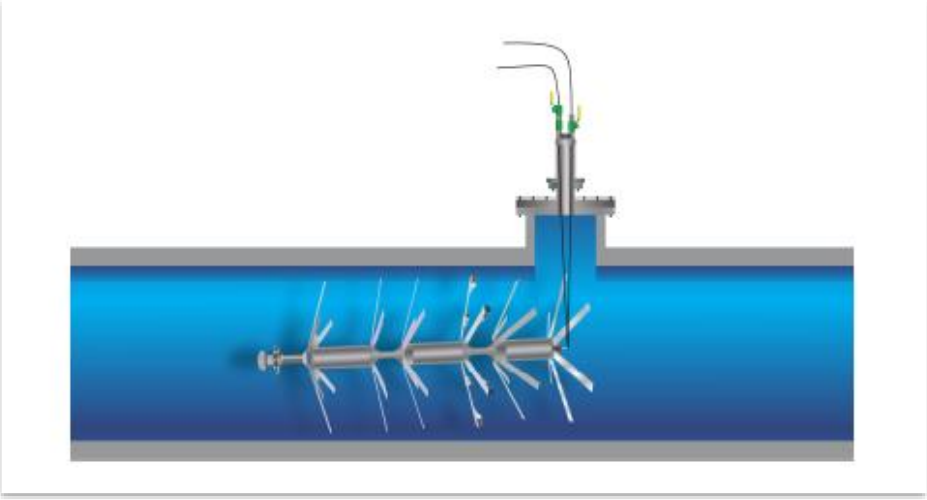

Whale Rock Dam Spillway.

1. Review of design, construction, inspection, analysis, operation and maintenance, and geologic information, as provided by City.
2. Detailed visual inspection of the spillway slabs and walls from upstream of the spillway crest to downstream of the stilling basin.
3. Video/camera inspection of accessible outfall drains and heel drains.
4. Geologic inspection of foundation material adjacent to the spillway.
5. Evaluation of original spillway design versus a modern spillway design.
6. Evaluation of operations, inspection, and surveillance practices.
7. Evaluation of performance of previous repairs.

A report was completed in March 2019 with recommendations including maintenance and repair activities for the drainage system and further engineering investigations. The City and its Whale Rock partners, Cal Poly and the California Men's Colony, will implement corrections as recommended by the California Department of Water Resources, Division of Safety of Dams.

Pipeline Condition Assessments

During the 2019 Water Year, pipeline condition assessments were completed for the Whale Rock Reservoir and Salinas Reservoir (Santa Margarita Lake) water transmission pipelines. The condition assessments used free-swimming electromagnetic inspection technology, shown in the image below, to locate and identify segments of the pipeline in need of repair. Over 16 miles of 30-inch transmission pipeline from Whale Rock Reservoir was analyzed. The assessment found that 2,610 segments had no abnormalities, and 25 segments had varying deficiencies (broken bar wraps or cylinder wall loss). The Salinas pipeline condition assessment analyzed 1.25 miles of pipeline originally installed in 1940s. Results of the assessment were described in a May 2019 report revealing 222 of the total 236 segments had no abnormalities, and 14 segments had varying deficiencies. Funding is programmed to address these pipeline deficiencies in the 2020-21 fiscal year.



Conceptual image of Electromagnetic Inspection Technology used to assess the Whale Rock and Salinas Reservoir transmission pipelines.

Sustainable Groundwater Management Act

The use of groundwater contributes to resiliency in the City's water supply portfolio by offering a potable water source to complement the City's three surface water supplies. The Sustainable Groundwater Management Act (SGMA) is a statewide law that requires Groundwater Sustainability Agencies (GSA) to adopt groundwater management plans that outline actions needed to return groundwater basins to sustainable levels of pumping and recharge. In May 2017, the City Council approved Resolution 10796 authorizing the City to become a Groundwater Sustainability Agency (GSA) for the San Luis Valley Groundwater Basin for the area that lies beneath and within the City's jurisdictional boundaries. In February 2019, the City Council, acting as the San Luis Valley Basin – City of San Luis Obispo Groundwater Sustainability Agency, approved the Notification of Intent to initiate development of a Groundwater Sustainability Plan (GSP) for the San Luis Obispo Valley Groundwater Basin.

The City is working in collaboration with the County of San Luis Obispo GSA to create a single Groundwater Sustainability Plan (GSP) that provides full coverage of the San Luis Valley Groundwater Basin. To get additional information, to sign up for the interested stakeholder email list, or to see materials for past or upcoming meetings related to the GSP development, interested parties are encouraged to visit www.slowaterbasin.com. The San Luis Valley GSP must be submitted to California Department of Water Resources (DWR) by January 31, 2022.

Leak Detection

In September 2019, staff from the City's Water Distribution section field tested acoustic correlation equipment by Echologics on an existing cast iron water main on Bebee Street. Acoustic sensors were attached to water valves to measure the speed at which sounds waves travel along the pipe. These sensors effectively listen to water flowing through the pipe and can hear when water is escaping through a leak. The location can then be identified. Using this tool regularly the City will be able to:

- More accurately locate small leaks, resulting in less damage to surrounding infrastructure
- Further optimize its capital spending
- Minimize water main breaks, water loss, and damage from leaks
- Better manage aging water infrastructure

The City's correlator can identify leaks that have not come to the surface yet, and pinpoint leak location within about two feet. The City's Water Distribution team is looking forward to utilizing this device to reduce water loss, find leaks before they create damage, reduce road repair work, and enhance proactive maintenance of the water distribution system.

Waterline Replacement Projects

Replacement of water distribution pipes and related facilities is an ongoing program aimed to address aging, substandard, and deteriorating infrastructure, with the added benefit of reducing customer impacts associated with emergency repairs. Waterline breaks occur with more frequency with aging waterlines, and the resulting repairs are disruptive to the public and expensive to repair. The main objectives of this program are to ensure reliable water service, reduce the need for emergency repairs, and to enhance available fire flows.

During the 2019 Water Year, the City completed replacement of approximately 5,000 lineal feet of waterline on Pacific (from Nipomo to Walker), Boysen (from Chorro to Hwy. 1), Chorro (from Pismo to Pacific) and Sierra (from Ella to Bishop) streets at a cost of approximately $2.3 million.

The Casa/Stenner/Murray Waterline Replacement Project proposes replacement of over 3,100 lineal feet of aged waterline on Casa, Stenner, Murray (from Hathway to Santa Rosa) and the intersections of Chorro/Meinecke and Chorro/Murray. The construction cost of the project is approximately $2 million. The waterlines replaced with this project are undersized and deteriorated. Their replacement will eliminate capacity limitations for Sierra Vista Hospital, reduce the likelihood of service interruptions due to leaks, and improve water flow for fire protection.

Short-Term Water Sales

At a March 2019 study session, City Council provided direction to staff related to short-term water sales. A potential recipient of this program may be Cal Poly while the university secures a permanent water supply specifically related to housing production. Council supported broadening existing policy language for the City to supply non-potable water (raw water or recycled water) through a short-term agreement for agricultural purposes. Short-term agreements would be crafted to include provisions for service interruption or reduction, due to operational issues or climatic events, low reservoir levels, increased

water demand forecasting, or water quality deterioration. Meaning, during a water shortage emergency, City water deliveries would be prioritized above those included in a short-term sales agreement.
The City is uniquely positioned to assist Cal Poly in meeting its 2035 Master Plan goals as both a regional water partner and in support of City goals, particularly as it relates to additional on-campus housing. Cal Poly currently only has one source of potable water, which is raw water from Whale Rock Reservoir that is treated at the City's water treatment plant and delivered to the campus as part of a contract between the City and Cal Poly. Any contracts for short-term water sales would be brought to the City Council for consideration.

II. WATER SUPPLY

Per the *General Plan Water and Wastewater Management Element*, Policy A2.2.1, the City uses multiple water sources to meet its water supply needs. The City has four primary water supply sources including Whale Rock Reservoir, Salinas Reservoir, Nacimiento Reservoir, and recycled water. Groundwater serves as a fifth supplemental source. The supply per source for Water Year 2019 (from October 1, 2018 to September 30, 2019) is summarized below.

2019 City Water Supply by Source
(in acre feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Recycled Water	Salinas Reservoir	Groundwater [3]	Total City Water Demand
3,406	350	201	805	0	4,762
71.5%	7.4%	4.2%	16.9%	0%	100%

Notes:
1. Values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand.
3. Groundwater was not used for potable purposes during Water Year 2019.

During Water Year 2019, 71.5 percent of the City's total water demand was met by Nacimiento Reservoir. San Luis Obispo County operates and maintains the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives from each of the four agencies' governing boards and a County Representative who is a member of the County Board of Supervisors who also sits on the Board of Directors for the Flood Control District.

During Water Year 2019, the City utilized a total of 1,155-acre feet from Salinas and Whale Rock reservoirs, meeting 24.3 percent of total City water demand. The City pays the County of San Luis Obispo Flood Control and Water Conservation District (County) to provide oversight, operations, and maintenance of Salinas Reservoir and related water delivery facilities. The City provides oversight, operations, and maintenance of the Whale Rock Reservoir for the benefit of the Whale Rock Commission, a joint powers agency made up of Cal Poly State University, California Men's Colony, and the City.

For Water Year 2019, the City delivered 201-acre feet of recycled water for landscape irrigation and construction water. This equates to 4.21 percent of total City water demand. New recycled water customers include Coast BMW, HASLO for the Iron Works housing project, and Prado Day Center.

Recycled Water for Construction
(in acre feet)

2017	2018	2019
19	36	20

Note: Values are rounded.

Construction water use decreased from 36-acre feet in Water Year 2018 to 20-acre feet in Water Year 2019.

Construction of the Water Resource Recovery Facility (WRRF) Project began in 2019 and will take approximately three years to complete. When complete, the new technology used at the WRRF will reduce overall wastewater treatment time by approximately 20 hours, from approximately 28 hours to eight hours, providing a shortened timeframe for when wastewater comes into the plant and when it can be sent out into the recycled water system for irrigation use.

Although the City suspended using groundwater for potable purposes in April 2015, groundwater wells remain in an operable, stand-by position should the use of groundwater be needed. During Water Year 2019, the City continued its work with a hydrogeologist to site a future well field for a potential groundwater program expansion. The City received notice from the State Water Resources Control Board inviting the City to submit a full proposal for the Proposition 1 Groundwater Grant Program for consideration in 2019. The City was notified in October 2019 that pending negotiation with the State Board, it will be receiving the $2 million planning-phase grant for installation of monitoring wells and for monitoring groundwater quality. These are necessary steps in reestablishing the City's groundwater program. The planning phase will continue through 2020 with implementation planned for 2021.

Salinas Dam spillway, February 2019.

III. WATER DEMAND

During Water Year 2019, 60.48 percent of total water use in the City was to support single and multi-family residential uses, 28.36 percent was to support commercial and other non-residential development, and 11.16 percent was to support landscape irrigation that is separately metered. Historical water use is summarized below, as well as corresponding population, per capita use rate, and rainfall. The 2019 per capita water use was 91 gallons per capita per day (gpcd). Per capita water use is calculated by dividing total water use in the City by the City's population. Total water use includes residential and daytime population needs for all uses such as restaurants, hotels, industrial/manufacturing, government/schools,

and irrigation. Based on the City's *General Plan Water and Wastewater Management Element* policies, the City uses a factor of 117 gpcd to project water required to serve the General Plan's estimated population in 2035.

Population, Water Use, and Rainfall

Year	Population[3]	Total Water Use (acre feet)	Per Capita Water Use (gpcd)	Rainfall[1,2] (inches)
2010	44,948	5,489	109	36.0
2011	45,418	5,285	104	18.9
2012	45,308	5,541	109	21.5
2013	45,541	5,892	116	3.8
2014	45,473	5,524	109	14.2
2015	45,802	4,990	97	11.8
2016	46,117	4,731	92	17.8
2017	46,424	4,975	95	35.1
2018	46,548	5,225	100	12.9
2019	**46,802**	**4,762**	**91**	**27.1**

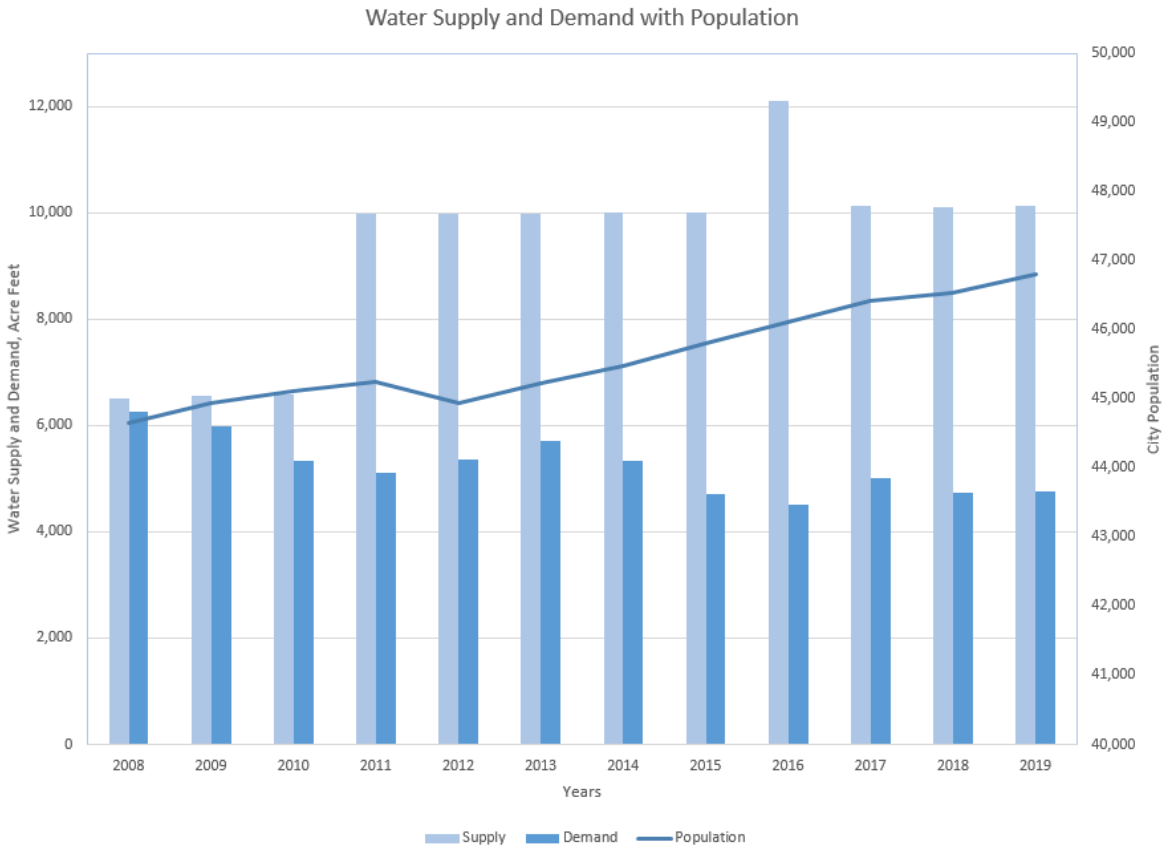
NOTES:
1. Rainfall for 2010 through 2012 calendar year source was from Cal Poly CIMIS Weather Station. Rainfall for calendar year 2013 through 2019 was from SLO Reservoir.
2. Rainfall data for 2000-2014 is for the calendar year; 2015-2019 data covers the Water Year (October 1 to September 30).
3. Population data is available at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/

The City's water supply reservoirs are in different watersheds, therefore rainfall at various locations within San Luis Obispo County benefits the City. During Water Year 2019, three reservoir locations (Rocky Butte, SLO Reservoir, and Salinas Dam) received more than the annual average. The remaining location, Hwy 46 and W 7 Mile Road, Cambria, CA, received 92 percent of average rainfall.

Water Year 2019 Rainfall Totals

Rainfall Measurement Location	Watershed	Annual Average Rainfall (in inches)	Water Year 2019 Total Rainfall (in inches)	Water Year 2019 Percent of Average
Rocky Butte	Nacimiento Reservoir	40	52.40	131%
Hwy 46 and W 7 Mile Road, Cambria, CA	Whale Rock Reservoir	30	27.65	92%
SLO Reservoir	City	24	27.10	113%
Salinas Dam	Salinas Reservoir	22	33.25	151%

Source: https://wr.slocountywater.org/list.php?sensor_class=11&mode=sensor&cache=1&refresh=off



IV. WATER RESOURCE AVAILABILITY

The following table summarizes the Water Resource Availability based on *Water and Wastewater Management Element,* Section 3. Water availability for 2019 is 10,136-acre feet.

2019 Water Resource Availability

Water Resource	Acre Feet	Description
Salinas & Whale Rock Reservoirs	4,910	Safe Annual Yield [1]
Nacimiento Reservoir	5,482	Dependable Yield [2]
Recycled Water	244	2018 Annual Usage [3]
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]
	10,136	**2019 Annual Availability**

NOTES:

1. The City's Safe Annual Yield model was updated in 2018.
2. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
3. The quantity of recycled water included is the actual prior year's usage (calendar year 2018) per *General Plan Water and Wastewater Management Element* Policy A 7.2.2.
4. Reservoir siltation is a natural occurrence that reduces storage capacity over long periods, resulting in the reduction of safe annual yield.

V. WATER SUPPLY ACCOUNTING

Per *General Plan Water and Wastewater Management Element,* Section 5, the City accounts for water supplies necessary to meet three specific community needs:

- Primary water supply
- Reliability reserve
- Secondary water supply

The City's primary water supply is defined as the amount of water needed to serve the build-out population identified in the *General Plan*, *Land Use Element (2014)*. Table 3 in the *Land Use Element* identifies an urban reserve capacity of 57,200 people. The quantity of water needed for the primary water supply is calculated per WWME Policy A 5.2.2, using 117 gallons per capita per day (gpcd).

The City's reliability reserve provides a buffer for future unforeseen or unpredictable long-term water supply impacts. The quantity of water for the reliability reserve is defined in WWME Policy A 5.2.3, using 20 percent of the existing City population (46,802, 2019 population) at 117 gpcd. The reliability reserve will change over time as the City's population changes. The reliability reserve concept is included in the City's Charter (Section 909) which identifies that the water may not be used to serve future development.

The City's secondary water supply is the amount of water remaining from available water resources above those needed to meet the primary water supply and reliability reserve. The secondary supply is identified to meet peak water demand periods or short-term loss of City water supply sources, per *General Plan Water and Wastewater Management Element,* Policy A 5.2.4.

Primary Water Supply

= 117 gpcd x City Build-out Population

= 117 gpcd x 57,200 x 365 day/year x Acre-Ft/325,851 gal

7,496 Acre-Ft/year

Reliability Reserve

= 117 gpcd x 2019 City Population x 20 percent

= 117 gpcd x 46,802 x 365 day/year x Acre-Ft/325,851 gal x 20 percent

1,227 Acre-Ft/year

Secondary Water Supply

= Current Annual Availability – Primary Water Supply – Reliability Reserve

= 10,130 Acre-Ft/year[A] – 7,496 Acre-Ft/year – 1,220 Acre-Ft/year

1,413 Acre-Ft/year

[A] 2018 Annual Availability

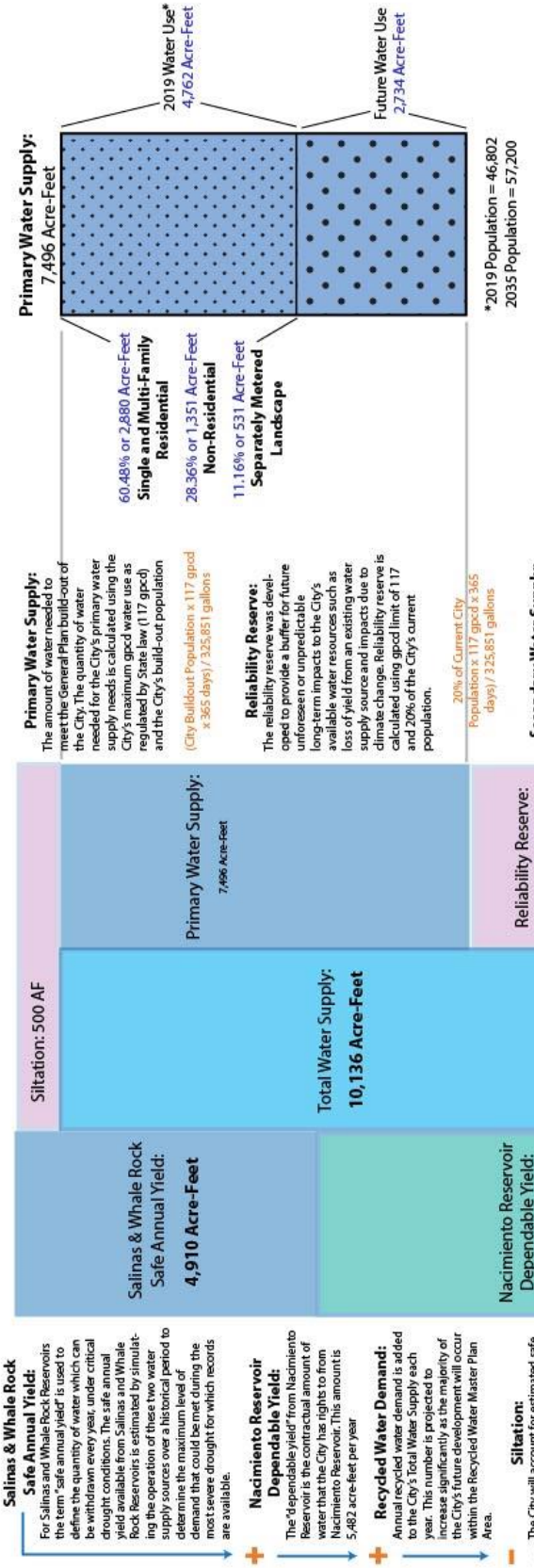
Water supply accounting is summarized in the table below and shown in Appendix A.

2019 Water Supply Accounting (acre feet)

Total	Primary Water Supply	Reliability Reserve	Secondary Water Supply
10,136	7,496	1,227	1,413

In summary, the City maintains a robust water supply portfolio with greater than five years of water available. Per capita water use (obtained from adding up all water used by visitors, residents, commercial uses, etc.) decreased during the 2019 Water Year to 91 gallons per capita per day (gpcd) from 100 gpcd during the 2018 Water Year.

Appendix A.


Primary Water Supply:
7,496 Acre-Feet
2019 Water Use*
4,762 Acre-Feet
Future Water Use
2,734 Acre-Feet
*2019 Population = 46,802
2035 Population = 57,200
60.48% or 2,880 Acre-Feet
Single and Multi-Family Residential
28.36% or 1,351 Acre-Feet
Non-Residential
11.16% or 531 Acre-Feet
Separately Metered Landscape
Primary Water Supply:
The amount of water needed to meet the General Plan build-out of the City. The quantity of water needed for the City's primary water supply needs is calculated using the City's maximum gpcd water use as regulated by State law (117 gpcd) and the City's build-out population
(City Buildout Population x 117 gpcd x 365 days) / 325,851 gallons
Reliability Reserve:
The reliability reserve was developed to provide a buffer for future unforeseen or unpredictable long-term impacts to the City's available water resources such as loss of yield from an existing water supply source and impacts due to climate change. Reliability reserve is calculated using gpcd limit of 117 and 20% of the City's current population.
20% of Current City Population x 117 gpcd x 365 days) / 325,851 gallons
Secondary Water Supply:
The amount of water needed to meet peak water demand periods or short-term loss of City water supply sources. The City's secondary water supply is identified as any water supply resources above those needed to meet the primary water supply and reliability reserve.
Total Water Supply - Primary Water Supply - Reliability Reserve
Salinas & Whale Rock Safe Annual Yield:
For Salinas and Whale Rock Reservoirs the term 'safe annual yield' is used to define the quantity of water which can be withdrawn every year, under critical drought conditions. The safe annual yield available from Salinas and Whale Rock Reservoirs is estimated by simulating the operation of these two water supply sources over a historical period to determine the maximum level of demand that could be met during the most severe drought for which records are available.
Nacimiento Reservoir Dependable Yield:
The "dependable yield" from Nacimiento Reservoir is the contractual amount of water that the City has rights to from Nacimiento Reservoir. This amount is 5,482 acre-feet per year
Recycled Water Demand:
Annual recycled water demand is added to the City's Total Water Supply each year. This number is projected to increase significantly as the majority of the City's future development will occur within the Recycled Water Master Plan Area.
Siltation:
The City will account for estimated safe annual yield losses at Salinas and Whale Rock Reservoirs through 2060 by deducting 500 acre feet of available water supplies to account for these future losses. The siltation rate will be updated as information becomes available from subsequent siltation analyses.
Total Water Supply:
(Safe Annual Yield + Dependable Yield + Recycled Water Demand - Siltation)
Salinas & Whale Rock Safe Annual Yield:
4,910 Acre-Feet
Nacimiento Reservoir Dependable Yield:
5,482 Acre-Feet
Recycled Water Demand:
244 Acre-Feet
Siltation: 500 AF
Total Water Supply:
10,136 Acre-Feet
Primary Water Supply:
7,496 Acre-Feet
Reliability Reserve:
1,227 Acre-Feet
Secondary Water Supply:
1,413 Acre-Feet

2020 Water Resources Status Report

For the Time Period October 1, 2019 through September 30, 2020

Stenner Canyon Water Treatment Plant.

The City's 2020 Water Resources Status Report was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The reporting period corresponds to the 2020 Water Year (October 1, 2019 through September 30, 2020), the twelve-month period for which precipitation totals are measured designated by the calendar year in which it ends. This report provides a summary of the following for the 2020 Water Year:

I. Regulatory and Water Capital Projects Update
II. Water Supply
III. Water Demand
IV. Water Resource Availability
V. Water Supply Accounting

I. CAPITAL PROJECTS AND REGULATORY UPDATE

The City completed two large water infrastructure projects during the 2020 Water Year and began the implementation of a third project with capital improvements totaling over $18.7 million. These projects are summarized below along with key regulatory updates related to the Sustainable Groundwater Management Act and the upcoming update to the City's Urban Water Management Plan.

Disinfection Byproduct Reduction & Water Treatment Plant Pipe Gallery Improvement Project

In August, the City completed the approximately $2.6 million Disinfection Byproduct Reduction and Water Treatment Plant (WTP) Pipe Gallery Improvements Project. The Project included modifications at two potable water storage tanks (Clearwell #2 at the WTP and Edna Saddle Tank) for the installation of specialty equipment (mixers, aerators, and ventilators) to effectively reduce disinfection byproducts to improve water quality and meet regulatory requirements. The Project also included replacement of corroded pipe within the pipe gallery at the WTP, and the replacement of a sections of effluent line and additional valving to provide a means for improved maintenance flexibility within the pipe gallery.

Water Energy Efficiency Project

In November 2019, the City Council approved the Water Energy Efficiency project that includes $14.3 million of improvements to the City's Water Treatment Plant. The benefits of the project include:

1. Contribute to the City's sustainability goals and advancement toward Zero Net Energy.
2. Reduce energy consumption and greenhouse gas emissions.
3. Replace obsolete equipment and components.
4. Improve ability to perform maintenance.
5. Improve reliability of achieving permit compliance.
6. Increase operational reliability, flexibility, and redundancy.
7. Reduced staff requirements for manual operation.

It is estimated that implementation of the Water Energy Efficiency Project will result in a reduction of energy usage of over 33 percent annually from 2019 WTP operations. The project is approximately 50 percent complete, with Phase 1

Installation of new Ozone Generators.

Installation of new Dilution Air Dryers.

Commissioning planned for early 2021. The Project is scheduled to be complete in mid-2021.

Waterline Replacement Projects

During the 2020 Water Year, the City completed replacement of over 3,000 lineal feet of waterline on Casa, Stenner, and Murray Streets surrounding Sierra Vista Hospital at a cost of approximately $1.7 million. Replacement of water distribution pipes and related facilities is an ongoing program aimed to address aging, substandard, and deteriorating infrastructure, with the added benefit of reducing customer impacts associated with emergency repairs. Waterline breaks occur with more frequency with aging waterlines, and the resulting repairs are disruptive to the public and expensive to repair. The main objectives of this program are to ensure reliable water service, reduce the need for emergency repairs, and to enhance available fire flows.

Capital Improvements at Whale Rock Reservoir

At the request of the California Department of Water Resources, Division of Safety of Dams, the City began preparing plans and specifications for a Spillway Underdrain Repair project at the Whale Rock dam, as well as the first draft of the Emergency Action Plan update, during the 2020 Water Year. The Plan is under review internally by staff. The City performs this work with its Whale Rock Commission partners, Cal Poly State University and the California Men's Colony.

Ongoing capital improvements aimed at maintaining infrastructure safety and reliability include replacement of pressure relief valves for Whale Rock Pump Station B, replacement of 2,000 feet of fence-line around Whale Rock Reservoir, and replacement of the Reservoir's boathouse structure.

Sunset bike ride at Whale Rock Reservoir.

Sustainable Groundwater Management Act

The use of groundwater will increase resiliency in the City's water supply portfolio by offering a local water source to complement the City's three surface water supplies. The Sustainable Groundwater Management Act (SGMA) is a statewide law that requires Groundwater Sustainability Agencies (GSA) to adopt groundwater management plans that outline actions needed to return groundwater basins to sustainable levels of pumping and recharge.

The City is working with the County of San Luis Obispo GSA to create a single Groundwater Sustainability Plan (GSP) that provides full coverage of the San Luis Valley Groundwater Basin. To-date, the first seven chapters of the GSP have been drafted and released to the public for review. To get additional information, to sign up for the interested stakeholder email list, or to see materials for past or upcoming meetings related to the GSP development, interested parties are encouraged to visit www.slowaterbasin.com. The San Luis Valley GSP must be submitted to California Department of Water Resources (DWR) by January 31, 2022.

2020 Urban Water Management Plan Guidelines

California's Department of Water Resources issued its draft 2020 Urban Water Management Plan Guidelines in August 2020. The State's new requirements include:

1. Water loss audit results that characterize distribution system losses.
2. Procedures for conducting annual water supply and demand assessment.
3. Five-year drought risk asssessment.
4. Energy analysis.
5. A six-phase water shortage contingency plan.

Many of these new State requirements are already part of the City's water planning, including the preparation of this Water Resource Status Report annually. Staff will present more information to the City Council on the new requirements at a March 2021 Study Session, with consideration of the City's 2020 Urban Water Management Plan in June of 2021.

II. WATER SUPPLY

Per the *General Plan Water and Wastewater Management Element*, Policy A2.2.1, the City uses multiple water sources to meet its water supply needs. The City has four primary water supply sources including Whale Rock Reservoir, Salinas Reservoir, Nacimiento Reservoir, and recycled water. Groundwater serves as the City's fifth supplemental water source. Substantial work efforts are being made to better understand the City's groundwater supplies and how they may be fully utilized in the future. The quantity of water supplied by each water source for Water Year 2020 (from October 1, 2019 to September 30, 2020) is summarized in Table 1.

Table 1: City Water Supply by Source during the 2020 Water Year
(in acre-feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Recycled Water	Salinas Reservoir	Groundwater [3]	Total City Water Demand
1,562	777	237	2,154	0	4,730
33%	16%	5%	46%	0%	100%

Notes:
1. Values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand.
3. Groundwater was not used for potable purposes during Water Year 2020.

During Water Year 2020, 33 percent of the City's total water demand was met by Nacimiento Reservoir. San Luis Obispo County operates and maintains the water delivery system from Nacimiento Reservoir to participating agencies (currently the cities of Paso Robles and San Luis Obispo, Atascadero Mutual Water Company, Templeton Community Services District, County Service Area 10A [Cayucos], Santa Margarita Ranch, and Bella Vista Mobile Home Park). The Nacimiento Project Commission provides oversight to project operations, maintenance, and the project budget. The Commission is made up of representatives

from each of the four agencies' governing boards and a County Representative who is a member of the County Board of Supervisors who also sits on the Board of Directors for the Flood Control District.

During Water Year 2020, water demand totaled 4,730 acre-feet, below the ten-year average of 5,004 acre-feet (for 2011 to 2020), and the lowest total water demand since 2015. This is likely due to the impacts of COVID-19. The City utilized a total of 2,931 acre-feet from Salinas and Whale Rock reservoirs, meeting 62 percent of total City water demand. The City pays the County of San Luis Obispo Flood Control and Water Conservation District (County) to provide oversight, operations, and maintenance of Salinas Reservoir and related water delivery facilities. The City provides oversight, operations, and maintenance of the Whale Rock Reservoir for the benefit of the Whale Rock Commission, a joint powers agency made up of Cal Poly State University, California Men's Colony, and the City.

For Water Year 2020, the City delivered 237acre-feet of recycled water for landscape irrigation and construction water. This equates to five percent of total City water demand. New recycled water customers during the 2020 Water Year include several properties in the Orcutt Specific Plan Area.

Although the City suspended using groundwater for potable purposes in April 2015, groundwater wells remain in an operable, stand-by position should the use of groundwater be needed. In July of 2020, the City received a nearly $2 million planning-phase grant, funded through Proposition 1, to study Tetrachloroethylene (PCE) contamination of the groundwater basin. A detailed understanding of the extent of PCE contamination and remediation options are necessary steps in fully utilizing the City's groundwater pumping opportunities. The planning phase will continue through 2021 with implementation planned for 2022.

III. WATER DEMAND

During Water Year 2020, the breakdown of water use in the City by sector is as follows:

- 65.8 percent of water use supported single and multi-family residential uses, or 3,112 acre-feet,
- 20.8 percent of water use supported commercial and other non-residential uses, or 984 acre-feet,
- 8.3 percent of water use supported separately metered landscape irrigation (potable water), or 393 acre-feet,
- 4.4 percent of water use supported separately metered landscape irrigation (recycled water), or 208 acre-feet, and
- 0.7 percent of water use supported construction (recycled water), or 33 acre-feet.

Compared to the prior water year, total City water demand for single and multi-family residential uses increased from 60.5 percent in Water Year 2019 to 65.8 percent in Water Year 2020, likely due to both remote work and remote learning during COVID-19. During the same timeframe, water demand for commercial uses decreased from 28.4 percent in Water Year 2019 to 20.8 percent in Water Year 2020.

Historical water use is summarized in Table 2, as well as corresponding population, per capita use rate, and rainfall. The 2020 per capita water use was 92 gallons per capita per day (gpcd). Per capita water use is calculated by dividing total water use (including recycled water) in the City by the City's population. Total water use includes residential and daytime population needs for all uses such as restaurants, hotels, industrial/manufacturing, government/schools, and irrigation. Based on the City's *General Plan Water*

and Wastewater Management Element policies, the City uses a factor of 117 gpcd to project water required to serve the General Plan's estimated population in 2035.

The City's water supply reservoirs are in different watersheds, therefore rainfall at various locations within San Luis Obispo County benefits the City. As shown in Table 3, during Water Year 2020, two reservoir locations (Rocky Butte and Salinas Dam) received more than the annual average. The remaining location, Hwy 46 and W 7 Mile Road, Cambria, CA, received less than average rainfall.

Table 2: Population, Water Use, and Rainfall, 2011-2020

Year	Population[3]	Total Water Use (acre-feet)	Per Capita Water Use (gpcd)	Rainfall[1,2] (inches)
2011	45,418	5,285	104	18.9
2012	45,308	5,541	109	21.5
2013	45,541	5,892	116	3.8
2014	45,473	5,524	109	14.2
2015	45,802	4,990	97	11.8
2016	46,117	4,731	92	17.8
2017	46,424	4,975	95	35.1
2018	46,548	5,225	100	12.9
2019	45,937[4]	4,762	93	27.1
2020	**45,920**	**4,730**	**92**	**21.59**

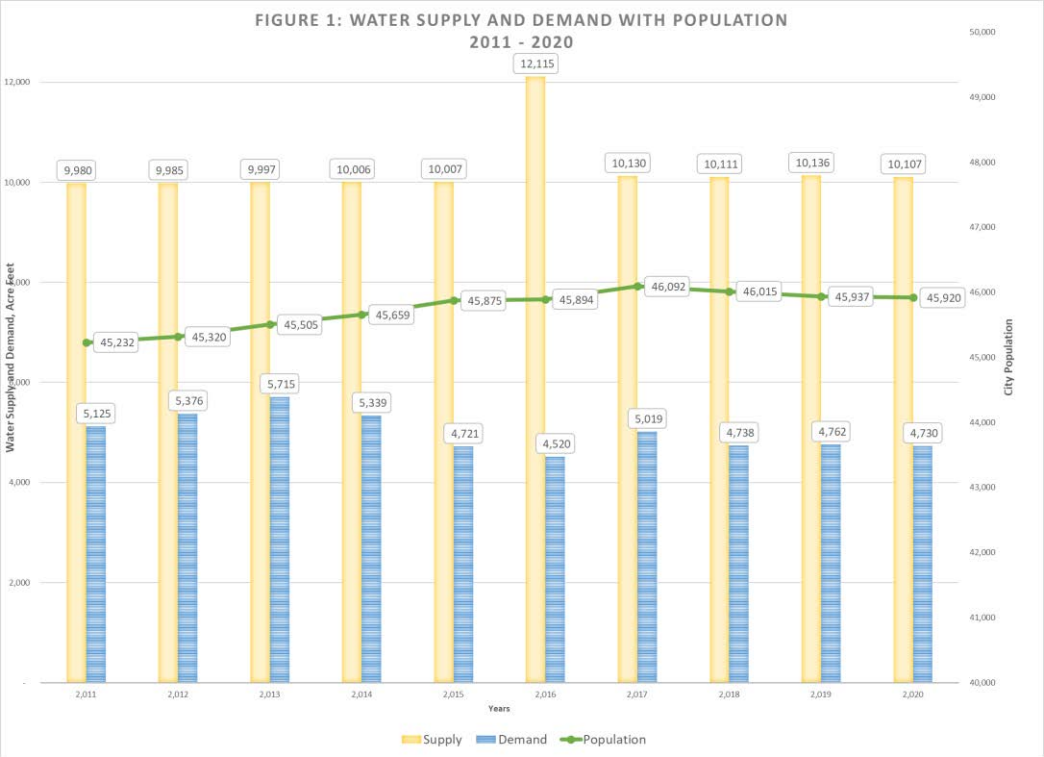
NOTES:

1. Rainfall for 2011 through 2012 calendar year source was from the Cal Poly CIMIS Weather Station. Rainfall for calendar year 2013 through 2020 was from data for SLO Reservoir available from SLO County at: https://wr.slocountywater.org/list/?sensor_class=11&mode=sensor&cache=1&refresh=off
2. Rainfall data for 20011-2014 is for the calendar year; 2015-2020 data covers the Water Year (October 1 to September 30).
3. City population data is available at the CA Department of Finance website at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/
4. The City's 2019 population figure reflects the **revised estimate** available from the CA Department of Finance in 2020 since the 2019 Water Resource Status Report.

Table 3: Water Year 2020 Rainfall Totals

Rainfall Measurement Location	Watershed	Annual Average Rainfall (in inches)	Water Year 2020 Total Rainfall (in inches)	Water Year 2020 Percent of Average
Rocky Butte	Nacimiento Reservoir	40	43.38	108%
Hwy 46 and W 7 Mile Road, Cambria, CA	Whale Rock Reservoir	30	17.49	58%
SLO Reservoir	San Luis Obispo Creek	24	21.59	90%
Salinas Dam	Salinas Reservoir	22	23.71	107%

Source: https://wr.slocountywater.org/list/?sensor_class=11&mode=sensor&cache=1&refresh=off



NOTE: In 2016, the City recognized the full allocation of Nacimiento Reservoir increasing the City's contractual water supply from 3,380 acre-feet to 5,482 acre-feet annually (+2,102 acre-feet). Following the end of the drought in 2016, the City updated the Safe Annual Yield model for Whale Rock and Salinas Reservoirs incorporating rainfall data and three climate change scenarios. In 2018, the City recognized the reduction from 6,940 acre-feet to 4,910 acre-feet in Safe Annual Yield (-2,030 acre-feet).

IV. WATER RESOURCE AVAILABILITY

The following table summarizes the Water Resource Availability based on *Water and Wastewater Management Element,* Section 3. Water availability for Water Year 2020 is 10,107 acre-feet.

Table 4: Water Year 2020 Water Resource Availability

Water Resource	Acre-Feet	Description
Salinas & Whale Rock Reservoirs	4,910	Safe Annual Yield [1]
Nacimiento Reservoir	5,482	Dependable Yield [2]
Recycled Water	215	2019 Annual Usage [3]
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]
	10,107	**2020 Availability**

NOTES:

1. The City's Safe Annual Yield model was updated in 2018.
2. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
3. The quantity of recycled water included (215 acre-feet) is the actual prior year's usage (calendar year 2019) per *General Plan Water and Wastewater Management Element* Policy A 7.2.2.
4. Reservoir siltation is a natural occurrence that reduces storage capacity over long periods, resulting in the reduction of safe annual yield.

V. WATER SUPPLY ACCOUNTING

Per *General Plan Water and Wastewater Management Element (WWME),* Section 5, the City accounts for water supplies necessary to meet three specific community needs:

- Primary water supply
- Reliability reserve
- Secondary water supply

Primary water supply is defined as the amount of water needed to serve the City's future residential and non-residential water demand, based on the population identified in the *General Plan*, *Land Use Element (2014)*. Table 3 in the *Land Use Element* identifies an urban reserve capacity of 57,200 people[1]. The quantity of water needed for the primary water supply is calculated per WWME Policy A 5.2.2, using 117 gallons per capita per day (gpcd).

The City's reliability reserve is defined as the buffer for future unforeseen or unpredictable long-term water supply impacts. The quantity of water for the reliability reserve is defined in WWME Policy A 5.2.3, using 20 percent of the existing City population (45,920, 2020 population) at 117 gpcd. Based on this policy, the reliability reserve will change over time as the City's actual population changes. The reliability reserve concept is included in the City's Charter (Section 909) which identifies that the water may not be used to serve future development.

The City's secondary water supply is defined as the amount of water remaining from available water resources above those needed to meet the primary water supply and reliability reserve. The secondary supply is identified to meet peak water demand periods or short-term loss of City water supply sources, per WWME Policy A 5.2.4.

2020 Water Supply Accounting

Primary Water Supply = 117 gpcd x City Build-out Population, in acre-feet per year
117 gpcd x 57,200 x 365 day/year x acre-ft/325,851 gallons **= 7,496 acre-ft per year**

Reliability Reserve = 117 gpcd x 2020 City Population x 20 percent, in acre-feet per year
117 gpcd x 45,920 x 365 day/year x acre-ft/325,851 gallons x 20 percent **= 1,204 acre-ft per year**

Secondary Water Supply = Current Annual Availability – Primary Water Supply – Reliability Reserve
10,107 acre-ft/year [A] – 7,496 acre-ft/year – 1,204 Acre-Ft/year **= 1,407 acre-ft per year**

[A] 2020 Annual Water Resource Availability from table above.

Water supply accounting for the 2020 Water Year is summarized in the table below and shown in Appendix A.

[1] The City's population projection of 57,200 persons, from the General Plan Land Use Element, is based one percent growth annually between 2014 and 2035. By policy, certain housing types and areas are excluded from this growth rate and projection (affordable housing, etc.). The City's estimated Primary Water Supply need is based on projected population but encompasses all water demand in the City (residential, non-residential, and irrigation). In WY 2020, single-family and multi-family residential water demand was 65.8 percent of total City water demand.

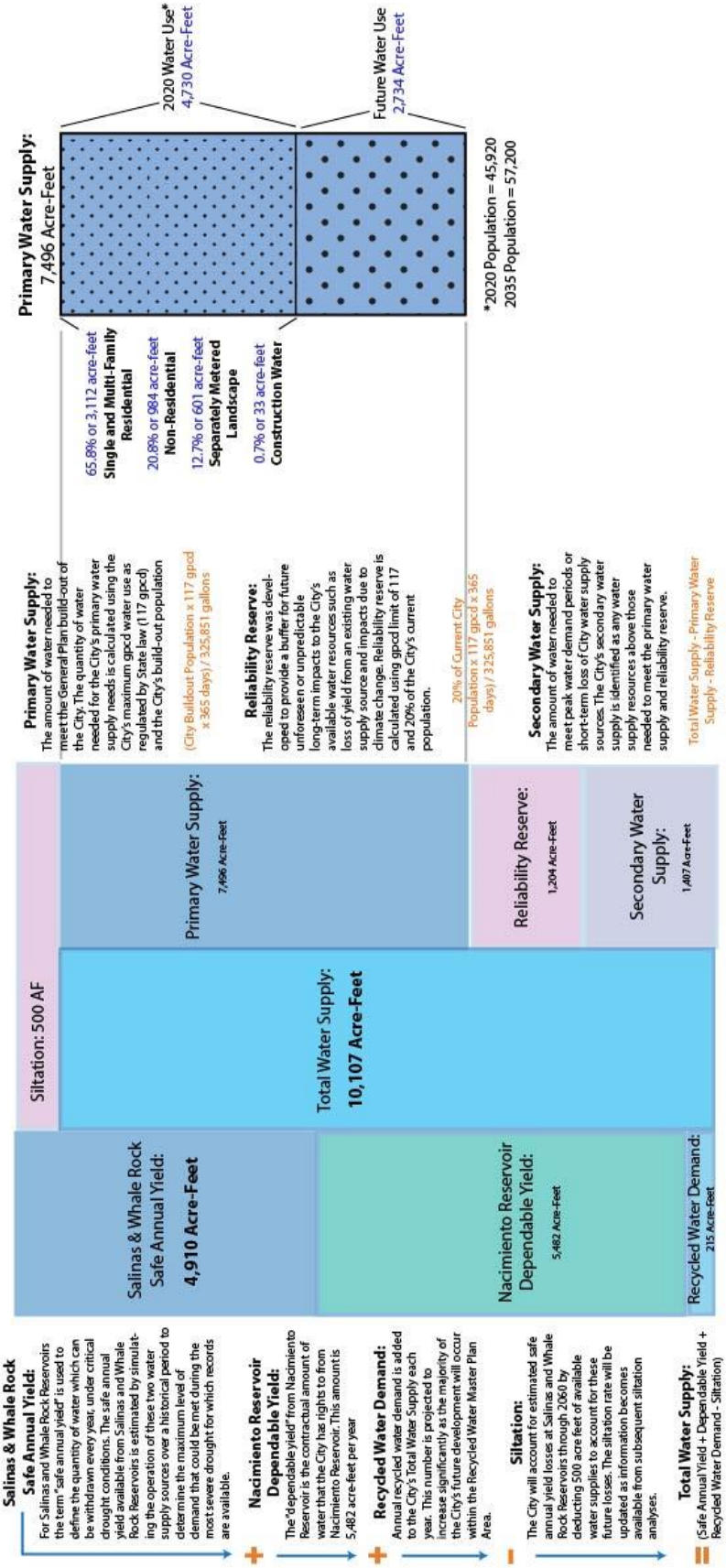
Table 5: 2020 Water Supply Accounting (in acre-feet)

Primary Water Supply	Reliability Reserve	Secondary Water Supply	Total
7,496	1,204	1,407	10,107

SOURCE: Policies related to Water Supply Accounting are found in the City's General Plan Water and Wastewater Management Element (Policies A 5.2.2 through A 5.2.4).

In summary, the City maintains a robust water supply portfolio with greater than five years of water available. Per capita water use (obtained from adding up all water used by visitors, residents, commercial uses, etc.) decreased during the 2020 Water Year to 92 gallons per capita per day (gpcd) from 93 gpcd during the 2019 Water Year. City population figures, and associated gallons per capita per day, reported in the 2019 Water Resource Status Report were updated from Department of Finance data.

Appendix A.


Primary Water Supply:
7,496 Acre-Feet
2020 Water Use*
4,730 Acre-Feet
Future Water Use
2,734 Acre-Feet
*2020 Population = 45,920
2035 Population = 57,200
65.8% or 3,112 acre-feet
Single and Multi-Family Residential
20.8% or 984 acre-feet
Non-Residential
12.7% or 601 acre-feet
Separately Metered Landscape
0.7% or 33 acre-feet
Construction Water
Primary Water Supply:
The amount of water needed to meet the General Plan build-out of the City. The quantity of water needed for the City's primary water supply needs is calculated using the City's maximum gpcd water use as regulated by State law (117 gpcd) and the City's build-out population
(City Buildout Population x 117 gpcd x 365 days) / 325,851 gallons
Reliability Reserve:
The reliability reserve was developed to provide a buffer for future unforeseen or unpredictable long-term impacts to the City's available water resources such as loss of yield from an existing water supply source and impacts due to climate change. Reliability reserve is calculated using gpcd limit of 117 and 20% of the City's current population.
20% of Current City Population x 117 gpcd x 365 days) / 325,851 gallons
Secondary Water Supply:
The amount of water needed to meet peak water demand periods or short-term loss of City water supply sources. The City's secondary water supply is identified as any water supply resources above those needed to meet the primary water supply and reliability reserve.
Total Water Supply - Primary Water Supply - Reliability Reserve
Siltation: 500 AF
Primary Water Supply:
7,496 Acre-Feet
Total Water Supply:
10,107 Acre-Feet
Reliability Reserve:
1,204 Acre-Feet
Secondary Water Supply:
1,407 Acre-Feet
Salinas & Whale Rock Safe Annual Yield:
4,910 Acre-Feet
Nacimiento Reservoir Dependable Yield:
5,482 Acre-Feet
Recycled Water Demand:
215 Acre-Feet
Salinas & Whale Rock Safe Annual Yield:
For Salinas and Whale Rock Reservoirs the term 'safe annual yield' is used to define the quantity of water which can be withdrawn every year, under critical drought conditions. The safe annual yield available from Salinas and Whale Rock Reservoirs is estimated by simulating the operation of these two water supply sources over a historical period to determine the maximum level of demand that could be met during the most severe drought for which records are available.
+
Nacimiento Reservoir Dependable Yield:
The "dependable yield" from Nacimiento Reservoir is the contractual amount of water that the City has rights to from Nacimiento Reservoir. This amount is 5,482 acre-feet per year
+
Recycled Water Demand:
Annual recycled water demand is added to the City's Total Water Supply each year. This number is projected to increase significantly as the majority of the City's future development will occur within the Recycled Water Master Plan Area.
-
Siltation:
The City will account for estimated safe annual yield losses at Salinas and Whale Rock Reservoirs through 2060 by deducting 500 acre feet of available water supplies to account for these future losses. The siltation rate will be updated as information becomes available from subsequent siltation analyses.
=
Total Water Supply:
(Safe Annual Yield + Dependable Yield + Recycled Water Demand - Siltation)

APPENDIX III: Compliance Checklist

The City completed the following checklist of specific UWMP requirements as requested by DWR. The Checklist includes each UWMP requirement by subject, applicable CWC section, and the page number where the required element is addressed in the City's Plan to assist in the DWR review of the City's UWMP.

CWC Section	2020 UWMP Requirement	Subject	Guidebook Location	2020 UWMP Location
10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1	Chapter 1
10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. A supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Chapter 1	Chapter 1 and introduction to Chapters 2 through Chapter 7
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Page 1-1
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Pages 1-2 & 1-3
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	Page 1-3
10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any – with water projections from that source.	System Supplies	Section 2.6, Section 6.1	Appendix I
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Page 2-1
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Page 2-1
10631(a)	Provide population projections for 2025, 2030, 2035, and 2040.	System Description	Section 3.4	Pages 2-2 & 2-3. Table 2
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Pages 2-1 & 2-2
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Page 2-2 Table 2
10631(a)	Describe the land uses within the service area.	System Description	Section 3.5	Page 3-1
10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Page 3-1 Table 4
10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.2.4	Page 3-2 to 3-3

CWC Section	2020 UWMP Requirement	Subject	Guidebook Location	2020 UWMP Location
10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.2.6	Page 3-3
10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.6	Page 3-10
10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.5	Chapter 6
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.4	Pages 3-4 Table 7
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5	Pages 3-4, 3-5, 3-6, & 3.7 Tables 8, 9, 10, 11, 12,13
10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Chapter 5	Page 3-8 & Table 14
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.2	NA
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.5	Page 3-8
10608.40	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Section 5.8 and App E	Page 3-8
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as wel as more frequent and severe periods of drought, including changes in supply due to climate change.	System Supplies	Section 6.1 and 6.2	Pges 6-1 to 6-3
10631(b)(2)	When multiple sources of wate supply are identified, describe the management of each supply in relation to other identified supplies	System Supplies	Section 6.1	Pges 6-1 to 6-3
10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1.1	Page 4-8
10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, and 2040.	System Supplies	Chapter 6.2.8	Page 4-10, Table 20 and Table 21
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Pages 4-7 to 4-9
10631(b)(4)(A)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	Page 4-9
10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2.2	Pages 4-7 to 4-9
10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Page 4-8

CWC Section	2020 UWMP Requirement	Subject	Guidebook Location	2020 UWMP Location
10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.2.1	Page 4-8
10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.	System Supplies	Section 6.2.2.4	Page 4-8, Table 19
10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2.2	N/A
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.2.7	Page 4-10, Table 22
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Wastewater treatment is also by the City of San Luis Obispo
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	Page 5-2
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Page 5-4
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Page 5-4
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water compared to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	Page 5-3
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	Page 5-4
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Page 5-4 and 5-7
10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Page 4-9
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Page 5-1 and 5-2
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.2.8	Page 4-9
10631.2(a)	The UWMP must include energy information, as stated in the code that a supplier can readily obtain.	System Supplies, Energy Intensity	Section 6.4 and Appendix O	Page 4-11, Table 23, Page 5-7, Table 29
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.i	Water Supply Reliability Assessment	Section 7.4	Page 6-1 and 6-2

CWC Section	2020 UWMP Requirement	Subject	Guidebook Location	2020 UWMP Location
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Page 6-3
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Tables 32-34
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	N/A
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.2	Page 6-3
10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Page 6-4 and 6-5, Tables 32-34
10635(a)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3	Page 6-4
10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3	Page 6-1 to 6-6
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3	Page 6-1 to 6-6
10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3	Page 6-5 to 6-6
10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3	Page 6-1 to 6-7
10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Page 7-1
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Appendix I
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Appendix I
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Available Following Adoption by City Council
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5 and	Appendix I

CWC Section	2020 UWMP Requirement	Subject	Guidebook Location	2020 UWMP Location
	held a public hearing about the plan.		WSCP	
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2	Appendix I
10642	Provide supporting documentation that the UWMP and WSCP has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2 and WSCP	Available Following Adoption by City Council
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4	Following Adoption by City Council
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4	Available Following Adoption by City Council
10644(a)(2)	The UWMP, or amendments to the UWMP, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Available Following Adoption by City Council
10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its UWMP with the department, the supplier has or will make the UWMP available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Available Following Adoption by City Council

2020 Water Shortage Contingency Plan (WSCP)

Compliance Checklist

The City completed the following checklist of specific WSCP requirements as requested by DWR. The Checklist includes each WSCP requirement by subject, applicable CWC section, and the page number where the required element is addressed in the City's Plan to assist in the DWR review of the City's 2020 WSCP.

CWC Section	2020 WSCP Requirement	Subject	Guidebook Location	2020 WSCP Location
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8	WSCP-1 through WSCP-12
10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of the Guidebook) in the WSCP.	Water Shortage Contingency Planning	Section 8	Page WSCP-1 to WSCP-3
10632(a)(10)	Describe reevaluation process and improvement procedures for monitoring and evaluation of the WSCP to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10	WSCP-2
10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2	WSCP-14
10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2	WSCP-1 to WSCP-2
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and >50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3	WSCP-8 to WSCP-12
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.3	NA
10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4	NA
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4	WSCP-8 to WSCP-12
10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4	WSCP-8 to WSCP-12
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4	WSCP-8 to WSCP-12
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4	WSCP-8 to WSCP-12
10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Planning	Section 8.4.6	WSCP-15

10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5	WSCP-8 to WSCP-12
10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.5 and 8.6	WSCP-8 to WSCP-12
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.7	WSCP-1
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency per Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7	WSCP-8 to WSCP-12
10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7	NA
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	WSCP-13
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	WSCP-13
10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Water Shortage Contingency Planning	Section 8.8	WSCP-13
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9	WSCP-14
10635(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.11	WSCP-13
10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Water Shortage Contingency Planning	Section 8.12 and Section 10.4.	Available Following Adoption by City Council
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its WSCP with the department, the supplier has or will make the plan available for public review during normal business hours.	Water Shortage Contingency Planning	Section 10.5	Available Following Adoption by City Council
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5 and WSCP	WSCP Appendix I
10642	Provide supporting documentation that the UWMP and WSCP has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2 and WSCP	Available Following Adoption by City Council

Appendix IV: SBx 7-7 2020 Compliance Tables

SENATE BILL X7-7 Standardized Tables:

SB X7-7 Table 0: Units of Measure Used in UWMP*
Acre Feet
**The unit of measure must be consistent with Table 2-3*

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	6,359	Acre Feet
	2008 total volume of delivered recycled water	90	Acre Feet
	2008 recycled water as a percent of total deliveries	1.42%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1997	
	Year ending baseline period range[3]	2006	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[4]	2008	
[1]If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. *[2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*			
[3]The ending year must be between December 31, 2004 and December 31, 2010.			
[4]The ending year must be between December 31, 2007 and December 31, 2010.			

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population	
☑	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
	2. Persons-per-Connection Method
	3. DWR Population Tool
	4. Other DWR recommends pre-review

SB X7-7 Table 3: Service Area Population

Year		Population
10 to 15 Year Baseline Population		
Year 1	1997	42,983
Year 2	1998	43,421
Year 3	1999	43,766
Year 4	2000	44,179
Year 5	2001	44,293
Year 6	2002	44,406
Year 7	2003	44,293
Year 8	2004	44,271
Year 9	2005	44,630
Year 10	2006	44,483
5 Year Baseline Population		
Year 1	2004	44,271
Year 2	2005	44,630
Year 3	2006	44,483
Year 4	2007	44,438
Year 5	2008	44,650
2015 Compliance Year Population		
2015		45,802

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		**Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Deductions**					**Annual Gross Water Use**
			Exported Water	**Change in Dist. System Storage** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use**	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1997	6,220			-		-	6,220
Year 2	1998	5,853			-		-	5,853
Year 3	1999	6,172			-		-	6,172
Year 4	2000	6,121			-		-	6,121
Year 5	2001	5,886			-		-	5,886
Year 6	2002	6,031			-		-	6,031
Year 7	2003	5,969			-		-	5,969
Year 8	2004	6,239			-		-	6,239
Year 9	2005	6,098			-		-	6,098
Year 10	2006	5,990			-		-	5,990
10 - 15 year baseline average gross water use								**6,058**
5 Year Baseline - Gross Water Use								
Year 1	2004	6,239			-		-	6,239
Year 2	2005	6,098			-		-	6,098
Year 3	2006	5,990			-		-	5,990
Year 4	2007	6,416			-		-	6,416
Year 5	2008	6,269			-		-	6,269
5 year baseline average gross water use								**6,203**
2015 Compliance Year - Gross Water Use								
2015		4,721	-		-		-	**4,721**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)				
Name of Source		Salinas Reservoir		
This water source is:				
☑	The supplier's own water source			
	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997	4186.75		4,187
Year 2	1998	5038.24		5,038
Year 3	1999	4951.54		4,952
Year 4	2000	4863.9		4,864
Year 5	2001	3255.14		3,255
Year 6	2002	3169.55		3,170
Year 7	2003	3730.5		3,731
Year 8	2004	3063.1		3,063
Year 9	2005	1083.37		1,083
Year 10	2006	1659.35		1,659
5 Year Baseline - Water into Distribution System				
Year 1	2004	3063.1		3,063
Year 2	2005	1083.37		1,083
Year 3	2006	1659.35		1,659
Year 4	2007	1638.78		1,639
Year 5	2008	2437.43		2,437
2015 Compliance Year - Water into Distribution System				
2015		492		492
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)				
Name of Source		Whale Rock Reservoir		
This water source is:				
☑	The supplier's own water source			
	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997	1732.84		1,733
Year 2	1998	525.48		525
Year 3	1999	1061.13		1,061
Year 4	2000	991.47		991
Year 5	2001	2383.39		2,383
Year 6	2002	2693.78		2,694
Year 7	2003	2097.79		2,098
Year 8	2004	3036.21		3,036
Year 9	2005	4867.53		4,868
Year 10	2006	4198.09		4,198
5 Year Baseline - Water into Distribution System				
Year 1	2004	3036.21		3,036
Year 2	2005	4867.53		4,868
Year 3	2006	4198.09		4,198
Year 4	2007	4676.77		4,677
Year 5	2008	3744.27		3,744
2015 Compliance Year - Water into Distribution System				
2015		1,743		1,743
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)				
Name of Source		Groundwater		
This water source is:				
☑	The supplier's own water source			
	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997	300.17		300
Year 2	1998	289.21		289
Year 3	1999	159.46		159
Year 4	2000	265.83		266
Year 5	2001	246.98		247
Year 6	2002	168.11		168
Year 7	2003	140.46		140
Year 8	2004	139.63		140
Year 9	2005	147.52		148
Year 10	2006	133.04		133
5 Year Baseline - Water into Distribution System				
Year 1	2004	139.63		140
Year 2	2005	147.52		148
Year 3	2006	133.04		133
Year 4	2007	100.75		101
Year 5	2008	86.88		87
2015 Compliance Year - Water into Distribution System				
2015		43		43
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)				
Name of Source		Nacimiento Reservoir		
This water source is:				
	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997			0
Year 2	1998			0
Year 3	1999			0
Year 4	2000			0
Year 5	2001			0
Year 6	2002			0
Year 7	2003			0
Year 8	2004			0
Year 9	2005			0
Year 10	2006			0
5 Year Baseline - Water into Distribution System				
Year 1	2004			0
Year 2	2005			0
Year 3	2006			0
Year 4	2007			0
Year 5	2008			0
2015 Compliance Year - Water into Distribution System				
2015		2,442		2,442
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1997	42,983	6,220	129
Year 2	1998	43,421	5,853	120
Year 3	1999	43,766	6,172	126
Year 4	2000	44,179	6,121	124
Year 5	2001	44,293	5,886	119
Year 6	2002	44,406	6,031	121
Year 7	2003	44,293	5,969	120
Year 8	2004	44,271	6,239	126
Year 9	2005	44,630	6,098	122
Year 10	2006	44,483	5,990	120
10-15 Year Average Baseline GPCD				123
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	44,271	6,239	126
Year 2	2005	44,630	6,098	122
Year 3	2006	44,483	5,990	120
Year 4	2007	44,438	6,416	129
Year 5	2008	44,650	6,269	125
5 Year Average Baseline GPCD				124
2015 Compliance Year GPCD				
2015		45,802	4,721	92

SB X7-7 Table 6: Gallons per Capita per Day	
10-15 Year Baseline GPCD	123
5 Year Baseline GPCD	124
2015 Compliance Year GPCD	92

SB X7-7 Table 7: 2020 Target Method		
Target Method		Supporting Documentation
	Method 1	SB X7-7 Table 7A
	Method 2	SB X7-7 Tables 7B, 7C, and 7D
☑	Method 3	SB X7-7 Table 7-E
	Method 4	Method 4 Calculator
NOTES: Central Coast Hydrologic Region		

SB X7-7 Table 7-A: Target Method 1	
10-15 Year Baseline GPCD	**2020 Target GPCD**
123	98

SB X7-7 Table 7-E: Target Method 3

Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
		North Coast	137	130
		North Lahontan	173	164
		Sacramento River	176	167
		San Francisco Bay	131	124
		San Joaquin River	174	165
☑	100%	Central Coast	123	117
		Tulare Lake	188	179
		South Lahontan	170	162
		South Coast	149	142
		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**117**

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
124	118	117	117

[1]Maximum 2020 Target is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.
[2]2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

NOTES: 117 gpcd is from Target Method 3

SB X7-7 Table 8: 2015 Interim Target GPCD

Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
117	123	120

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
		Extraordinary Events	Weather Normalization	Economic Adjustment				
92	120	-	-	-	-	92	92	YES

Appendix V: Technical Memorandum (Safe Annual Yield)

Technical Memorandum

WSC
Water Systems Consulting, Inc.

Date: 1/8/2018

To: Mr. Aaron Floyd
City of San Luis Obispo – Public Utilities
San Luis Obispo, California

Prepared by: Adam Rianda, P.E.

Reviewed by: Jeroen Olthof, P.E.

Project: Safe Annual Yield Analysis Update

SUBJECT: **SALINAS AND WHALE ROCK RESERVOIRS SAFE ANNUAL YIELD**

Section 1: Background

The City of San Luis Obispo (City) maintains a diversified portfolio of water supply sources that it can use to meet potable water demand. Two of these sources are Salinas Reservoir, also known as Santa Margarita Lake, and Whale Rock Reservoir, located near the town of Cayucos. Whale Rock Reservoir is a shared-use reservoir serving the City, the California Polytechnic State University (Cal Poly), the California Men's Colony (CMC), and the town of Cayucos. The City, Cal Poly, and CMC comprise the Whale Rock Commission, which governs reservoir operation. Some characteristics of the two reservoirs are shown in Table 1.

Table 1. Reservoir Attributes

Reservoir	Watershed Size (Square Miles)	Storage Capacity (Acre Feet)	Average Annual Precipitation (Inches)[1]	Average Annual Evaporation (Inches)[1]
Salinas	112.0	23,843	22.1	85.4
Whale Rock	20.3	38,967	18.7	61.6

[1]Average annual precipitation and evaporation depths are based on the verified hydrologic data discussed in Section 2.

Salinas Reservoir and Whale Rock Reservoir are located in different climate regions and have differing characteristics. Whale Rock Reservoir has a larger storage volume than Salinas, but it has a smaller watershed to provide natural recharge. Salinas Reservoir receives more runoff each year, but it also experiences higher temperatures and higher evaporation rates, and it spills more frequently. To maximize the available supply from these two reservoirs, the City has developed operational strategies that recognize the differences between the reservoirs. In general, the strategies involve withdrawing water from Salinas Reservoir when it is available, and using Whale Rock Reservoir as-needed to supplement the supply from Salinas.

To assist with the management of the City's water resources and understand the available supply from Salinas and Whale Rock Reservoirs, the City maintains an Excel-based model that estimates a safe annual yield (SAY) based on historical climatic conditions and reservoir operations. For each reservoir, the model sums the inputs and outputs to calculate the reservoir volume on a monthly time step. As inputs, the model uses the historical

record of inflows, evaporation, precipitation, and downstream releases. The model then calculates, over the period of record, the maximum amount that could be withdrawn each year without drawing the reservoir below its minimum pool constraint. This maximum allowable annual withdrawal is considered to be the SAY.

The City's Excel-based model of the two reservoirs was first developed in 1988. At that time, the critical drought period that controlled the SAY was the 1946-1951 drought. In 1991 the model was updated to incorporate the hydrologic conditions experienced during the 1986-1991 drought. That drought was the most severe in the historical record to that point and became the new controlling condition for estimating SAY. The City estimated the combined SAY from the two reservoirs as 6,940 acre-feet per year (AFY). This estimate included the anticipated loss of storage volume due to siltation through the year 2010. This estimate has been reported in previous City planning documents, including the 2015 Urban Water Management Plan (UWMP) and the 2016 update to the General Plan Water and Wastewater Management Element. The 2015 UWMP, published in June of 2016, was prepared during a period of extended drought, and it noted that the City planned to re-calculate the SAY when the on-going drought came to an end.

During the winter of 2016-2017, California received enough precipitation to provide some drought relief, and the Department of Water Resources phased out its mandatory conservation guidelines. However, the state is still in a period of below-average precipitation. Figure 1 shows historical precipitation recorded at Salinas and Whale Rock Reservoirs. For each month, the graph shows the average precipitation for the previous five-year period. This rolling five-year average can be compared to the long-term average, in this case the period from 1962 to 2016. The 1986-1991 drought was preceded by a period of above-average rainfall, and when the drought ended the subsequent years had above-average rainfall. By contrast, the current dry period has had a much longer duration. Since 2003, the rolling average has been at or below the long-term average, and at the end of 2016 the rolling average reached the lowest value ever at Whale Rock. It remains to be seen whether future years will bring enough precipitation to bring the rolling five-year average back to its historical levels.

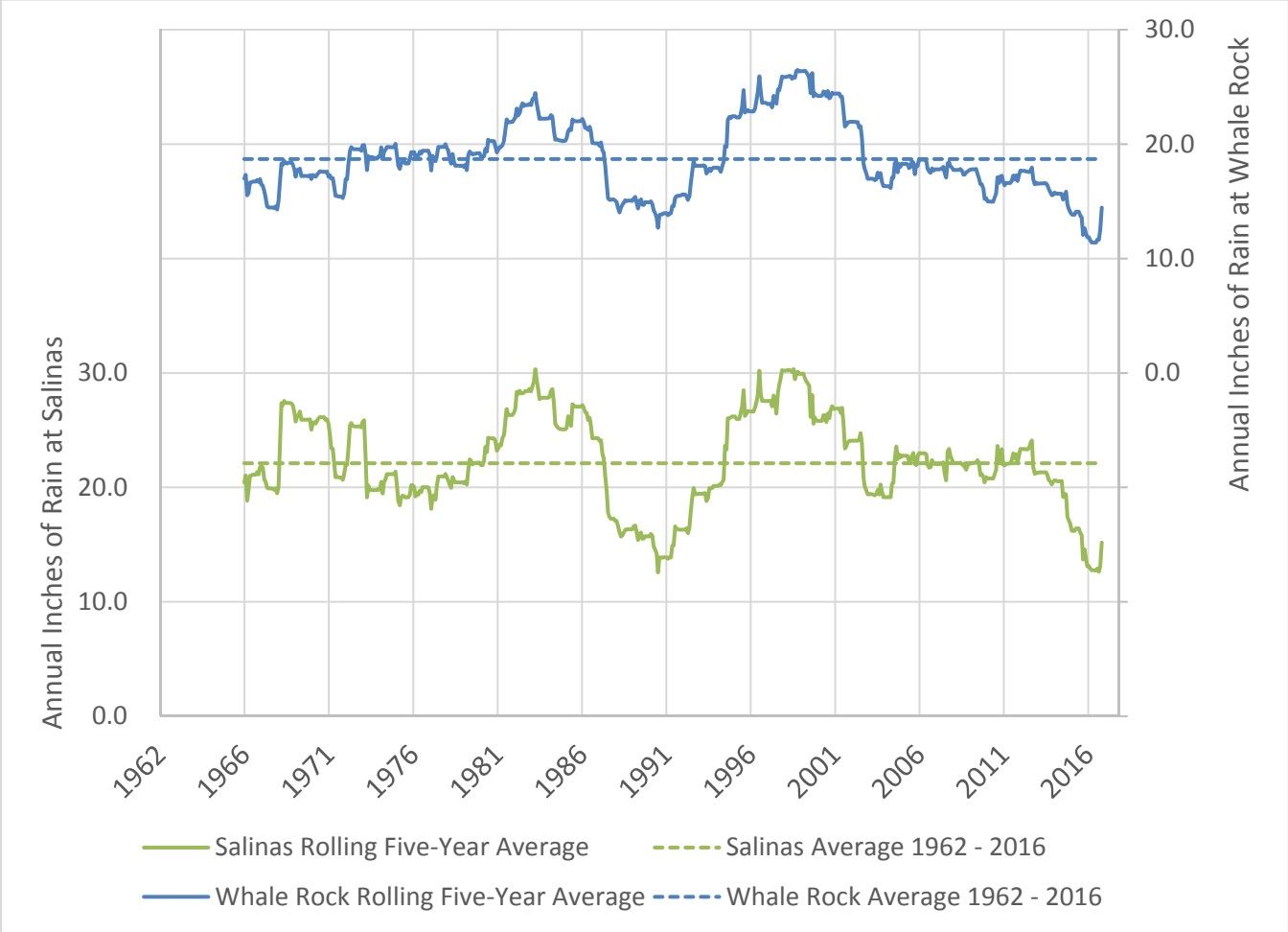


Figure 1. Rolling Five-Year Average Precipitation at Salinas and Whale Rock

In early 2017, the City contracted with Water Systems Consulting, Inc. (WSC) to update the SAY model. The update was intended to verify the historical input data, validate and document the calculations in the model, incorporate the full extent of the 2006-2016 drought, and generate scenarios that accounted for potential climate change impacts.

Section 2: Model Updates

In January 2017, the City and Cal Poly began an update of the SAY model. Two major objectives of the project were to update and verify the hydrologic input data and to develop scenarios that accounted for climate change impacts. The SAY model was last updated in early 2015; therefore, the model that was used as the starting point for this project is referred to as the 2015 model.

Verification of Input Data and Extension of Input Data Through January 2017

The 2015 model contained hydrologic input data for Whale Rock Reservoir and Salinas Reservoir through February of 2015. While this data set contained values beginning in October of 1943, the source of the data had not been documented. Furthermore, the construction of Whale Rock Reservoir was not completed until April of 1961, so there was nearly 18 years of data that predated the reservoir. According to the City's records, the

hydrologic data predating the reservoir was generated through correlations between Salinas and Whale Rock Reservoir lake levels and precipitation.

In order to load the model with verified historical hydrologic data, the City compiled the information that could be traced to verified sources. Table 2 presents the data sets collected for this update as well as the start date of each data series. All data sets were compiled through January of 2017, when the drought of 2006-2016 had subsided.

Table 2. Verified Hydrologic Data Start Date

Reservoir	Precipitation	Evaporation	Inflow[1]	Downstream Releases
Salinas	7/1/1948	7/1/1970	4/1/1942	7/1/1942
Whale Rock	1/1/1962	10/1/1963	2/1/1962	2/1/1962

[1]Inflow for Whale Rock Reservoir calculated by Damsaver begins 6/1/1987. Inflow from 1962 to 1987 was calculated using paper records compiled by City staff.

The inflow data for Whale Rock Reservoir came from two sources: Damsaver and paper records. Damsaver is an Excel-based tool that the City began to use in June 1987 to record and report Whale Rock Reservoir hydrologic data, including the computation of monthly inflow. Prior to 1987, the City utilized a paper form to record monthly precipitation, evaporation, reservoir elevation, reservoir storage, and water releases. To generate a complete data set extending back to 1962, WSC performed mass balance[1] calculations using data from the paper records. The calculated inflows were validated using a 2.5-year overlap period, 1987 to 1989, when the City utilized both Damsaver and the paper forms. While there was variation from month to month, the total calculated inflows over the 2.5-year period were within 10 percent of the total produced using the Damsaver software. Therefore, the pre-1987 inflows calculated from the paper forms were considered acceptable for use in this evaluation.

In general, the verified historical data compiled for this update was not significantly different than the input data in the 2015 model. The exception was in recorded evaporation rates. For this update, historical evaporation data was available for the period beginning July 1, 1970. The historical data in the previous model and the data compiled for this study are shown in Figure 2 and Figure 3.

[1] The mass balance calculation was based on the fact that monthly change in storage volume will be determined by the inputs (precipitation and inflow) and outputs (evaporation and downstream releases) during that month. Historical data for reservoir levels were used to calculate change in storage, and historical data was available for precipitation, evaporation, and downstream releases. The team then solved for the only unknown variable, monthly inflow.

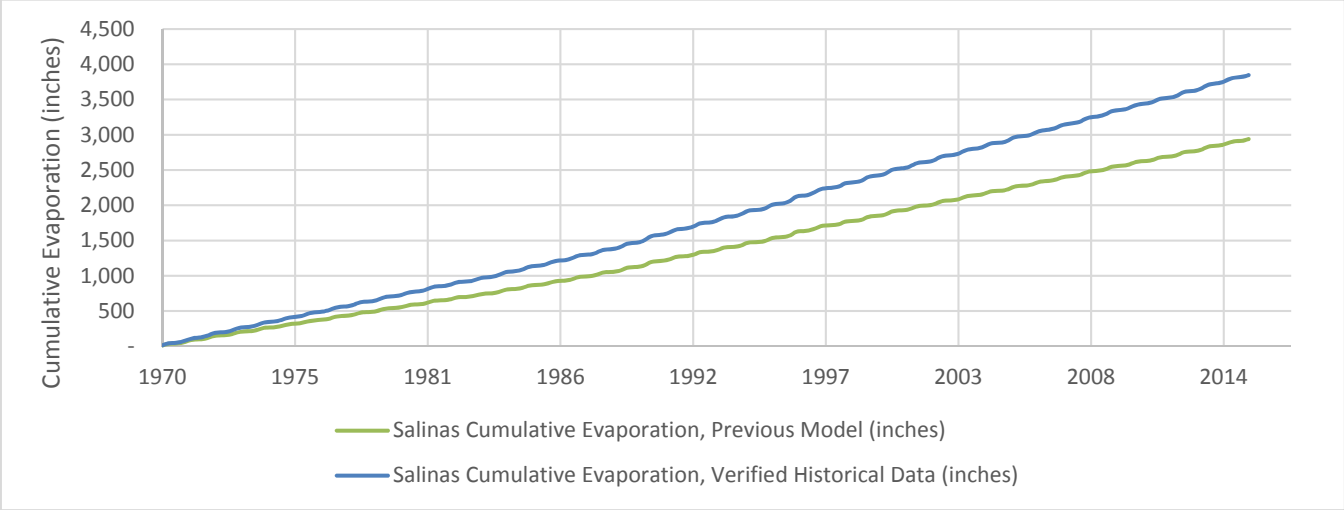


Figure 2. Cumulative Evaporation Data for Salinas Reservoir, 1970-2015

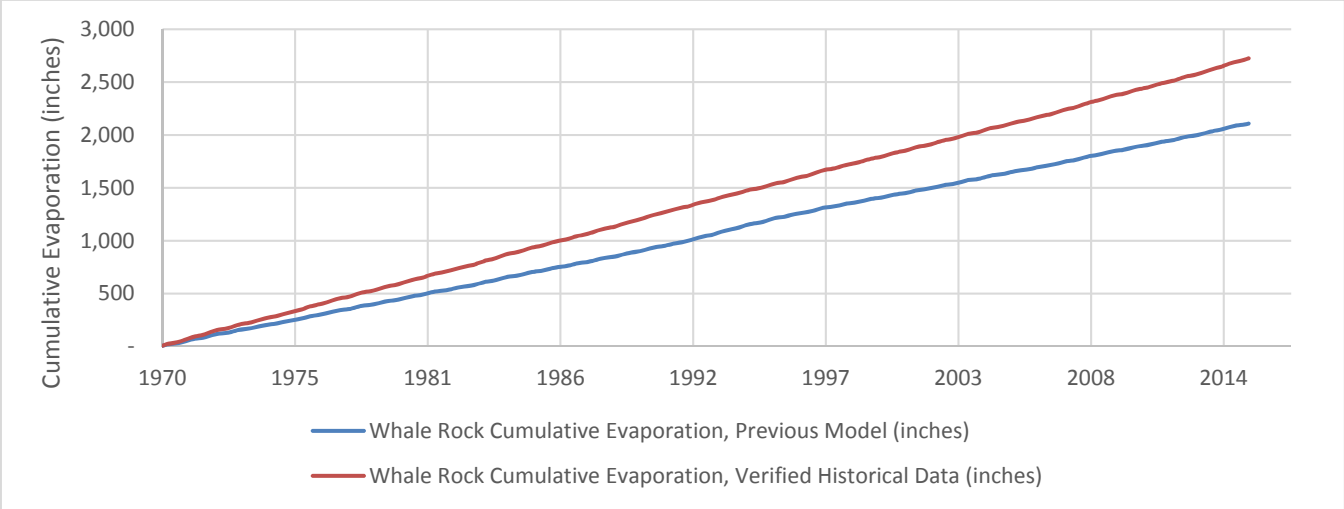


Figure 3. Cumulative Evaporation Data for Whale Rock Reservoir, 1970-2015

For both reservoirs, the updated historical data show consistently higher evaporation rates than the data used in the 2015 model. The difference results in evaporation losses approximately 30 percent higher than the 2015 model, leading to a reduction in the calculated SAY.

Climate Change Impacts

Although previous versions of the model included several scenarios with adjusted climatic patterns, they were based on simple modifications to relatively short data sets. As part of this model update, a range of new scenarios was added based on varying climate change projections identified by the U.S. Environmental Protection Agency (EPA) and the San Luis Obispo Council of Governments (SLOCOG). The estimated changes in climate associated with these scenarios were applied to the historical data set for inflows, precipitation, and evaporation. The model was then used to calculate a revised SAY assuming that these conditions had prevailed during the historical period of record.

Section 3: Scenario Modeling

Scenario 1: 2015 Model

Scenario 1 runs the model using the hydrologic input data used in the 2015 model. As discussed previously, the source of this hydrologic input data was not documented.

Scenario 2: Verified Historical Data

Scenario 2 utilizes the historical hydrological data set compiled for this update. Because this input data has been verified against historical records, Scenario 2 is considered to be the baseline estimate for future conditions.

Scenarios 3 through 8: EPA CREAT Climate Change Projections

Scenarios 3 through 8 are based on climate change projections identified in the EPA's Climate Resilience Evaluation and Awareness (CREAT) Projection Map. CREAT was prepared by the EPA, specifically for drinking water, wastewater and stormwater utility owners and operators, as an informational tool to assist in understanding and addressing climate change risks. Projected changes in CREAT were derived from the evaluation of thirty-eight Global Climate Models recognized by the Intergovernmental Panel on Climate Change (IPCC). Results from each model were recorded on a 0.5- by 0.5-degree (approximately 34- by 34-mile) grid basis and compared to three statistical targets based on the distribution of the models. The five models closest to each target were averaged to generate each projected temperature and precipitation change. The three targets are defined as:

- Hot/dry future conditions – Nearest to the 5th percentile of precipitation and 95th percentile of temperature projections;
- Central future conditions – Nearest to the 50th percentile of both precipitation and temperature projections; and
- Warm/wet conditions – Nearest to the 95th percentile of precipitation and 5th percentile of temperature projections.

Projections are presented for two planning horizons: 2035, the midpoint of a range from 2024 to 2045, and 2060, the midpoint of a range from 2050 to 2070.

For the SAY model, it is assumed that the change in inflow is directly proportional to the change in precipitation. Because of the uncertainty about the exact relationship between higher temperatures and increased evaporation, future evaporation rates were assumed to be five percent higher than the verified historical data. Projected changes are applied to the entire verified historical data set in Scenario 2.

Scenarios 9 through 12: SLOCOG Climate Change Projections

Scenarios 9 through 12 are based on climate change projections identified in the San Luis Obispo Council of Governments (SLOCOG) 2014 Regional Transportation Plan. SLOCOG climate change projections reflect the continuation of current energy-subsidy policies, implying relatively high energy consumption and high greenhouse gas (GHG) emissions. Per the SLOCOG report, this scenario closely followed the global emissions path of the late 1990s. The SLOCOG report states that given a sharp rise in emissions since 2000, the climate projections reflected may underestimate actual climate change.

Like EPA's CREAT tool, the SLOCOG projections are based on IPCC recognized Global Climate Models. However, the SLOCOG study focuses specifically on three models: CSIRO (from Australia), MIROC (from Japan), and HadCM (from the UK). The United States Department of Agriculture (USDA) Forest Service Mapped Atmosphere-Plant-Soil System (MAPSS) team at the Pacific Northwest Research Station then converted the model output to a locally-relevant scale of 8 kilometers (km) using local temperature and precipitation pattern data.

As with the EPA CREAT projections, SLOCOG projections are presented as a percent difference in precipitation and degree difference in temperature, and are assigned to two planning horizons, 2035 to 2045 and 2075 to 2085. The SLOCOG projections, however, are presented as a range for each window of time. Therefore, a scenario was created for the climatic lower bound and upper bound for each planning horizon.

As with Scenarios 3 through 8, Scenarios 9 through 12 apply the respective climate change projections to the verified historical data set (Scenario 2) and adjust the inflow proportionally to the change in precipitation, while evaporation rates were assumed to be five percent higher than historical values.

Scenario 13: Nature Climate Change Evaluation

Nature Communications, a peer-reviewed open access scientific journal published by the Nature Publishing Group, published an article in in July of 2017 that presented an overview of various climate models and their predictions for future precipitation in California. This work found that under future conditions, California could receive more precipitation in response to global warming. It found that the anticipated changes in air circulation patterns were reminiscent of an El Nino event, which can lead to an increase in storm track activity in the east Pacific.

The article concluded that central California could expect on the order of three inches per year in additional rainfall attributable to global warming. The historical average annual rainfall at Salinas Dam is approximately 23 inches, while the annual average at Whale Rock Reservoir is approximately 19 inches. As a conservative estimate, it was assumed that under this scenario, precipitation and runoff values would increase 15 percent over their historical values. Evaporation rates were assumed to be 5 percent higher than historical values.

Section 4: Model Results

The updated spreadsheet model is intended to be a tool that the City can use to evaluate SAY under potential future conditions. Several simulations were run during the development of the spreadsheet, and the results are summarized in the following tables. These preliminary results are intended to show the range of potential values under differing input assumptions. As discussed further in the Appendix, the model is set up to account for loss of reservoir capacity due to siltation up to, and including, the designated simulation year. The model results presented in Tables 3 through 5 account for the estimated siltation through 2017.

The model was first used to determine the impact of using verified historical data as inputs. The results are summarized in Table 3. For consistency with previous estimates, these results do not include the 2006 - 2016 drought. These results are presented for comparison with previously reported values of SAY. Using the raw input data from the 2015 model, the updated model showed that an annual withdrawal of 6,940 AFY could be sustained. With the incorporation of the updated evaporation data, the corresponding value is 6,590 AFY.

Table 3. Safe Annual Yield Model Outputs with Verified Historical Data

	2015 Model SAY (AFY)	Updated Model SAY with Verified Historical Data (AFY)
SAY (Period of record ending 2006; does not include the 2006-2016 drought)	6,940	6,590
Note: These results are the combined City SAY from Salinas and Whale Rock Reservoirs, based on a joint operating strategy		

The model was then used to calculate an updated SAY for the entire period of record, including the 2006 – 2016 drought. These results are shown in Table 4. This drought was more severe than the 1986-1991 drought, and it has become the new controlling condition for the estimation of SAY. The estimated SAY is 4,910 AFY, approximately 2,000 AFY less than the previously used estimate of 6,940 AFY.

Table 4. Safe Annual Yield Model Outputs Incorporating 2006 – 2016 Drought

	Updated Model SAY with Verified Historical Data (AFY)
SAY (Period of record through 2016; includes the 2006-2016 drought)	4,910
Note: These results are the combined City SAY from Salinas and Whale Rock Reservoirs, based on a joint operating strategy	

Finally, the model was used to simulate a range of potential climate change scenarios. These estimates are summarized in Table 5. There is considerable uncertainty about how climate change will impact the precipitation and evaporation patterns on the Central Coast. The range of values provides an indication of potential future conditions that might occur, but it is not yet feasible to identify an expected value for future SAY.

Table 5. Safe Annual Yield Model Outputs for Climate Change Scenarios

	Range of SAY under EPA Climate Change Scenarios (AFY)	Range of SAY under SLOCOG Climate Change Scenarios (AFY)	Nature Climate Change Scenario (AFY)
SAY (Period of record through 2016; includes the 2006-2016 drought)	4,690 – 5,050	4,050 – 5,070	4,950
Note: These results are the combined City SAY from Salinas and Whale Rock Reservoirs, based on a joint operating strategy			

Section 5: Conclusion

The City's spreadsheet model for estimating SAY from Salinas and Whale Rock Reservoirs was updated to incorporate verified historical data and the full extent of the most recent drought (2006 – 2016). The revised estimate for the SAY from these reservoirs is 4,910 AFY, approximately 2,000 AFY less than the value of 6,940 AFY used in previous planning documents. Two factors contributed to this decline. First, the historic evaporation data in the model were revised to match currently available records. Second, the updated model includes the full extent of the 2006-2016 drought. This dry period was more severe than the 1986-1991 drought, and it is the new controlling period for estimating SAY.

The updated spreadsheet model can be used to estimate the SAY under a variety of scenarios. The spreadsheet can also be used to demonstrate the advantages of coordinating the use of the City's water supply sources, rather than analyzing each source in isolation. It is recommended that the City and Cal Poly continue to coordinate their analyses of the expected supply from Whale Rock. The model should also be kept up-to-date with additional hydrological data, as it becomes available.

Appendix A: Model Layout

The updated model has been restructured to provide a more user-friendly and transparent interface. This appendix briefly describes key tabs in the spreadsheet model.

Dashboard Tab

The primary components of the Dashboard tab, circled in blue in Figure A-1, are the Modeled Scenario dropdown list, the City Withdrawal Mode selection, and the Solve buttons. The Modeled Scenario dropdown list allows the user to select the scenario of interest. The City Withdrawal Mode allows the user to calculate separate SAY's for Salinas and Whale Rock Reservoir, or to model them as joint, or coordinated, use. When Joint Use is selected, the model prioritizes withdrawal from Salinas Reservoir and provides a single SAY for the two reservoirs. The Solve buttons allow the user to run the model without having to manually iterate to the desired solution. The Solve buttons count down the SAY from 100,000 AFY until the total unmet demand is equal to zero over the entire time series.

Just above the Modeled Scenario dropdown list is a summary of assumptions and input data. These assumptions and inputs have been discussed with the City and Cal Poly, and therefore likely will not change on a regular basis, but they should always be reviewed prior to a model run.

	A	B	C	D	E	F	G	H
6	Salinas Pipeline Capacity (AF/day)	23.87						
7	WR Cayucos Deliveries (AFY)	679	679 AF to Cayucos agencies downstream of Whale Rock; can be higher with Nacimiento exchange					
9	Model Year	2017						
10	Salinas Minimum Storage (AF)	2,000						
11	Salinas Record Start	2/1/1962	Must be equal or prior to the Whale Rock Record Start for the City Joint Withdrawal Scenario					
12	Salinas Bathymetry Year	1990						
13	Salinas Bathymetry Year Max Storage	23,843						
14	Salinas Siltation Rate (AF/YR)	40	Based on 1990 Study					
15	Salinas Full Capacity Storage in Model Year (AF)	22,763						
16	Whale Rock Min Storage (AF)	2,000						
17	Whale Rock Record Start	2/1/1962						
18	Whale Rock Bathymetry Year	2013						
19	Whale Rock Max Storage in Bathymetry Year	38,967						
20	Whale Rock Siltation Rate (AF/YR)	32.6	Based on 2013 Study					
21	Whale Rock Full Capacity Storage in Model Year (AF)	38,836						
22	Whale Rock Storage Capacity at Model Start Date (%)	100%						
23	Whale Rock Storage Capacity at Model Start Date (AF)	38,836						
24	Most Recent Historical Data	1/1/2017						
25	Modeled Scenario	Verified Historical Data						
26								
27	**Cal Poly Adaptive Demand Management**		All values should be set to zero when not running an adaptive demand management scenario					
28	Storage Capacity Threshold 1 (% full)	0%	Storage Capacity Threshold 1 should be the highest % full value and Storage Capacity Threshold 3 should be the lowest % full value					
29	Reduction Factor 1 (% reduction in monthly demand)	0%						
30	Storage Capacity Threshold 2 (% full)	0%						
31	Reduction Factor 2 (% reduction in monthly demand)	0%				**City Withdrawal Mode**	Joint	
32	Storage Capacity Threshold 3 (% full)	0%						
	Reduction Factor 3 (% reduction in monthly demand)	0%				When joint withdrawals are selected, unmet city demands at Salinas and Whale Rock are not accurate (use joint results below		
33								
34							City Joint Yield	
35		Salinas	City Whale Rock	Cal Poly Whale Rock	CMC Whale Rock		Salinas	Whale Rock
36	Storage Portion	100.00%	55.05%	33.71%	11.24%			
37	Maximum Usable Storage (AF)		20,278	12,418	4,140			
38	Maximum Total Storage (AF)		21,379	13,092	4,365			
39	Natural Inflow Portion		55.05%	33.71%	11.24%			
40	Cayucos Deliveries Portion		55.05%	33.71%	11.24%			
41								
42	Estimated Safe Annual Yield (AFY)	1,118	1,942	1,191	398		4,907	
43								
44	Calculated Average Annual Withdrawal (AFY)	1,024	1,942	1,191	398		4,488	419
45	Calculated Demand Portion		55%	34%	11%			
46	Total Unmet Demand (AFY)	(185,347.6)	83,738	0	0		0	
47	Number of Months with Unmet Demand	56	603	0	0		0	
48								
49		Solve City Salinas	Solve City WR	Solve Cal Poly WR	Solve CMC WR		Solve City Joint	
50								
51								
52								
53			Solve Each 5 Times					
54								
55								

Figure A-1. Dashboard Tab Screenshot

Scenario Tab

As discussed in Section 2, a suite of new scenarios has been incorporated into the updated model. All scenarios are defined on the Scenarios tab, including the scenario number and respective percent change in inflow, precipitation, and evaporation. While a temperature change in degrees Fahrenheit is listed, it is not currently being included in the calculations. All future scenarios are expected to have higher temperatures, which will lead to increased evaporation, but there is uncertainty about how much evaporation will increase. In addition to defining the scenario criteria, this tab is used to manually record the calculated SAY for each scenario.

Bathymetry Tab

The Bathymetry tab houses the stage-storage-area relationships for the two reservoirs. For Salinas Reservoir, the relationship is based on the Salinas Reservoir Bathymetric survey conducted in 1990. The annual siltation was estimated to reduce available storage in Salinas Reservoir by 40 AFY, based on the 1990 bathymetric survey. For Whale Rock Reservoir, the relationship is based on the Whale Rock Reservoir Bathymetry survey conducted in 2013. As part of the 2013 bathymetric survey, the annual siltation was estimated to reduce available storage by 32.6 AFY. These siltation rates can be found on the Dashboard tab along with the year of the associated bathymetric survey.

The user can select a year to run the simulation, and the model will reduce the full capacity of each reservoir to account for the expected siltation between the date of the respective bathymetric survey and the simulation year. The City's water supply planning policy already includes an expected reduction in future water supply of 500 AFY to account for reservoir siltation. Therefore, the model simulations run for this project used a simulation year of 2017 to estimate the SAY under current conditions.

Demand Patterns Tab

The Demand Patterns tab defines the monthly demand multipliers for the City, Cal Poly, CMC, and Cayucos water deliveries. For the updated model, the City demand pattern has remained the same as in the previous model. The State demand pattern has been split into two new Cal Poly demand patterns, domestic and agricultural, and an evenly distributed demand pattern for the CMC. Cal Poly provided domestic and agricultural usage data from 1992 through 2016, which was used to refine the Cal Poly demand patterns. The demand patterns are shown in Figure A-2.

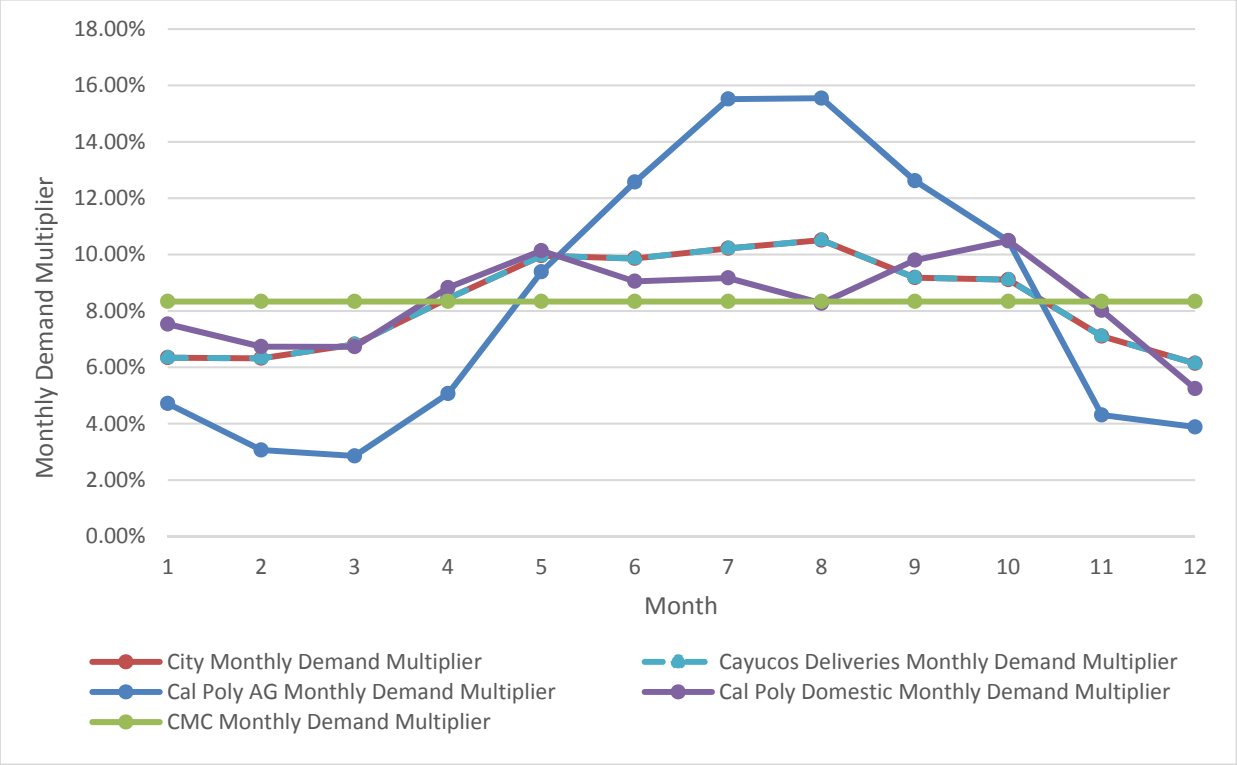


Figure A-2. Demand Patterns

Calculations Tab

The Calculations tab has inputs and formulas organized in a progression from left to right, with one row for every month. Row 7 on the Calculations tab defines whether a column is an input value or a formula. Input values are historical monthly hydrologic inputs including natural inflow volume, precipitation depth, and evaporation depth. Input values should be added to the model as new data is collected over time. As input values are added, the remainder of the cells in that row should be populated by dragging down the formulas from the cell above.

Column Descriptions Tab

This tab contains descriptions for each column on the Calculations tab. Column descriptions include a written description and a display of the respective formula. This tab provides more detailed information about the calculations embedded in the spreadsheet.

Appendix VI: AWWA Water Loss Audits

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: City of San Luis Obispo (4010009)
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Pcnt: Value:

Volume from own sources:	3	4,990.930	acre-ft/yr		3					acre-ft/yr
Water imported:	n/a		acre-ft/yr							acre-ft/yr
Water exported:	3	471.180	acre-ft/yr		1					acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **4,519.750** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	3	3,990.463	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	4	2.305	acre-ft/yr			
Unbilled unmetered:	5	11.299	acre-ft/yr		11.299	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: **4,004.067** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **515.683** acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	11.299	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	2	81.485	acre-ft/yr	2.00%	acre-ft/yr
Systematic data handling errors:		9.976	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **102.761** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **412.923** acre-ft/yr

WATER LOSSES: **515.683** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **529.287** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	176.8	miles
Number of active AND inactive service connections:	1	11,000	
Service connection density:		62	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 2 | 70.0 | psi

COST DATA

Total annual cost of operating water system:	10	$17,959,132	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$8.84	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	4	$265.14	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 43 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: City of San Luis Obispo (4010009)
Reporting Year: 2017 | 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	3	5,296.150	acre-ft/yr	3			acre-ft/yr
Water imported:	n/a		acre-ft/yr				acre-ft/yr
Water exported:	3	435.310	acre-ft/yr	1			acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **4,860.840** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	3	4,281.000	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	5	9.780	acre-ft/yr			
Unbilled unmetered:	5	12.152	acre-ft/yr		12.152	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: **4,302.932** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **557.908** acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	12.152	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	132.705	acre-ft/yr	3.00%	acre-ft/yr
Systematic data handling errors:		10.703	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **155.559** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **402.349** acre-ft/yr

WATER LOSSES: **557.908** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **579.840** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	178.0	miles
Number of active AND inactive service connections:	1	11,000	
Service connection density:		62	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 3 | 70.0 psi

COST DATA

Total annual cost of operating water system:	10	$20,152,788	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$8.15	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	4	$267.36	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 45 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: City of San Luis Obispo (4010009)
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Pcnt: Value:

Volume from own sources:	+ ?	3	4,990.930	acre-ft/yr	+ ?	3				acre-ft/yr
Water imported:	+ ?	n/a		acre-ft/yr	+ ?					acre-ft/yr
Water exported:	+ ?	3	471.180	acre-ft/yr	+ ?	1				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **4,519.750** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:	
Billed metered:	+ ?	3	3,990.463	acre-ft/yr			
Billed unmetered:	+ ?	n/a		acre-ft/yr			
Unbilled metered:	+ ?	4	2.305	acre-ft/yr			
Unbilled unmetered:	+ ?	5	11.299	acre-ft/yr		11.299	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? **4,004.067** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **515.683** acre-ft/yr

Apparent Losses

					Pcnt:	Value:	
Unauthorized consumption:	+ ?		11.299	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	2	81.485	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:	+ ?		9.976	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? **102.761** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **412.923** acre-ft/yr

WATER LOSSES: **515.683** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **529.287** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	8	176.8	miles
Number of active AND inactive service connections:	+ ?	1	11,000	
Service connection density:	?		62	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 2 70.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$17,959,132	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	8	$8.84	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	4	$265.14	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 43 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: City of San Luis Obispo (CA4010009)
Reporting Year: 2019 | 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	3	5,065.140	acre-ft/yr	3			acre-ft/yr
Water imported:	n/a		acre-ft/yr				acre-ft/yr
Water exported:	3	522.060	acre-ft/yr	1			acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **4,543.080** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	4,198.605	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	10	2.431	acre-ft/yr			
Unbilled unmetered:	7	2.500	acre-ft/yr		2.500	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: **4,203.536** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **339.544** acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		11.358	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	4	85.735	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		10.497	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **107.590** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **231.954** acre-ft/yr

WATER LOSSES: **339.544** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **344.475** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	164.1	miles
Number of active AND inactive service connections:	8	15,291	
Service connection density:		93	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 | 70.0 psi

COST DATA

Total annual cost of operating water system:	10	$19,323,017	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$7.62	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	4	$268.77	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 53 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of San Luis Obispo (CA4010009)
Reporting Year: 2020 1/2020 - 12/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	3	5,261.420	acre-ft/yr			acre-ft/yr
Water imported:	n/a		acre-ft/yr			acre-ft/yr
Water exported:	3	444.610	acre-ft/yr			acre-ft/yr
				3		
				1		

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 4,816.810 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	4,348.870	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	10	2.431	acre-ft/yr			
Unbilled unmetered:	7	2.500	acre-ft/yr		2.500	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 4,353.801 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 463.009 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		12.042	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	4	88.802	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		10.872	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 111.716 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 351.293 acre-ft/yr

WATER LOSSES: 463.009 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 467.940 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	164.1	miles
Number of active AND inactive service connections:	8	15,291	
Service connection density:		93	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line:			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	70.0	psi

COST DATA

Total annual cost of operating water system:	10	$19,323,017	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$7.62	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	4	$268.77	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 53 out of 100 *****

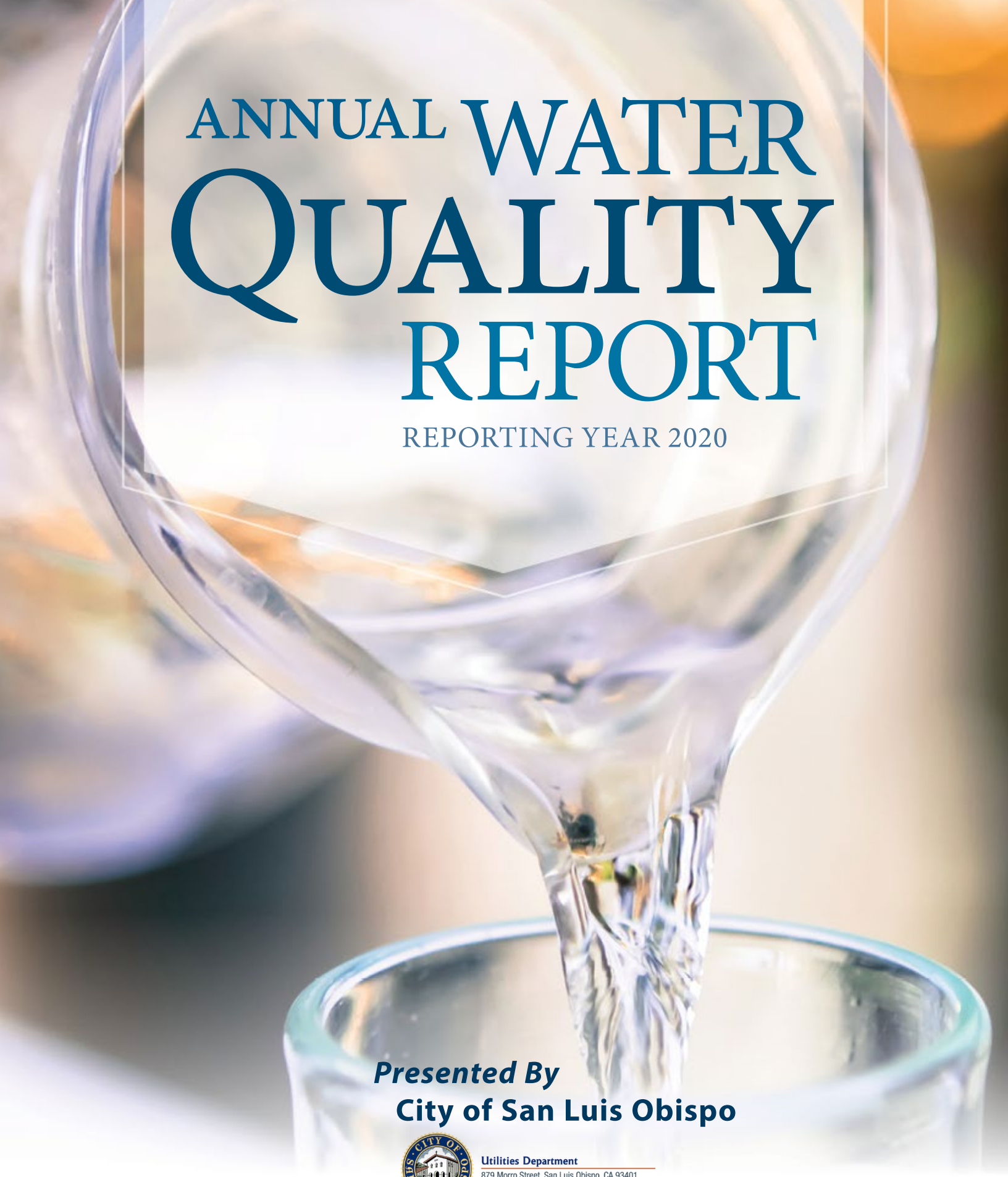
A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

Appendix VII: 2020 Annual Water Quality Report



ANNUAL WATER QUALITY REPORT

REPORTING YEAR 2020

Presented By

City of San Luis Obispo

Utilities Department
879 Morro Street, San Luis Obispo, CA 93401

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

PWS ID#: 4010009

Quality First

Once again, we are pleased to present our annual water quality report covering all testing performed between January 1 and December 31, 2020. As in years past, we are committed to delivering the best-quality drinking water possible. To that end, we remain vigilant in meeting the challenges of new regulations, source water protection, water conservation, and community outreach and education while continuing to serve the needs of all our water users. Thank you for allowing us the opportunity to serve you and your family.

We encourage you to share your thoughts with us on the information contained in this report. After all, well-informed customers are our best allies.

Public Meetings

City Council meetings are held on the first and third Tuesday of each month at 6:00 p.m. at City Hall, 990 Palm Street, San Luis Obispo. A public comment period is held at the beginning of each meeting.

Emergency Public Meeting Procedure due to COVID-19

Based on the threat of COVID-19, as reflected in the Proclamations of Emergency issued by the Governor of the State of California, the San Luis Obispo County Emergency Services Director, and the City Council of the City of San Luis Obispo as well as the Governor's Executive Order N-29-20 issued on March 17, 2020, relating to the convening of public meetings in response to the COVID-19 pandemic, the City of San Luis Obispo will be holding all public meetings via teleconference. There will be no physical location for the public to attend the meeting.

Using the most rapid means of communication available at this time, members of the public are encouraged to participate in council meetings in the following ways: View the webinar. Information is available on the city's website at https://www.slocity.org/

Source Water Assessment

Assessments of the drinking water sources for the City of San Luis Obispo have been conducted. These sources include Salinas Reservoir, Whale Rock Reservoir, Nacimiento Lake, and Pacific Beach Well. These sources are considered most vulnerable to the following activities not associated with any detected contaminants: grazing, managed forests, recreational areas, septic systems, sewer collection systems, gas stations.

A copy of the complete assessment is available from the SWRCB Division of Drinking Water, 1180 Eugenia Place, Suite 200, Carpinteria, California, 93013 or the City of San Luis Obispo, 879 Morro Street, San Luis Obispo, California, 93401.

Where Does My Water Come From?

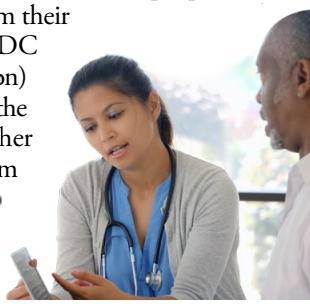
The City of San Luis Obispo is fortunate to have several sources of water. The Salinas Reservoir (also known as Santa Margarita Lake, eight miles east of Santa Margarita), Whale Rock Reservoir (Cayucos), and Nacimiento Lake (16 miles northwest of Paso Robles) are the main supplies. The surface water from the three lakes is treated at the Stenner Creek Water Treatment Plant. During 2020, the treatment plant delivered 1.71 billion gallons of water to San Luis Obispo.

The Benefits of Fluoridation

Our water system treats your water by adding fluoride to the naturally occurring level to help prevent dental caries in consumers. State regulations require the fluoride levels in the treated water be maintained within a range of 0.6 to 1.2 ppm with an optimum dose of 0.7 ppm. Our monitoring showed that the fluoride levels in the treated water ranged from 0.0 to 0.9 ppm with an average of 0.59 ppm. Information about fluoridation, oral health, and current issues is available from http://www.swrcb.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.shtml.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or http://water.epa.gov/drink/hotline.



Questions?

For more information about this report, or for any questions relating to your drinking water, please contact Jason Meeks, Water Treatment Plant Supervisor, at (805) 781-7566 or jmeeks@slocity.org.

Substances That Could Be in Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material and can pick up substances resulting from the presence of animals or from human activity.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (U.S. EPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration regulations and California law also establish limits for contaminants in bottled water that provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

Contaminants that may be present in source water include: Microbial Contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; Inorganic Contaminants, such as salts and metals, that can be naturally occurring or can result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming; Pesticides and Herbicides that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses; Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and which can also come from gas stations, urban stormwater runoff, agricultural applications, and septic systems; Radioactive Contaminants that can be naturally occurring or can be the result of oil and gas production and mining activities.

More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Water Treatment Process

The treatment process consists of a series of steps referred to as conventional surface water treatment. First, raw water is drawn from our water sources and sent to an ozone contact basin, which provides primary disinfection and oxidation of the high iron levels that are present in the water. The water then goes to a mixing tank, where aluminum sulfate and cationic polymer are added. The addition of these substances causes small particles (called floc) to adhere to one another, making them heavy enough to settle into a basin, from which sediment is removed. At this point, the water is filtered through layers of anthracite and silicate sand. As smaller suspended particles are removed, turbidity disappears and clear water emerges. Chlorine is added as a precaution against any bacteria that may still be present. We carefully monitor the amount of chlorine, adding the lowest quantity necessary to protect the safety of your water without compromising taste. Finally, fluoride (to prevent tooth decay) and a corrosion inhibitor (to protect distribution system pipes) are added before the water is pumped to sanitized underground reservoirs and water tanks and into your home or business.

Lead in Home Plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to two minutes before using water for drinking or cooking. (If you do so, you may wish to collect the flushed water and reuse it for another beneficial purpose, such as watering plants.) If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at (800) 426-4791 or at www.epa.gov/safewater/lead.

Test Results

Drinking water is monitored for many different kinds of substances on a very strict sampling schedule. The water delivered must meet specific health standards. This report only shows substances that were detected in the city's drinking water (a complete list of all analytical results is available upon request). Remember that detecting a substance does not mean the water is unsafe to drink; the goal is to keep all detects below respective maximum allowed levels.

The state recommends monitoring for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

The City of San Luis Obispo participated in the fourth stage of the U.S. EPA's Unregulated Contaminant Monitoring Rule (UCMR4) program by performing additional tests on our drinking water. UCMR4 sampling benefits the environment and public health by providing the U.S. EPA with data on the occurrence of contaminants suspected to be in drinking water in order to determine if U.S. EPA needs to introduce new regulatory standards to improve drinking water quality. Unregulated contaminant monitoring data are available to the public, so please feel free to contact us if you are interested in obtaining that information. If you would like more information on the U.S. EPA's Unregulated Contaminant Monitoring Rule, please call the Safe Drinking Water Hotline at (800) 426-4791.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	PHG (MCLG) [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum (ppm)	2020	1	0.6	0.079	0.06–0.1	No	Erosion of natural deposits; residue from some surface water treatment processes
Chlorine (ppm)	2020	[4.0 (as Cl2)]	[4 (as Cl2)]	0.81	0.02–1.6	No	Drinking water disinfectant added for treatment
Control of DBP Precursors [TOC][1] (percent removal)	2020	TT	NA	27	3–54	No	Various natural and human-made sources
Fluoride[2] (ppm)	2020	2.0	1	0.59	ND–0.9	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Gross Alpha Particle Activity (pCi/L)	2011	15	(0)	0.0145	ND–0.029	No	Erosion of natural deposits
Haloacetic Acids[3] (ppb)	2020	60	NA	39	16–77	No	By-product of drinking water disinfection
Hexavalent Chromium (ppb)	2015	10[4]	0.02	2.0	ND–12.0	No	Discharge from electroplating factories, leather tanneries, wood preservation, chemical synthesis, refractory production, and textile manufacturing facilities; erosion of natural deposits
TTHMs [Total Trihalomethanes][3] (ppb)	2020	80	NA	43	17–74	No	By-product of drinking water disinfection
Turbidity[5] (NTU)	2020	TT	NA	0.18	0.05–0.18	No	Soil runoff
Turbidity (lowest monthly percent of samples meeting limit)	2020	TT = 95% of samples meet the limit	NA	100	NA	No	Soil runoff

Tap water samples were collected for lead and copper analyses from sample sites throughout the community

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	PHG (MCLG)	AMOUNT DETECTED (90TH %ILE)	SITES ABOVE AL/ TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2019	1.3	0.3	0.188	0/30	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (ppb)	2019	15	0.2	ND	0/30	No	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	PHG (MCLG)	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum (ppb)	2020	200	NS	0.079	0.06–0.1	No	Erosion of natural deposits; residual from some surface water treatment processes
Chloride (ppm)	2020	500	NS	16	16–16	No	Runoff/leaching from natural deposits; seawater influence
Specific Conductance (µmho/cm)	2020	1,600	NS	467	467–467	No	Substances that form ions when in water; seawater influence
Sulfate (ppm)	2020	500	NS	78.2	78.2–78.2	No	Runoff/leaching from natural deposits; industrial wastes

UNREGULATED AND OTHER SUBSTANCES [6]

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE
Hardness (ppm)	2020	184	120–300	Polyvalent cations present in the water, generally magnesium and calcium, which are naturally occurring
Sodium (ppm)	2020	23	23–23	Naturally occurring

Definitions

90th %ile: The levels reported for lead and copper represent the 90th percentile of the total number of sites tested. The 90th percentile is equal to or greater than 90% of our lead and copper detections.

AL (Regulatory Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs (SMCLs) are set to protect the odor, taste, and appearance of drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. EPA.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NS: No standard

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L (picocuries per liter): A measure of radioactivity.

PDWS (Primary Drinking Water Standard): MCLs and MRDLs for contaminants that affect health, along with their monitoring and reporting requirements and water treatment requirements.

PHG (Public Health Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California EPA.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

µmho/cm (micromhos per centimeter): A unit expressing the amount of electrical conductivity of a solution.

[1] Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection by-products such as TTHMs and HAA5s. The city's TOC reduction requirement was 25 to 35 percent based on a running annual average calculated quarterly.

[2] Our water system treats your water by adding fluoride to the naturally occurring level to help prevent dental caries in consumers. State regulations require the fluoride levels in the treated water be maintained within a range of 0.6 to 1.2 ppm, with an optimum dose of 0.7 ppm. Our monitoring showed that the fluoride levels in the treated water ranged from below detection limits to 0.9 ppm, with an average of 0.59 ppm. Information about fluoridation, oral health, and current issues is available from http://www.swrcb.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.shtml.

[3] Regulatory compliance is determined based on the locational running annual average (LRAA). Additional sample results are included in this report, along with regulatory compliance results.

[4] There is currently no MCL for hexavalent chromium. The previous MCL of 10 ppb was withdrawn on September 11, 2017.

[5] Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

[6] Unregulated contaminant monitoring helps U.S. EPA and the State Water Resources Control Board determine where certain contaminants occur and whether the contaminants need to be regulated.

Appendix VIII: Draft Mandatory Water Conservation Ordinance

Draft ORDINANCE NO. (2021 Series)

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SAN LUIS OBISPO ESTABLISHING A MANDATORY WATER CONSERVATION PROGRAM

WHEREAS, the City has experienced multiple years of below normal rainfall; and

WHEREAS, the City's reservoirs have an estimated five-year water storage capacity; and

WHEREAS, City policy requires that when there is an estimated five-year water storage capacity remaining in the City's reservoirs that mandatory conservation measures be implemented.

BE IT ORDAINED by the Council of the City of San Luis Obispo as follows:

SECTION 1. The City has established the following water allocation method for each customer classification.

Single-family Residential **-** A per capita allotment of _____ gallons per day will be assigned to each single-family residence based on the water shortage stage the City is entering. The per capita allotment may be reduced in each subsequent water shortage stage. Additional water would be allocated dependent on verification of the actual number of people in a household.

Multi-family Residential **-** A per capita allotment of _____ gallons per day based on a three-person household will be assigned to each multi-family residence. If there are more than three people in the household, additional water would be allocated dependent on verification of the actual number of person in the household.

Commercial **-** Commercial customers will receive an allocation using a percent reduction methodology based on the average of the previous three years of water use. An optional baseline standard allocation will also be available to commercial customers.

Institutional **-** Institutional customers will receive an allocation using a percent reduction methodology based on the average of the previous three years of water use.

Landscape Meters **-** Landscape only metered customers will receive an allocation using a percent reduction methodology based on the average of the previous three years of water use.

Excessive Water Use Penalties **-** Customers exceeding their assigned allocation will pay a 100 percent surcharge of the water portion of their bill. If the customer exceeds the base allocation assigned to their account, a 200 percent surcharge will be assessed.

SECTION 2. A summary of this ordinance, approved by the City Attorney, together with the names of the Council members voting for and against it, shall be published at least five days prior to its final passage, in the New Times, a newspaper published and circulated in this City. This ordinance will go into effect at the expiration of thirty (30) days after its final passage.

INTRODUCED on the _____ day of 2021 AND FINALLY ADOPTED by the Council of the City of San Luis Obispo on the _____day of 2021, on the following roll call vote:

AYES:

NOES:

ABSENT:

_____
Mayor Heidi Harmon

ATTEST:

____
_____
Teresa Purrington, City Clerk

APPROVED AS TO FORM:

_____
J. Christine Dietrick, City Attorney