2022 Water Supply and Demand Assessment

For the Time Period July 1, 2021 through June 30, 2023

Salinas Reservoir Spillway.

I. INTRODUCTION

California Water Code (***CWC §10632.1.***) directs urban water suppliers (Suppliers) to conduct an Annual Water Supply and Demand Assessment (Water Supply Assessment) for the purpose of (i) evaluating its water supply reliability for the current year and one dry year and (ii) generating and submitting an Annual Shortage Report by July 1 every year starting July 1, 2022. The procedures for conducting a Water Supply Assessment shall include the following:

> *(A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.*
> *(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:*
> *(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.*
> *(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.*
> *(iii) Existing infrastructure capabilities and plausible constraints.*
> *(iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.*
> *(v) A description and quantification of each source of water supply.*

The City's 2022 Water Supply Assessment was prepared in accordance with the *General Plan, Water and Wastewater Management Element*, Policy A5.3.1. The methods for calculating water supply and water demand have been modified to match the reporting requirements of the Water Supply Assessment and are described below.

II. DECISION MAKING PROCESS

The CWC does not specify the type of year the Suppliers should use to do the Water Supply Assessment (Calendar or Fiscal). However, the California Department of Water Resources (DWR) recommends that the one Dry Year begin in July. For this Water Supply Assessment, which will be submitted by July 1, 2022, the Dry Year will therefore cover the twelve months from July 2022 to June 2023. Each subsequent Water Supply Assessment will define the Dry Year period as July 1st of the Water Supply Assessment year through June of the next calendar year. The Current Year for this Water Supply Assessment will cover the twelve months from July 2021 through June 2022. The Current Year and Dry Year periods for this Water Supply Assessment are concurrent with the City's 2021 and 2022 Fiscal Year periods, respectively.

The City utilizes a Water Projection Model to test both hypothetical and actual water demand scenarios and to forecast how long water supplies will sustain the community under specific conditions. The Water Projection Model accounts for the storage in the City's surface water reservoirs, in conjunction with other available resources (i.e., groundwater and recycled water), needed to meet the City's water demand. The model uses historical hydrologic information (rainfall, evaporation, inflow) based on the average for the worst drought period (2012 to 2014). Other data included in the model are:

a. Water entitlement
b. Current reservoir levels/storage

c. Average gallons per capita per day community water demand
d. Rainfall
e. Temperature
f. Evaporation
g. Existing population
h. Population growth

Utilizing the Water Projection Model as part of its water supply management, the City can foresee whether a water supply shortage is anticipated in any given year, and the severity of a shortage based on the availability of the City's different sources of supply and water demand trends. The City uses the Water Projection Model to study the potential impacts of various intensities of drought conditions, including increased temperature and evaporation rates, along with decreased precipitation. Per the City's 2020 Water Shortage Contingency Plan, the Water Supply Assessment will utilize the Water Projection Model to determine current demand, future demand, and any associated water shortages.

Water supply and demand are presented in the units of acre-feet (AF). Annual available supply is determined using existing methods (*General Plan Water and Wastewater Management Element (WWME),* Section 3). Annual demand for the purposes of estimating Current Year and Dry Year demand is determined using a modification of the methods described in the City's method for determining Primary Water Supply (*WWME,* Section 5) as described below. Current Year monthly demand is determined using actual metered data when available; however, for the months when metered data have not been collected, demand is calculated using the methods described in this report.

III. WATER SUPPLY REALIABILITY EVALUATION

Description and Quantification of Each Water Supply Source

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: Nacimiento Reservoir, Whale Rock Reservoir, Salinas Reservoir, and recycled water. The City intends to use its contractual water supply from Nacimiento Reservoir first, with Whale Rock Reservoir and Salinas Reservoir used as needed to meet the City's overall potable water demand. 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. Recycled water is used as a non-potable source for irrigation and construction purposes within City limits.

Nacimiento Reservoir

In 1959, the San Luis Obispo Flood Control and Watershed Protection District (San Luis Obispo 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 AF of water per year (AFY) 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 AF and serves the purpose of abating seawater intrusion in the groundwater aquifers of the Salinas River Valley, while also providing flood protection and groundwater recharge for the Salinas Valley. Of the San Luis Obispo District's entitlement, 1,750 AFY have been designated for uses around the lake, leaving 15,750 AFY for allocation to other areas within the County of San Luis Obispo. Water is delivered via a 45-mile pipeline from Nacimiento Reservoir to participating agencies and cities.

The "dependable yield" from Nacimiento Reservoir is the contractual amount of water that the City has rights to from Nacimiento Reservoir. The City's original amount contracted for was 3,380 AFY. Engineering studies, environmental impact reports, dependable yield analyses, and preliminary design reports were completed to ensure water needs within the County were met. 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 AF. On June 29, 2004, the City Council authorized participation in the Nacimiento Water Project for the delivery of the original 3,380 AF of water. In 2004, the County Service Area 10A in Cayucos became a project participant (25 AFY).

In March 2016, the City Council approved the addition of 2,102 AFY from Nacimiento Reservoir to the City's water supply. This addition brought the City's total Nacimiento Reservoir allocation to 5,482 AFY. 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, extending these stored supplies during future critical water shortages.

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 AFY. 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 San Luis Obispo District's entitlement could still be met if inflow remained at this level.

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 California State Department of Water Resources (DWR). 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.

Whale Rock Reservoir is formed by an earthen dam and was able to store an estimated 40,662 AF 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 AF. The City owns 55.05 percent of the water storage rights at the

reservoir (22,364 AF). 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. 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 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.

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 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 right permit to divert water from the Salinas River for storage within the reservoir.

Salinas Reservoir is formed by a concrete arched dam. Immediately following construction, the reservoir had an estimated storage capacity of 24,000 AF with a surface area of 793 acres, and a drainage area of

112 square miles. Safe Annual Yield for Whale Rock and Salinas reservoirs was updated in 2018 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. As a result of siltation since the original construction, the reservoir capacity has been reduced.

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.

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.

Recycled Water

The City's Water Resource Recovery Facility (WRRF) produces over 3,200 AF of disinfected tertiary-treated effluent per year. A minimum of 1,807 AF 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 and 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, non-potable water supply.

The primary use of recycled water in the City is for landscape irrigation with 73 percent of the City's recycled water

demand occurring from May through October. The City began issuing annual construction water permits in July 2009. Permit holders have access to recycled water for dust control and compaction on construction sites in the City. The City has metered wharf head hydrant filling stations throughout city limits. During 2021, 248 AF of recycled water was used for landscape irrigation and construction water. The City has identified a "seasonal surplus" of recycled water available in excess of required discharge to San Luis Obispo Creek (5 AF per day as required by the National Oceanic and Atmospheric Association, National Marine Fisheries Service in 2005) and recycled water for landscape irrigation. As only a limited amount of landscape irrigation takes place from November to April (seasonal off-peak period), more than 6 AF per day of recycled water is available during the seasonal off-peak period. An upgrade of the WRRF is underway, which will accommodate the City's buildout and maximize recycled water production. The upgrade will enable the City to maximize beneficial use of recycled water, including consideration of either direct or indirect potable reuse in the future. Until potable reuse is implemented, the City is focused on expanding the use of recycled water within City limits to help offset potable water use. Per the City's Recycled Water Master Plan, recycled water use is projected to increase by 10 AF per year.

Groundwater

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 2022 with implementation planned for 2023. In January 2022, the City and the County, acting as Groundwater Sustainability Agencies, submitted a draft of the Groundwater Sustainability Plan (GSP) for the San Luis Obispo Valley Groundwater Basin to the California Department of Water Resources (DWR). The GSP was a result of several years of work conducted to better understand the hydrology of the basin and will be instrumental in guiding sustainable use of groundwater in the basin, including the City's utilization of groundwater as a source of supply. The GSP estimates a groundwater surplus (recharge minus withdraws) of approximately 700 AFY.

Assessment Methodology: Locally Applicable Evaluation Criteria

Water supply reliability is the City's ability to meet the water needs of its customers under varying conditions. The City estimates annual Water Supply based on *Water and Wastewater Management Element,* Section 3. This method incorporates Safe Annual Yield from Salinas and Whale Rock Reservoirs as determined through the City's 2018 Safe Annual Yield Model, the City's contractual amount of water from Nacimiento Reservoir (Dependable Yield), the prior Calendar Year volume of Recycled Water utilized by the City, and reduction in reservoir storage caused by siltation as directed in WWME Policy A 4.2.2. As described in Chapter 6 of the City's 2020 Urban Water Management Plan (UWMP), the City assesses water supply reliability by analyzing the hydrological variability of the City surface water reservoirs (Salinas, Whale Rock, and Nacimiento), regulatory variability, climate conditions, and other factors that may affect the City's water supplies and customer water uses. This analysis is done using the City's Water Projection model and applies worst-case drought conditions according to guidelines set forth in the UWMP plan documentation.

The City accounts for the water supplies necessary to meet community needs using the methods detailed in the *General Plan Water and Wastewater Management Element (WWME),* Section 5. The amount of water needed to serve the City's future residential and non-residential water demand is termed the primary water supply. The primary water supply is calculated using the build-out population identified in the General Plan, Land Use Element (2014) and 117 gallons per capita per day (GPCD), which is the

maximum allowed per capita water use under Senate Bill X7-7. For this Water Supply Assessment, Current Year population (2021) and Dry Year population (Current Year population plus one percent) are used in lieu of the build-out population when calculating total annual demand. When utilizing the Water Projection Model to estimate future water supply and demand, GPCD decreases in accordance with the Water Shortage Contingency Plan. For example, water demand is calculated using an initial value of 117 GPCD and decreases by ten percent (corresponding to a ten-percent decrease in water use) to 105 GPCD when available supply is less than 5-years of estimated annual demand. This ten percent reduction is in alignment with the demand reduction that the City projects it would achieve from conservation measures outlined in the Water Shortage Contingency Plan.

The annual water supply and demand volumes calculated using the methods described above are converted to monthly volumes for the purposes of this Water Supply Assessment so that potential seasonal water shortages are highlighted. Monthly supply and demand volumes are calculated using average monthly demand as a percent of average annual demand for the ten-year period 2011-2021. These monthly average demand percentages are then applied to the annual supply and demand to provide monthly volumes.

Current Year Water Supply and Demand Assessment

Analysis of the supply and demand data from the previous year allows for a better understanding of how annual demand is met with the available water supplies. As shown in Table 1, the City's 2020-2021 Fiscal Year demand was 5,228 AF. The per-capita demand during this period was 101 GPCD. Forty-seven percent (47%) of this demand was supplied by Nacimiento Reservoir, 49% was supplied by Whale Rock and Salinas Reservoirs, and 5% was supplied by recycled water. The City will likely utilize similar proportions of water from the available sources to meet Current Year and Dry Year water demands.

Table 1: City Water Supply by Source during the 2020-2021 Fiscal Year[1]

(in acre-feet)

Nacimiento Reservoir	Whale Rock Reservoir [2]	Salinas Reservoir	Recycled Water	Groundwater [3]	Total City Water Demand
2,449	1,183	1,337	259	0	5,228
47%	23%	26%	5%	0%	100%

Notes:

1. Values are rounded.
2. Water delivered to Cal Poly State University is excluded from the City's water demand, as Cal Poly has its own water storage and water diversion rights in Whale Rock Reservoir.
3. Groundwater was not used for potable purposes during Fiscal Year 2021.

Current Year available water supply is 10,140 AF (Table 2). The quantity of water available from each water source for the Current Year is summarized in Table 2. Results from the City's Water Projection Model demonstrate that this is a reliable estimate of supply availability for the Current Year as well as extended drought periods (greater than 5 years).

Table 2: Current Year 2021-22 Annual Water Supply

Water Resource	Acre-Feet	Description
Nacimiento Reservoir	5,482	Dependable Yield [1]
Salinas & Whale Rock Reservoirs	4,910	Safe Annual Yield [2]
Recycled Water	248	2021 Annual Usage [3]
Siltation from 2010 to 2060	(500)	WWME Policy A 4.2.2 [4]
	10,140	**Total Availability**

NOTES:

1. Dependable Yield is the contractual amount of water the City has rights to from Nacimiento Reservoir.
2. The City's Safe Annual Yield model was updated in 2018.
3. The quantity of recycled water included (245 AF) is the actual prior year's usage (calendar year 2020) 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.

The Current Year estimated potable demand is 6,036 AF (Table 3). This value is the demand calculated using the 2022 population of 46,058 and per-capita daily demand of 117 GPCD. The actual Current Year demand shown in Table 3 (5,318 AF) is lower than the estimated demand because of more efficient water use (97 GPCD calculated using actual data for the period July 2021 through March 2022) and variations in water needs caused by annual climate variations. Therefore, the monthly values estimated in Table 3 are likely conservative estimates of demand that overestimate the actual demand.

Community-wide water conservation, thanks to a history of collaboration between the City and its community members, has resulted in more efficient water use. This water conservation ethic is supported by City programs such as the school education program, community outreach program, customer water audits, and the retrofit upon sale program. Additionally, the City is improving the water efficiency of its operations by identifying and repairing leaking infrastructure, annually testing and upgrading water meters, and supplying parks with non-potable recycled water. The City will conduct regular assessments of the water conservation program to ensure the most effective use of City resources to provide the greatest water savings.

Table 3: Current Year 2021-22 Water Supply and Demand, in acre-feet

Potable Water	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Anticipated Unconstrained Demand	459	486	468	450	402	333	311	368	420	479*	569*	573*	5,318
Anticipated Total Water Supply	940	968	909	892	756	691	690	666	713	782	937	946	9,891
Surplus/Shortage	482	482	441	442	354	357	379	298	307	304	369	372	4,587
% Surplus/Shortage	105%	99%	94%	98%	88%	107%	122%	81%	76%	63%	65%	65%	86%
State Standard Shortage Level	0	0	0	0	0	0	0	0	0	0	0	0	0

Non-Potable	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Anticipated Unconstrained Demand	34	30	29	25	12	6	5	15	7	19*	28*	31*	241
Anticipated Total Water Supply	129	125	137	180	147	185	231	246	283	220	177	158	2,217
Surplus/Shortage	95	95	108	156	135	179	226	231	276	201	149	126	1,976
% Surplus/Shortage	278%	315%	372%	626%	1089%	2909%	5026%	1543%	3698%	1075%	536%	403%	818%

Notes:

1. * denotes estimated demand values.

The Current Year non-potable demand is 241 AF. This represents recycled water used for irrigation and acts to offset potable water use. The Current Year non-potable supply and demand assessment shows large surpluses for every month and a total annual surplus of about 1,976 AF. The total non-potable supply includes the total volume of water treated at the City's WRRF minus 5 AF per day creek discharge requirement. The non-potable supply and demand assessment provides insight on seasonal fluctuations in non-potable water supply and will assist the City in determining the ability to meet increases in future demands for irrigation and the volume of water available for potable reuse projects.

Current Year water supply and demand data are shown on a monthly time-step in Table 3. The values demonstrate the seasonal differences in demand and the supplies needed to meet those demands. As demonstrated by a water surplus (supply greater than demand) in each month, the City is not anticipating entering into a water shortage emergency at any point in the Current Year. Monthly potable surpluses range from 298 to 482 AF, or 63% to 122% of monthly demand. Annually, the City is expecting to have a potable water supply surplus of about 4,587 AF (86% of annual demand). This surplus is a result of drought resilient water supply sources and community-wide water conservation efforts. As mentioned in previous sections of this report, because the City's contractual right in Nacimiento Reservoir is met even during years of low precipitation, water deliveries from Whale Rock and Salinas reservoirs can be kept low, resulting in stable storage volumes. Additionally, 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 97 GPCD and not anticipated to increase beyond minor year-to-year variations over time. The difference between projected demand and actual demand provides a water supply source that acts as a buffer against unexpected changes in supply or demand.

Dry Year Water Supply

The City's estimated Dry Year water supply is 10,239 AF (potable supply plus recycled water for non-potable reuse in Table 4). The City's Current Year water supply and Dry Year water supply are equivalent because of the reliability of the supply from Nacimiento Reservoir and the City's ability to manage withdraws from its multiple reservoirs to meet demands. As mentioned previously in this report, studies and recent drought-period data show that even during extended periods of below average rainfall inflows to Nacimiento Reservoir are sufficient to meet the San Luis Obispo District's annual entitlement, and therefore, the City's allocation. The City prioritizes water deliveries from Nacimiento Reservoir, allowing water to be stored in Whale Rock and Salinas reservoirs. The City's potable and non-potable water supplies are shown on a monthly time-step in Table 4.

Table 4: Dry Year 2022-23 Water Supply, in acre-feet

Water Supply Source	Additional Detail on Water Supply	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total Annual Water Supply
Nacimiento Reservoir	From contractual allocation	518	533	502	492	421	387	386	373	398	435	516	521	5,481
Salinas and Whale Rock Reservoirs	From safe annual yield	464	477	449	441	377	346	346	334	357	389	463	467	4,910
Groundwater	Supplier-produced	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	Decrease in available supply from siltation in reservoirs	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(41.7)	(500)
Total Potable		**940**	**967**	**909**	**892**	**756**	**691**	**690**	**666**	**713**	**782**	**937**	**946**	**9,891**
Recycled Water for non-potable reuse	For irrigation and construction uses	49	51	43	32	19	9	8	10	11	24	41	52	348
Recycled Water available for use	Produced by the WRRF that is not allocated for non-potable reuse or creek discharge requirements	79	75	94	148	128	176	223	237	272	196	135	106	1,869
Total Non-Potable		**129**	**126**	**137**	**180**	**147**	**185**	**231**	**246**	**283**	**220**	**177**	**158**	**2,217**

Dry Year Unconstrained Demand

The Dry Year estimated potable demand is 6,096 AF (Table 5). This value is the demand calculated using the estimated 2023 population of 46,519 and per-capita daily demand of 117 GPCD. These values account for maximum population growth and expected in-City development. As was seen in the Current Year demand shown in Table 3, actual Dry Year demand will likely be lower than the estimated demand because of more efficient water use and variations in water needs caused by annual climate variations.

Most of the City's potable demand is for single-family residential use (46%), followed by muti-family residential (21%), and commercial (21%). Demands for industrial, institutional, and dedicated landscape are each below ten percent of the total annual demand. Single-family and multi-family residential demands are greatest during the period May through October when precipitation is generally low. This suggests that residential demand is driven by outdoor irrigation and the increased demand for irrigation during dry periods. Non-potable water is estimated to offset about 283 AF of potable demand during the Dry Year.

Existing Infrastructure Capabilities and Plausible Constraints

The utilization of water from three separate reservoirs provides the City with operational flexibility to meet water demands while maintaining optimal storage volumes in each reservoir; however environmental factors can inhibit reservoir storage or prevent utilization of stored water by degrading water quality. While inflow to Nacimiento has proven to be sufficient during the worst drought in recent history, it is conceivable that in the most extreme drought, when precipitation is near zero, that inflow is less than the San Luis Obispo District's contractual amount. The City has not experienced significant water quality issues with water stored in its reservoirs, but extreme heat and low reservoir levels associated with drought conditions are ideal conditions for biological processes that can impair water quality, including growth of algae, which can lead to secondary water quality complaints related to taste and odor. The City's water treatment plant is capable of producing water that meets all state and federal standards, even as water quality is deteriorated by ongoing drought.

Currently the City satisfies demand without utilizing the full dependable yield from Nacimiento Reservoir because pipeline capacity constraints and treatment operation only allow for the delivery and treatment of approximately 4,500 AFY. Projects are being developed to allow for the full utilization of dependable yield from Nacimiento Reservoir in preparation for future periods when demands require the full available water supply. Should the City need to utilize its full entitlement to Nacimiento for any reason, it could modify plant operation to accommodate this need. Because the City relies primarily on water supplied by its reservoirs, disruptions in delivery of water from a reservoir could be caused by damage to existing infrastructure. While temporary disruptions in water supply availability can be mitigated through utilization of water from the other available reservoirs, prolonged disruptions could result in water shortages.

The City is expanding its groundwater program and considering potable reuse of recycled water to provide water supply redundancy and increased operational flexibility in extreme drought scenarios and during disruptions in delivery of water from reservoirs. Additionally, the City produces recycled water that can be used to offset potable demand and during disruptions water supply. To further increase potable demand offset, recycled water use could be temporarily expanded to meet irrigation needs beyond the current scope. Ultimately the City understands the potential issues that threaten its water supply and are proactively pursuing projects to mitigate them.

Table 5: Dry Year 2022-23 Unconstrained Demand, in acre-feet

Water Use	Projected Monthly Water Demand[1]												Total Annual Demand
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Demands Served by Potable Supplies													
Single Family	265	275	262	251	217	199	195	191	201	229	268	274	2,827
Multi-Family	107	110	111	118	105	98	109	100	105	104	118	107	1,291
Commercial	117	119	108	109	100	99	97	94	101	98	112	115	1,271
Industrial	16	16	14	14	11	10	10	9	10	11	15	15	149
Institutional/Government	3	3	3	3	3	2	2	2	2	3	3	3	33
Landscape	68	69	60	52	32	22	17	19	23	39	59	65	525
Total by Month (Potable)	**576**	**593**	**558**	**548**	**468**	**430**	**429**	**415**	**443**	**484**	**574**	**579**	**6,096**
Demands Served by Non-Potable Supplies[2]													
Landscape	32	33	28	21	12	6	6	7	7	16	28	33	229
Golf Course Irrigation	3	3	3.8	3.2	2.4	0.6	0.5	0.8	0.3	1	2	4	25
Construction	0.4	1	3.8	5.3	3.5	1.1	0.5	1.1	3.9	5	3	0.8	30
Total by Month (Non-Potable)	**36**	**37**	**35.6**	**29.0**	**18.3**	**7.9**	**6.6**	**8.5**	**11.4**	**21.9**	**33.5**	**37.9**	**283**

Notes:

1. Estimated values.
2. Non-potable water treated to tertiary level.

IV. SUPPLY AND DEMAND ANALYSIS

Using the Water Projection Model described above, the City has more than ten years of water available under a drought scenario with current water supply and demand conditions. The City does not expect to enter a water shortage emergency in any month during the Current Year and following Dry Year. Analysis of supply and demand data at a monthly timescale shows that the City has ample supply the meet monthly demands for the Current Year and a subsequent Dry Year (Table 6). Monthly potable surpluses range from 298 to 482 AF, or 63% to 122% of monthly demand. Annually, the City is expecting to have a potable water supply surplus of about 4,587 AF (86% of annual demand).

This analysis provides valuable insight on the primary uses of water in the City and also highlights periods when disruptions in delivery of water from one or more of the City's reservoirs would be most impactful to the City's ability to meet demand. Monthly demands show that water supply is used primarily to meet residential demands. Additionally, monthly demands show the seasonal variation associated with the need for more water in the hot, dry summer months and the need for less water during the cool, wet winter months. Ultimately, the data show that water use within the City is driven by residential use during the dry, summer months, likely in response to outdoor irrigation needs. Because of this, water conservation programs that target reduction in outdoor irrigation may provide the greatest water savings.

The supply and demand analysis assumes reliable delivery of available water supplies during drought conditions similar to those experienced in recent history. More extreme drought conditions may present issues that decrease the volume of available water in storage or degrade the quality of water in storage. Available water supply may also be less than estimated because of disruptions in the delivery of available water supplies, whether temporarily caused by minor issues or prolonged disruptions caused by catastrophic events.

Table 6: Dry Year 2022-23 Water Supply and Demand, in acre-feet

Potable Water	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Anticipated Unconstrained Demand	576	593	558	548	468	430	429	415	443	484	574	579	6,096
Anticipated Total Water Supply	940	969	909	892	756	691	690	666	713	782	937	946	9,891
Surplus/Shortage	364	376	351	344	288	261	261	251	270	299	363	366	3,795
% Surplus/Shortage	63%	63%	63%	63%	62%	61%	61%	60%	61%	62%	63%	63%	62%
State Standard Shortage Level	0	0	0	0	0	0	0	0	0	0	0	0	0

Non-Potable Water	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Anticipated Unconstrained Demand	36	37	36	29	18	8	7	9	11	22	34	38	283
Anticipated Total Water Supply	129	125	137	180	147	185	231	246	283	220	177	158	2,217
Surplus/Shortage	93	89	101	151	129	177	224	238	272	198	143	120	1,934
% Surplus/Shortage	258%	241%	284%	522%	703%	2241%	3395%	2799%	2382%	904%	427%	316%	683%

V. PLANNED SHORTAGE RESPONSE ACTIONS

The City does not plan to implement a water shortage response in the Current Year or following Dry Year; however, the City's Water Shortage Contingency Plan (WSCP) provides a framework for responding to water shortages when necessary. The City's water shortage response is dependent on the ability to temporarily augment supply and/or reduce water demand. The goals of the WSCP are to extend the City's available water resources long enough to gain another winter rainfall period which could serve to add to reservoir storage. Extending available water resources through water demand reductions provides time for the City to bring on supplemental water supplies to meet demand. The City's water shortage response would combine a variety of strategies including outreach, indoor water efficiency regulations, and outdoor irrigation restrictions, each increasing in intensity as the shortage persists and the City's water supplies are further restricted. Implementation of these restrictions is necessary to conserve the City's water supply for the greatest public benefit regarding domestic use, sanitation, and fire protection.

The City reads water meters monthly to ensure water consumption data is collected for tracking, analysis, and to meet state reporting requirements. Monitoring and reporting key water use metrics is fundamental to water supply planning and management. Monitoring is also essential to ensure that the response actions are achieving their intended water use reduction purposes, or if new actions need to be considered. Compliance tracking is also necessary for an effective enforcement program. To evaluate the functionality of the WSCP and ensure strategies are effective, staff will monitor community response to water demand reduction measures, public outreach, enforcement, and other administrative actions at each water shortage response stage. This will include review of monthly water consumption data for each customer class and monitoring associated revenue and expenditure impacts. Staff will make recommendations on program refinements to the City Council with water shortage stage progression.

VI. SUMMARY

Based on the findings from this Water Supply Assessment, the City does not expect to enter a water shortage emergency and will not need to implement a water shortage response. In fact, the Water Supply Assessment shows that the City will have a water supply surplus on an annual and monthly timestep. The City will continue to monitor its supply and demand using its Water Projection Model to ensure that any water shortage emergencies may be identified well in advance so that programmatic and operational changes can be made to mitigate their effects. Finally, this Water Supply Assessment assumes reliable delivery of available water supplies during drought conditions similar to those experienced in recent history. Decreases in water availability caused by extreme drought conditions or disruptions in the delivery of available water supplies may create unexpected water shortage emergencies. When such water shortage emergencies arise, the City is prepared to implement its WSCP to extend the City's available water resources long enough to gain additional winter rainfall periods which could serve to add to reservoir storage or to bring on supplemental water supplies to meet demand.

In summary, the City maintains a robust water supply portfolio with a water supply that is sufficient to meet current and future demands, even in periods of drought. The City has planned for drought periods by securing a multi-source supply that provides reliability and operational flexibility. Current and future, build-out demands are factored into the City's estimations of water supply and demand to ensure adequate water supply, and the use of conservative estimates provides a buffer that decreases the potential for water shortages even during unexpected disruptions in water supply or greater than expected increases in demand. The City can rely on this buffer because of community-wide water conservation that resulted from a history of collaboration between the City and its community members. Water conservation is a large component of the City's water shortage mitigation strategy. The City is also working to expand the use of recycled water within City limits to help offset potable water use, as well

as developing groundwater and potable reuse programs to provide additional sources of potable water supply and provide operational flexibility during disruptions in delivering water from its reservoirs.