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## Chapter 8

# WATER AND WASTEWATER

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**Adopted: February 24, 1987**

*Last Revised: June 15, 2016*

*(Council Resolution No. 10725, 2016)*

*Please see the next page.*



## CHAPTER 8 WATER AND WASTEWATER

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## INTRODUCTION

The City's General Plan guides the use and protection of various resources to meet community purposes. It reflects consensus and compromise among a wide diversity of citizens' preferences, within a framework set by State law. The General Plan contains elements that address various topics.

The City decided to adopt an element addressing water resources and wastewater services because of the vital role of these resources and the far-reaching impacts of water policies on community growth and character. This element translates the Land Use Element's capacity for development into potential demand for water supply and wastewater services. This element 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.

Before adopting or revising any General Plan element, the Planning Commission and the City Council must hold public hearings. The City publishes notices in the local newspaper and on the City's website to let citizens know about the hearings at least ten days before they are held. Also, the City prepares environmental documents to help citizens understand the expected consequences of its planning policies before the hearings are held.

Anyone may suggest or apply for amendments to General Plan elements.

## A. WATER MANAGEMENT

### INTRODUCTION

#### A 1.0 Background

The original Water and Wastewater Management Element was adopted in 1987 around the time the City experienced its most severe drought period which lasted from 1986 to 1991. During this point in time mandatory water use restrictions were instituted and restrictions on new development were imposed. Following this period, the City pursued additional water supplies to meet the existing water needs of the community, as well as to fulfill the goals of the General Plan. The policies in the Water Management section of the Element were written in a manner to address the water scarcity issues the City was facing. With the addition of the Nacimiento Water Project to the City's water portfolio, the City has an adequate water supply to serve the community's existing and future water needs as defined by the General Plan. The 2010 revisions to the Water and Wastewater Management Element reflect the change in the water supply situation.

The 2016 revisions to the Water and Wastewater Management Element are proposed to include a larger contractual water supply from Nacimiento Reservoir, to update the daily per capita water use assumption used in water supply accounting, and to reflect information from the *Whale Rock Reservoir Bathymetric Survey and Volumetric Study* completed in 2013.

#### A 1.1 Purpose

The Water Management section of the Element includes goals, policies, and programs related to water supply, demand, and other emerging issues.



## MULTI-SOURCE WATER SUPPLY

### A 2.0 Background

The City is the sole water purveyor within the city limits. This allows the City to maintain uniformity of water service and distribution standards, and to be consistent in developing and implementing water policy. As the sole water purveyor, the City maintains control over water quality, distribution, and service to users of the system, as well as ensuring consistency with the City's General Plan policies and goals.

The Water Element of the General Plan, adopted in 1987, identified multiple water projects to meet projected short and long-term water demand. 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 usually greater reliability and flexibility if sources are of different types (such as surface water and groundwater) and if the sources of one type are in different locations (such as reservoirs in different watersheds). In November of 1990, the Council affirmed the multi-source concept.

Consistent with the multi-source concept, the City obtains water from five sources: Salinas Reservoir (Santa Margarita Lake), Whale Rock Reservoir, Nacimiento Reservoir, recycled water from the City's Water Resource Recovery Facility, and groundwater. See Figure 1.

#### Salinas Reservoir

The Salinas Dam was built in 1941 by the War Department to supply water to Camp San Luis Obispo and, secondarily, to meet the water needs of the City of San Luis Obispo. The Salinas Reservoir (Santa Margarita Lake) captures water from a 112 square mile watershed and can store up to 23,843 acre-feet. In 1947, the Salinas Dam and delivery system was transferred from the regular Army to the U.S. Army Corps of Engineers. Since the late 40s or early 50s, the San Luis Obispo County Flood Control and Water Conservation District has operated this water supply for the City under a lease from the U.S. Army Corps of Engineers. Water from the reservoir is pumped through the Cuesta Tunnel (a one-mile long tunnel through the mountains of the Cuesta Ridge) after which it flows by gravity to the City's Water Treatment Plant on Stenner Creek Road.

#### Whale Rock Reservoir

The Whale Rock Reservoir is a 40,662 acre-foot reservoir created by the construction of an earthen dam on Old Creek near the town of Cayucos. The dam was designed and constructed by the State Department of Water Resources in 1961 to provide water to the City of San Luis Obispo, Cal Poly State University, and the California Men's Colony. The Whale Rock Dam captures water from a 20.3 square mile watershed and water is delivered to the three agencies through 17.6 miles of 30-inch pipeline and two pumping stations. The City of San Luis Obispo owns 55.05 percent of the water storage rights at the reservoir. The remaining water storage rights are divided between the two State agencies with Cal Poly owning 33.71 percent and the California Men's Colony owning 11.24 percent.

#### Nacimiento Reservoir

The Nacimiento Reservoir provides flood protection and is a source of supply for groundwater recharge for the Salinas Valley. It is owned and operated by the Monterey County Water Resources Agency. Since 1959, the San Luis Obispo County Flood Control and Water Conservation District has had an entitlement to 17,500 acre-feet per year (AFY) of water from the reservoir for use in San Luis Obispo County. Approximately 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.

Figure 1 Multi Source Water Supply



**FIGURE 1: Multi-Source Water Supply**

Reservoir      City Limits      Conveyance Pipelines

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





The County began construction in 2007 on a 45-mile pipeline project to deliver water from the Nacimiento Reservoir to five participating agencies and cities. The City has a contractual entitlement to 5,482 AFY of water from the project.

**Recycled Water**

Recycled water is highly treated wastewater approved for reuse by the California Department of Public Health for a variety of applications, including landscape irrigation and construction dust control. Completed in 2006, the Water Reuse Project created the first new source of water for the City since 1961 following construction of Whale Rock Dam. The Project resulted in improvements at the City’s Water Resource Recovery Facility and an initial eight miles of distribution pipeline. The City’s first delivery of recycled water took place in 2006. The City estimates demand exists for approximately 1,000 acre feet of recycled water for landscape irrigation and other approved uses. Additional information is provided on recycled water in subsections A 3.0, A 7.0, and B 3.0 of this Element.

**Groundwater**

The groundwater basin beneath the City is relatively small and recharges very quickly following normal rainfall periods. The groundwater basin also lowers relatively quickly during periods of below-average rainfall. Extensive use of groundwater sustained the City through most of the drought of 1986-1991. The City’s two largest producing wells were shut down in 1992 and 1993 when elevated nitrate levels were detected. The City stopped utilizing the Pacific Beach well in April 2015. Due to new regulatory requirements, using the groundwater would require additional costly treatment before the water could be used. Additionally, portions of the groundwater basin are contaminated with a chemical solvent (tetrachloroethylene) which would require treatment facilities to remove. While the City does not currently utilize potable water from wells, this remains a viable option for future use. Private wells are in use in the City, such as the well operated by San Luis Coastal Unified School District at San Luis Obispo High School.

The City maintains a non-potable well at the City’s Corporation Yard that is available for non-potable purposes by permit. The City’s Laguna Lake Golf Course also has two wells that meet a portion of the irrigation demand for the course. The remainder of the irrigation demand for the golf course is met using recycled water from the City’s Water Resource Recovery Facility.

**A 2.1 Goal**

Ensure a long-term, reliable water supply to meet both current and future water demand associated with development envisioned by the General Plan.

**A 2.2 Policies**

**A 2.2.1 Multi-Source Water Supply**

The City shall utilize multiple water resources to meet its water supply needs.

**A 2.2.2 Water Service within the City**

- A. The City will be the only purveyor of water within the City.
- B. Appropriate use of privately-owned wells is allowed on individual parcels. The use of the water from a well shall only be utilized on the parcel on which it is situated.

### **A 2.3 Programs**

- A 2.3.1** Work cooperatively on regional water issues and water resource planning (Water Resource Advisory Committee, Whale Rock Commission, etc.).
- A 2.3.2** Participate with the County of San Luis Obispo in the Integrated Regional Water Management Plan process.
- A 2.3.3** Participate with other appropriate agencies in controlling invasive species which could impact the City's water supplies (i.e. quagga mussels).
- A 2.3.4** Work with appropriate agencies to minimize water quality impacts from new development and other activities in the watersheds of the City's water supplies.
- A 2.3.5** Continue to work with the County of San Luis Obispo on the operation and maintenance of Salinas Reservoir and Nacimiento Water Project.
- A 2.3.6** Complete sanitary surveys for the Salinas and Whale Rock Reservoirs every five years.



## Water Resource Availability

### A 3.0 Background

As described in Section A 2.0, the City has five water resources to meet current and future City water demand: Salinas Reservoir (Santa Margarita Lake), Whale Rock Reservoir, Nacimiento Reservoir, recycled water from the City’s Water Resource Recovery Facility, and groundwater. In order to ensure water supply reliability, the City must determine the amount of water available from these water resources on an annual basis. The method to determine the available yield from each resource varies based on water right, contractual agreement, or the amount of water actually supplied.

For Salinas and Whale Rock Reservoirs the term “safe annual yield” is used to define the annual amount of water available from these two resources. The two reservoirs are operated in a coordinated manner to increase the available water. In contrast, the “dependable yield” from Nacimiento Reservoir is the contractual amount of water to which the City has rights. Since Nacimiento Reservoir is operated as a water supply project for Monterey County, the concept of safe annual yield is not used for the City’s contractual water supply from this source. For recycled water, the annual amount delivered is counted in the water availability calculation. Though groundwater is part of the City’s water portfolio the City does not consider this supply in estimating available water resources to meet community needs at this time.

Another issue the City must address is the potential impact of climate change on the City’s water resources. Climate change could have a significant impact on future water availability in the form of droughts or increased siltation in reservoirs as a result of wildland fires which could affect the safe annual yield of the City’s reservoirs. As research on the topic continues, the City will monitor the potential for long-term impacts to its water supply resources.

The following sections provide more detail about each water resource. Table 1 is a summary of the City’s available water resources.

**Table 1. City Water Resource Availability**

Water Resource	2016 Annual Availability	
Salinas Reservoir (Santa Margarita Lake) and Whale Rock Reservoir	6,940 AF	Safe Annual Yield
Nacimiento Reservoir	5,482 AF	Contractual Limit
Recycled Water	187 AF	2015 Annual Usage
Siltation to 2060	(500 AF)	Policy A 4.2.2
<b>TOTAL</b>	<b>12,109 AF</b>	

**Note:** The quantity of recycled water included as part of the City’s available water resources identified above, is the actual prior year’s recycled water usage (2015), per Policy A 7.2.2.

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

### Salinas and Whale Rock Reservoirs

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. The two reservoirs are operated in a coordinated manner to maximize the available water from these sources. Salinas Reservoir fills and spills every two to three years due to its larger drainage area and more favorable runoff characteristics, yet has higher evaporation rates. Whale Rock Reservoir fills much less frequently. The combined yield from the two reservoirs can be maximized by utilizing water from Salinas as the City’s primary source, and using Whale Rock as a backup source during periods when Salinas is below minimum pool or unable to meet all of the demand. This approach increases the long-term water supply from these two sources.

Safe annual yield analyses of water supply sources are based on rainfall, evaporation, and stream flow experienced during a historical period. The City’s safe annual yield analysis utilizes data from 1943 through 1991 including drought periods in 1946-51, 1959-61, 1976-77, and 1986-91.

In 1988, the City contracted with the engineering firm of Leedshill-Herkenhoff, Inc., to prepare a detailed analysis of the City’s water supplies and create a computer model to determine safe annual yield, based on coordinated operation of the two reservoirs. The report *Coordinated Operations Study for Salinas and Whale Rock Reservoirs* was completed in 1989. Key assumptions used in the 1988 model were that the “controlling drought period” was from 1946 to 1951 and that the City only used Whale Rock Reservoir when Salinas was below minimum pool or could not meet the City’s monthly demand. The study also assumed a 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. The current minimum pool established for each lake is 2,000 acre feet. The study estimated the City’s total safe annual yield from the two reservoirs to be 9,080 acre-feet per year. This amount was never adopted by Council since the study period was only to 1988 and the City was then in a drought period of unknown length.

In 1991, staff updated the computer model to examine the impact of the 1986-1991 drought on safe annual yield and revise the assumptions on the amount of water used from Whale Rock Reservoir each year to more accurately reflect the way the City actually used that resource. The analysis determined that the 1986-91 drought was the critical drought of record for the two reservoirs. These revised assumptions resulted in a reduction in the safe annual yield estimate.

The City’s safe annual yield, from the coordinated operation of Salinas and Whale Rock Reservoirs is 6,940 acre feet. This includes reductions due to siltation at both reservoirs to the year 2010. Future losses due to siltation are addressed in Section 4.0 of this Element.



### **Nacimiento Reservoir**

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. The San Luis Obispo County Flood Control and Water Conservation District (County) has held an entitlement to 17,500 acre-feet of water from Nacimiento Lake since 1959. Since that time, a small portion has been dedicated for uses in the immediate areas around the Lake. Several times in the past, the County has evaluated opportunities for utilizing water to meet identified needs throughout the County. In the early 1990’s, the City was facing dire drought conditions and dwindling water supplies and was considering building an emergency water supply project on its own to provide a new water source. The City requested the County allocate 3,000 acre feet to the City on a permanent basis. While the County denied this request, this triggered the initiation of investigations on a county-wide basis for separate contracts for use of the available water from Nacimiento Reservoir.

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. Since 2004, the County Service Area 10A, which serves the southern portion of Cayucos, has become a project participant (25 AFY). In addition, 1,750 acre-feet was reserved for uses around the lake.

On June 29, 2004, the City Council authorized participation in the Nacimiento Water Project for the delivery of 3,380 acre-feet of water. This amount is considered to be the City’s dependable yield from this water source and will be utilized to meet existing and future water demands based on analyses prepared during the Nacimiento Project planning process (“Nacimiento Reservoir Reliability as a Water Source for San Luis Obispo County”, Boyle Engineering Corporation, October 2002).

In March 2016, the City Council approved the addition of 2,102 acre feet per year from Nacimiento Reservoir to the City’s secondary water supply. 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 critical water shortage periods.

### **Recycled Water**

With an average influent flow of just under 2.74 million gallons per day in 2015, the City’s Water Resource Recovery Facility produces over 3,000 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 San Luis Obispo Creek environment. The balance makes up the City’s available recycled water resource (See Table 2) which is available for approved uses including:

- Landscape and golf course irrigation
- Wetlands, wildlife habitat, stream augmentation
- Groundwater recharge
- Toilet flushing
- Vehicle washing
- Surface irrigation of orchards and vineyards

- Landscape impoundments
- Industrial cooling processes
- Food crop irrigation

**Table 2. Annual Recycled Water Availability based on Influent Flow**

Average Influent Flow to WRF (MGD)		Treated Effluent Produced (AFY)	Minimum Average Daily Creek Release (MGD) <sup>1</sup>	Minimum Annual Creek Release (AFY)	Average Daily Recycled Water Availability (MGD)	Annual Recycled Water Availability (AFY) <sup>1</sup>
<b>2015 Average Flow</b>	2.74	3,066	1.6129	1,807	1.13	1,259
<b>Future Flow at WRRF Design Capacity</b>	5.4	5,966	1.6129	1,807	3.79	4,159

**NOTES:**

1. 2015 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 in the design phase in 2016.

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

The design phase for the upgrade of the WRRF is underway in 2016 to accommodate General Plan buildout and maximize recycled water production. The upgrade will enable the City to consider potable reuse in the future.

Additional background information on recycled water, as well as applicable goals, policies and programs, is provided in subsection A 7.0 of the Water Section and subsection B 3.0 of the Wastewater Management Section.

**A 3.1 Goal**

Manage the City’s water resources to meet the current and future water demand requirements associated with development envisioned by the General Plan.

**A 3.2 Policies**

**A 3.2.1 Basis for Planning**

The City will plan for future development through the Land Use Element taking into consideration available water resources from the Salinas, Whale Rock, and Nacimiento Reservoirs and recycled water.

**A 3.2.2 Coordinated Operation**

The City will coordinate the operation of the Salinas, Whale Rock, and Nacimiento Reservoirs to maximize available water resources.

**A 3.2.3 Groundwater**

The City will continue to use groundwater for domestic purposes when available.

**A 3.3 Programs**

**A 3.3.1** An update on the water resource availability will be presented to the City Council as part of an annual Water Resources Status Report.



- A 3.3.2** 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.
- A 3.3.3** The City will monitor ongoing research on the potential for long-term impacts associated with climate change to water supply resources.

## SILTATION

### A 4.0 Background

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. 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.

During the drought period ending in 1991, water at Salinas Reservoir fell to record low levels. Recognizing the unique opportunity presented by the low water level, the County of San Luis Obispo contracted with a local engineering consultant to provide an aerial survey of the lake and prepare revised storage capacity information. Early studies indicated average annual siltation rates from 23 acre-feet per year to 34 acre-feet per year. The study done by the U.S. Geological Survey in 1975 estimated that the siltation rate was approximately 82 acre-feet per year. The 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.

It should be noted that siltation impacts to the reservoirs are a long-term impact to the resources and should be considered in the City’s long range plans for adequate water resources. At an annual siltation rate of 40 AFY at each reservoir, it would take approximately 530 years to fill up the Salinas Reservoir and 960 years to fill up Whale Rock Reservoir. Siltation does not occur uniformly over time but the situation should continue to be monitored into the future.

The purpose of the 2013 bathymetric survey and volumetric study at Whale Rock Reservoir was to determine the level of siltation that has occurred in the reservoir since the dam’s completion in 1961. The study concluded that sedimentation has reduced reservoir capacity by 4.2 percent in 52 years as shown in Table 3 and 4.

**Table 3. Whale Rock Reservoir Capacity Change**

1961 Capacity:	40,662	Acre-Ft @ Spillway ELV 216.0 NGVD29
2013 Capacity:	38,967	Acre-Ft @ Spillway ELV 218.3 NAVD88
Capacity Loss due to Siltation:	<b>1,695</b>	Acre-Ft
Difference in Years:	52	Years
Siltation Rate:	<b>32.6</b>	Acre-Ft/Year
Percentage Capacity Loss:	<b>4.2%</b>	

Source: *Whale Rock Reservoir Bathymetric Survey and Volumetric Study*, 2013.





**Table 4. Reservoir Storage Capacity**

Agency	% Entitlement	Original Storage Capacity (AF)	Revised Storage Capacity (AF)	Difference (AF)	Revised Total Available Water * (AF)
City of San Luis Obispo	55.05	22,384	<b>21,451</b>	933	<b>20,350</b>
Cal Poly	33.71	13,707	<b>13,136</b>	571	<b>12,462</b>
CMC	11.24	4,570	<b>4,380</b>	191	<b>4,155</b>
<b>Total</b>	100 %	40,662 AF	<b>38,967 AF</b>	1,695 AF	<b>36,967 AF</b>

Source: *Whale Rock Reservoir Bathymetric Survey and Volumetric Study*, 2013.

\*Total Available Water is agency share of reservoir storage capacity minus agency proportional share of minimum pool requirements.

The safe annual yield from the two reservoirs will be continually reduced as a result of siltation. The City’s computer model is used to calculate the reduction in safe annual yield from Salinas and Whale Rock reservoirs to-date, which is reflected in the safe annual yield amount in Section A 3.0 which accounts for estimated siltation losses to 2010.

Since the storage capacity for Salinas Reservoir was last estimated in 1990, the annual loss of 40 acre-feet per year can be applied from that date.

The estimated loss in storage capacity for Salinas Reservoir between 1990 and 2010 is 800 acre-feet. The loss at Whale Rock Reservoir between 1961 and 2013 was 1,695 acre-feet. Based on these reduced storage capacities, the computer model was used to estimate the safe annual yield from the combined operation of the two reservoirs. With an estimated loss of 40 acre-feet per year at each reservoir, the total safe annual yield from the two reservoirs is estimated to be reduced by 10 acre-feet per year.

### **A 4.1 Goals**

- A 4.1.1** Accurately account for siltation in the Salinas and Whale Rock Reservoirs.
- A 4.1.2** Recognize and account for future projected water losses due to siltation at Salinas and Whale Rock Reservoirs.

### **A 4.2 Policies**

#### **A 4.2.2 Accounting for Future 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.

### **A 4.3 Programs**

- A 4.3.1** Work cooperatively with other agencies and/or watershed management groups, including the County of San Luis Obispo and Resource Conservation Districts, implementing best management practices (BMPs) to reduce erosion and subsequent siltation consistent with other City watershed management goals and water quality objectives included in the Conservation and Open Space Element.
- A 4.3.2** Continue public education and outreach to property owners in the watersheds above the reservoirs to encourage practices that reduce erosion and other practices that could impact siltation or water quality in the reservoirs.
- A 4.3.3** Consider periodic siltation studies at each reservoir to evaluate and document the impacts associated with siltation.
- A 4.3.4** An update on siltation at the City's reservoirs will be provided to the City Council as part of the annual *Water Resources Status Report*.



## WATER SUPPLY ACCOUNTING AND DEMAND PROJECTION

### A 5.0 Background

The City is located in a Mediterranean climate that is prone to drought. As a result, the City has experienced serious water supply deficits. In 1991, during an extended drought, the community was within 18 months of running out of water in Salinas and Whale Rock Reservoirs. In fact, Salinas Reservoir was below minimum pool and was not available to the City toward the end of this drought period. In 1996, citizens voted to incorporate Section 909 into the City's Charter identifying a water reliability reserve. In an effort to reduce the impacts of drought on the community, the City Council has enacted numerous water policies to strengthen its water resources portfolio. The City will account for water supplies necessary to meet three specific community needs: 1) primary water supply, 2) reliability reserve, and 3) secondary water supply.

1. Primary water supply is the amount 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 a ten-year average of actual per-capita water use and the City's build-out population.
2. Reliability reserve provides 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.
3. 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.

In order to support growth projections and other goals of the General Plan, the City must project how much water will be needed to serve residents, businesses, and other users. This can be done by using different methods, all of which involve assumptions about future usage rates and the numbers and types of users expected in the future. There will always be some uncertainty in estimating development capacity (such as the number of dwellings or residents) as well as the usage per customer type (such as acre-feet per dwelling or per resident). The estimating method must use reasonable assumptions, based on experience, to assure an adequate level of water supply while not overstating demands.

To project the City's primary water supply and reliability reserve into the future the City will use 117 gpcd which is the maximum allowed per capita water use under Senate Bill X7-7. This water use rate is used with the City's build-out population and current population to project the primary water supply and reliability reserve. The City's remaining water resources make up secondary water supply.

**Table 5. Water Supply Accounting**

Proposed Water Supply Accounting and Demand Projections				
(City Buildout Population * 117 gpcd * 365 days) / 325,851 gallons =	+	20% of Current City Population * 117 gpcd * 365 days) / 325,851 gallons =	+	All Remaining Supplies =
<b>Primary Water Supply</b>		<b>Reliability Reserve</b>		<b>Secondary Water Supply</b>
				<b>Annual Availability</b>

Notes:

1. The “Total” water supply is identified in Table 1. It includes safe annual yield from Salinas and Whale Rock Reservoirs, contractual limit from Nacimiento Reservoir, annual recycled water usage for 2015, and deducts siltation losses at Salinas and Whale Rock Reservoirs to 2060.
2. Primary Water Supply is calculated using the City’s buildout population and the water use rate of 117 gallons per capita per day per policy A 5.2.2.
3. Reliability Reserve was calculated using the City’s population and 20 percent of the water use rate of 117 gallons per capita per day, per policy A 5.2.3.
4. Secondary Water Supply includes the remaining water resources, identified in Table 1, per policy A 5.2.4.

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

**A 5.1 Goals**

- A 5.1.1** Identify and meet the City’s multi- source water supply needs.
- A 5.1.2** Accurately forecast future water demand for planning purposes.

**A 5.2 Policies**

**A 5.2.1 Water Use Rate**

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

**A 5.2.2 Primary Water Supply**

The City shall establish the amount of water needed for General Plan build-out using the water use rate established in Policy A 5.2.1 multiplied by the projected General Plan build-out population identified in the Land Use Element.

**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.

**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.

**A 5.2.5 Paying for Water for New Development**



New development shall pay its proportionate or “fair share” for water supplies, expanded treatment and distribution system capacity and upgrades.

**A 5.3 Programs**

- A 5.3.1** An update on water supply accounting and demand projections will be presented to the City Council as part of the annual *Water Resources Status Report*.
- A 5.3.2** The City will conduct periodic updates to water development impact fees.
- A 5.3.3** Prepare and update the *Urban Water Management Plan* every five years as required by the State.
- A 5.3.4** Analyze and prepare water supply assessments for large new developments in accordance with State law.
- A 5.3.5** Analyze the impacts of water efficiency programs and services to reduce overall water demand within the City

## WATER CONSERVATION

### A 6.0 Background

Water conservation was first referenced as a part of the City's water management policy in 1973. In 1985, the City adopted the Annual Water Operational Plan policy establishing water conservation as a means of extending water supplies during projected water shortages. Since 1985, many technological and philosophical changes have occurred which are proving water conservation to be both a short-term corrective measure for immediate water supply shortages and a long-term solution to water supply reliability.

Because of the experience during the drought of 1986 to 1991, the City developed a *Water Shortage Contingency Plan (Plan)* to deal with immediate, short-term water shortages. The *Plan* is designed to require mandatory actions when there is a projected five year supply of water remaining from available water resources. The *Plan* uses water allocations based on customer classification as a means to decrease water use during critical water shortages. For instance, residential customers are given a water allocation based on the average water use for multi- or single-family households having three occupants. If there are more residents, additional water may be allocated with sufficient proof. Commercial customers are allocated water either by a reduction based on their historical water use or by the average water use by business type. The *Plan* is also a required component of the City's *Urban Water Management Plan* which is updated every five years per State Water Code.

The Water Conservation Act of 2009, Senate Bill X7-7 (SB X7-7), was incorporated into the California Water Code in 2009. The legislation directs urban water suppliers to adopt one of four methods to determine their urban water use target. The method selected by the City corresponds to the Central Coast hydrologic region. The Central Coast region's 2020 target of 117 gallons per capita per day is the lowest in the state.

In terms of water supply reliability the City was one of the original signatories to the Memorandum of Understanding Regarding Urban Water Conservation (MOU) and has actively pursued the implementation of the water efficiency best management practices (BMPs) prescribed in the MOU. The MOU was a negotiated agreement between water purveyors statewide and environmental organizations on how best to utilize the State's water resources by incorporating conservation into their water management practices.

The BMPs have been developed over the years by water purveyors, environmental groups, and industry stakeholders. They represent the best available water conservation practices based on research and experience and include:

- Water conservation pricing and rate structures
- Technical assistance for water customers
- Incentives for indoor and outdoor water saving technologies
- Public information and outreach
- Water audits

Additionally, the City has adopted the Ahwahnee Principles as part of the General Plan's Conservation and Open Space Element (COSE). The water conservation components of the principles align with both the indoor and outdoor water conservation BMPs.

In the future, the City will reevaluate and update its water conservation efforts in response to changing water demand, supplies, technology, and economic conditions.

### A 6.1 Goal

The efficient use of the City's water resources to protect both short- and long-term water supply reliability.



**A 6.2 Policies**

**A 6.2.1 Long-term Water Efficiency**

The City will implement water-efficiency programs which are consistent with accepted best management practices and comply with any State-mandated water use reductions.

**A 6.2.2 Short-term Water Shortages**

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

**A 6.3 Programs**

**A 6.3.1** Work cooperatively with other San Luis Obispo County water agencies to identify cooperative water efficiency measures that can be implemented in each jurisdiction.

**A 6.3.2** Participate in State and regional water conservation efforts and research and development opportunities.

**A 6.3.3** Implement the Water Shortage Contingency Plan as required.

## RECYCLED WATER

### A 7.0 Background

Water recycling was envisioned as part of the City's overall water supply strategy since the 1980's. In 1994, the City completed a major capital improvement project at the Water Resource Recovery Facility that included addition of tertiary treatment and other unit processes required to meet stringent effluent quality limits intended to protect and enhance the receiving waters of San Luis Obispo Creek. While a municipal water reuse program was envisioned at the time of this upgrade, the City did not receive regulatory approvals for diversion of treated effluent for off-site landscape irrigation and other approved uses until 2002.

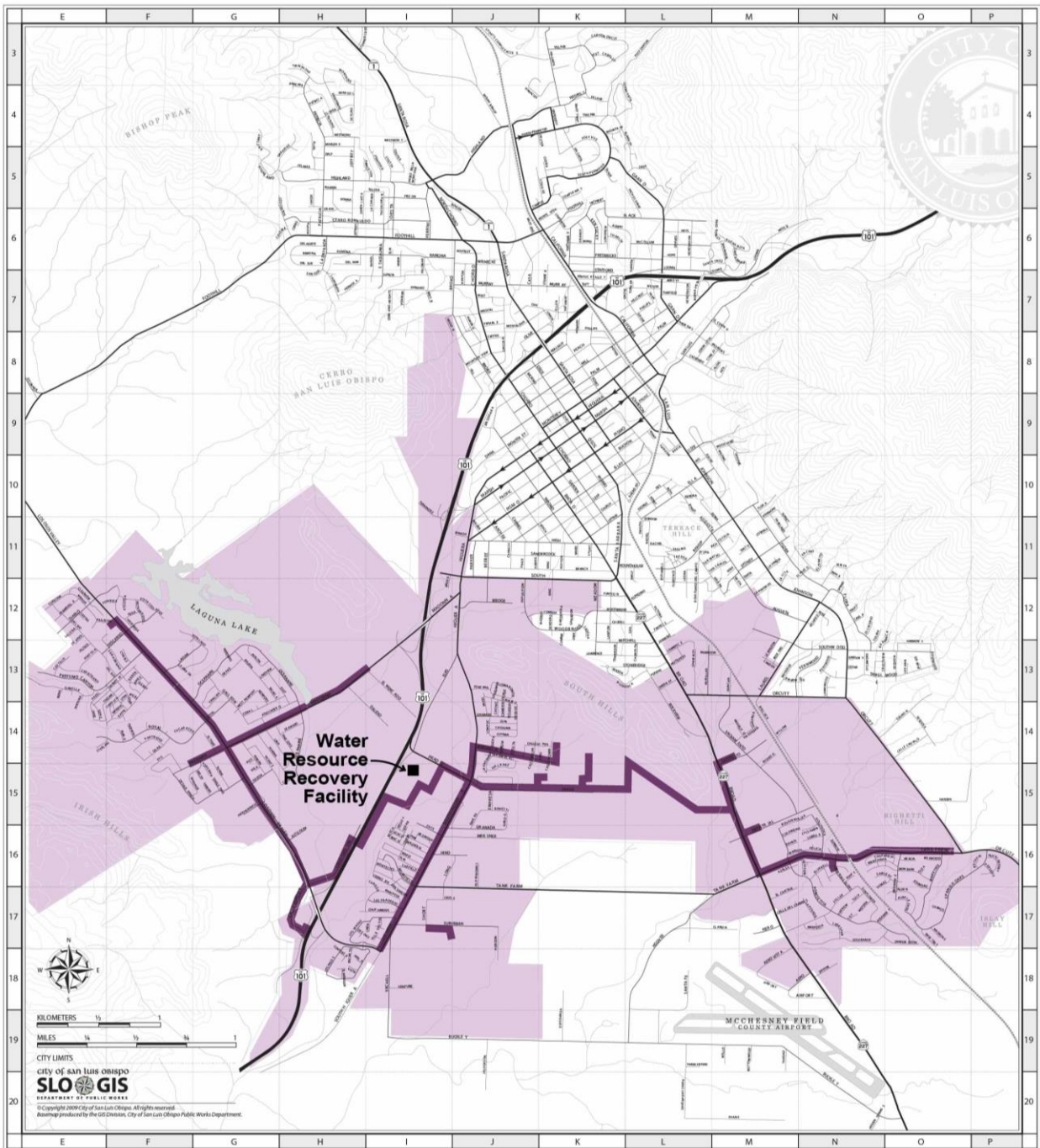
The City's *2004 Water Reuse Master Plan* identifies the areas of the City to be served with recycled water (See Figure 3, Water Reuse Master Plan Area and Distribution System), as well as potential customers and anticipated future recycled water demand.

Recycled water deliveries began in October 2006. Additional sites continue to be connected to the recycled water distribution system through retrofits of existing irrigation systems as well as the irrigation systems associated with new development in the area. In the future, recycled water will be delivered to development in the Airport, Margarita, and Orcutt specific plan areas and is being considered with development proposals for the Avila Ranch, San Luis Ranch, and Madonna on LOVR specific plans. Recycled water will be used for the irrigation of parks, streetscape, and median landscaping, common area (homeowners association) landscaping, and landscaping in commercial centers, industrial areas, and business parks.





Figure 2 Water Reuse Master Plan Area and Distribution System



**FIGURE 2: Water Reuse Master Plan Area & Distribution System**

 Water Reuse Master Plan Area       Recycled Water Distribution System

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

### **A 7.1 Goals**

**A 7.1.1** Maximize recycled water for all approved purposes.

### **A 7.2 Policies**

#### **A 7.2.1 Recycled Water Supply**

The City will make available recycled water to substitute for existing potable water uses as allowed by law and to supply new non-potable uses.

#### **A 7.2.2 Accounting for Recycled Water**

The City will add total recycled water usage from the prior year to the City's water resource availability on an annual basis.

### **A 7.3 Programs**

**A 7.3.1** Expand the recycled water distribution system to serve customers in the Water Reuse Master Plan area.

**A 7.3.2** Review development proposals for projects within the Water Reuse Master Plan area to ensure recycled water is utilized for appropriate uses.

**A 7.3.3** Annual recycled water usage will be presented to the City Council as part of the annual *Water Resources Status Report* and will be added to the City's water resource availability per policy A 3.2.1.

**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.

**A 7.3.5** Continue to explore potable reuse consistent with statewide regulations.



## **B. WASTEWATER MANAGEMENT**

### **INTRODUCTION**

#### **B 1.0 Background**

The Wastewater Management section was first incorporated into the Water and Wastewater Management Element of the General Plan in 1987. The City owns and operates, under regulatory permits, a wastewater collection system and a water resource recovery facility that produces recycled water. In order to adequately maintain the systems, meet the needs of the community, and meet increasingly stringent regulations the City implements infrastructure replacement and upgrade projects at the Water Resource Recovery Facility and throughout the wastewater collection system. It also has a pretreatment program.

The 2016 revisions include updated data related to the City's wastewater flows.

#### **B 1.1 Purpose**

This section of the Water and Wastewater Management Element establishes goals, policies, and programs to ensure provision of adequate sanitary sewer infrastructure and wastewater treatment capacity to accommodate existing and future development in order to protect public health, human safety, and the environment.

### WASTEWATER SERVICE

#### **B 2.0 Background**

The City is the sole provider of wastewater service within the City. The service provides collection and treatment for residential, commercial, and industrial users on properties within the city limits. In 2010, the number of service connections is estimated to be 14,400. Through agreement, the City also provides service to the San Luis Obispo campus of California Polytechnic State University (Cal Poly) and the County of San Luis Obispo Airport.

The collection system is primarily a gravity flow system. Where gravity flow is not feasible due to the topography, wastewater lift stations and pressurized force mains are used to move wastewater to the City's Water Resource Recovery Facility on Prado Road. Sewer pipelines measure from six inches to 48 inches in diameter.

The Water Resource Recovery Facility is designed for an average dry-weather flow of 5.1 million gallons per day (mgd). Instantaneous peak flows exceeding 20 mgd are not uncommon during storm events due to infiltration and inflow into the wastewater collection system, discussed further in subsection B 4.0. As the City grows to its build-out population outlined in the Land Use Element, the average dry-weather flow of wastewater is expected to reach 5.4 mgd. In 2016, master planning for the expansion of the Water Resource Recovery Facility to accommodate General Plan buildout is underway. When the WRRF is expanded in the future it will have a treatment capacity of 5.4 mgd.



**B 2.1 Goal**

Adequate wastewater collection and treatment service to meet the long-term needs of the City.

**B 2.2 Policies**

**B 2.2.1 Service Outside the City Limits**

To receive City wastewater service, property must be annexed to the City. The City Council may authorize exceptions to this policy provided it is found to be consistent with the General Plan.

**B 2.2.2 Service Capacity**

The City's wastewater collection system and Water Resource Recovery Facility shall support population and related service demands consistent with the General Plan.

**B 2.2.3 Wastewater Service for New Development**

New development shall pay its proportionate or "fair share" of expanded treatment and collection system capacity and upgrades. New development will only be permitted if adequate capacity is available within the wastewater collection system and/or Water Resource Recovery Facility.

**B 2.2.4 City as Exclusive Provider**

The City will be the only provider of public wastewater treatment within the City (but on-site pretreatment of wastewater to meet City Standards may be required).

**B 2.3 Programs**

**B 2.3.1** Expand capacity in the City's collection system and Water Resource Recovery Facility in support of projected wastewater flows.

**B 2.3.2** Evaluate the potential for the wastewater flows of a proposed project to exceed the capacity of collection and treatment systems.

**B 2.3.3** The City will conduct periodic updates to its wastewater development impact fees.

### WASTEWATER TREATMENT

#### B 3.0 Background

The Water Resource Recovery Facility processes wastewater in accordance with standards set by the State's Regional Water Quality Control Board (RWQCB). The RWQCB issues a permit to the City under the National Pollutant Discharge Elimination System (NPDES), setting standards for the discharge of treated wastewater. The standards are to protect beneficial uses of the receiving water (San Luis Obispo Creek) including recreation, agricultural supply, and fish and wildlife habitat.

The Water Resource Recovery Facility removes solids, reduces the amount of nutrients, and eliminates bacteria in the treated wastewater which is then discharged into San Luis Obispo Creek. Solids are separated and treated, to create biosolids. Biosolids are beneficially reused as compost, and/or soil amendment. As described in Section A 7.0, the Water Resource Recovery Facility has been producing tertiary treated recycled water for delivery to water customers in the City since 2006.

The design phase for the upgrade of the Water Resource Recovery Facility is underway in 2016 with completion anticipated in 2020. The upgrade will enable the City to consider potable reuse, part of a *One Water* concept, in the future.

#### B 3.1 Goals

- B 3.1.1 Wastewater treatment that meets or exceeds regulatory requirements and ensures the protection of public health and the environment.
- B 3.1.2 Maximize recycled water production.

#### B 3.2 Policies

##### B 3.2.1 Treating Wastewater

The City will treat all wastewater in compliance with approved discharge permits.

##### B 3.2.2 Recycled Water Production

The City will produce high-quality, dependable recycled water, suitable for a wide range of uses.

##### B 3.2.3 Beneficial Use

The City will pursue treatment and disposal methods which provide for further beneficial use of wastewater and biosolids.

#### B 3.3 Programs

- B 3.3.1 Prepare and implement Water Resource Recovery Facility master plan consistent with regulatory requirements.
- B 3.3.2 Work cooperatively on regional water quality issues.



## COLLECTION SYSTEM

### B 4.0 Background

The first sanitary sewers were built in San Luis Obispo in the late 1800s. Today portions of the collection system are over 100 years old. It includes nine lift stations, approximately 135 miles of gravity sewer line and three miles of force main. Approximately 2,900 manholes provide access to the collection system. The sewer lines are made of a variety of materials, including terra cotta salt-glazed pipe, vitrified clay pipe (VCP), polyvinyl chloride (PVC), and asbestos concrete.

The City's wastewater collection system requires maintenance to ensure uninterrupted flows and minimize sanitary sewer overflows. Area and preventive maintenance programs are regularly evaluated to ensure their effectiveness. The City also utilizes video inspection to prioritize problem areas for replacement, maintenance, assess overall mainline conditions, conduct inflow and infiltration evaluations, and assess new construction.

The City issues discharge permits to and conducts inspections of facilities that have the potential to discharge pollutants in concentrations that could pose a threat to worker safety, the wastewater collection system, and/or the Water Resource Recovery Facility. Through its Pretreatment Program, the City also implements programs to target constituents of special concern.

Like most cities in California, San Luis Obispo has separate sewer and storm drain systems. This means each system of pipes in the ground is designed to accommodate either sewer or stormwater flows. One set of pipes takes sanitary waste to the Water Resource Recovery Facility while a second set carries stormwater runoff from street drains directly into bioswales, detention basins, or creeks.

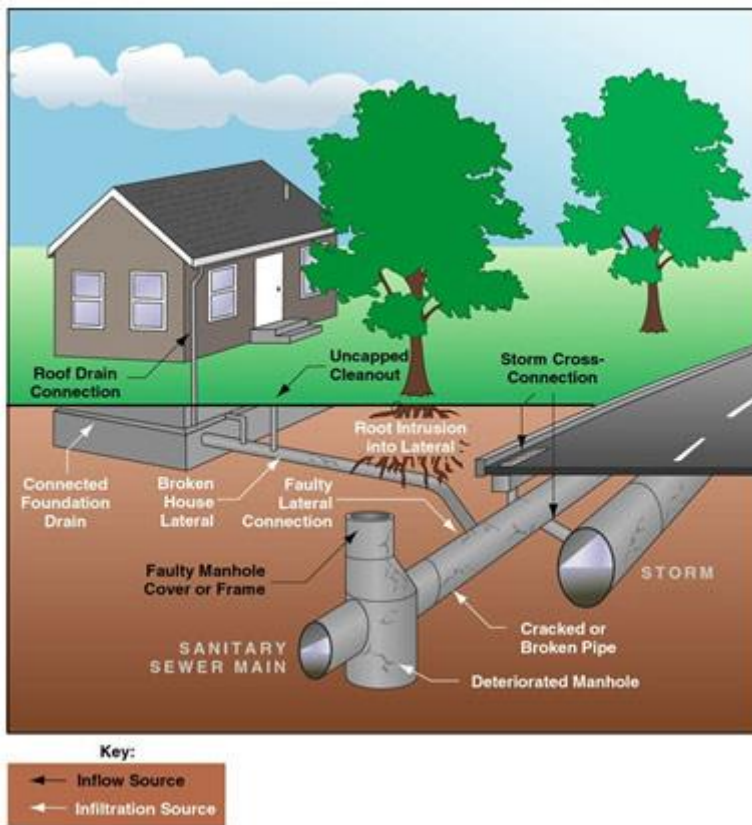
The City's wastewater collection system and the WRF have long experienced problems associated with wet weather infiltration and inflow (I & I). *Inflow* is water that enters the collection system at points of direct connection (non-soil) such as around manhole covers or through illegal connection of roof drains, downspouts, or landscape drains. *Infiltration* is water that flows through the ground into the collection system usually through cracks in public sewer mains and/or private sewer laterals (See Figure 5). I & I overloads the collection system during heavy rains and can result in sanitary sewer overflows. During periods of significant rain events, the Water Resource Recovery Facility can become hydraulically overwhelmed (as mentioned previously, instantaneous peak flows exceeding 20 mgd are not uncommon during storm events) increasing the chance of effluent violations and the release of partially treated wastewater to San Luis Obispo Creek. Table 6 includes data on the highest average daily flows experienced at the Water Resource Recovery Facility during rain events over a nine-year period.

**Table 6. Highest Average Daily Flows to the Water Reclamation Facility, 2006 to 2015**

Average Daily Flows <sup>1</sup>	Year
19.75 mgd	2006 (April)
7.24 mgd	2007(December)
9.83 mgd	2008 (January)
11.67 mgd	2009 (October)
13.51 mgd	2010 (December)
13.23 mgd	2011 (March)
7.10 mgd	2012 (January)
5.17 mgd	2013 (January)
5.12 mgd	2014 (March)
5.24 mgd	2015 (February)

Note:

1. Instantaneous peak flows are higher.
  2. August dry weather flow to the WRF from 2001 to 2009 ranged from 3.44 mgd to 4.23 mgd.
- Source: City of San Luis Obispo Utilities Department, 2010.



**Figure 3 Inflow and Infiltration Illustrated**





### **B 4.1 Goal**

Collect and convey all wastewater under safe and sanitary conditions to the Water Resource Recovery Facility.

### **B 4.2 Policies**

#### **B 4.2.1 Collection System Maintenance**

The City will manage the collection system to ensure that the proper level of maintenance is provided and that the flow in sanitary sewers does not exceed design capacity.

#### **B 4.2.2 Infiltration and Inflow**

The City will minimize stormwater and groundwater infiltration and inflow into the sewer system.

### **B 4.3 Programs**

**B 4.3.1** Investigate and carry out cost-effective methods for reducing infiltration and inflow into the wastewater collection system.

**B 4.3.2** Develop education and outreach materials to increase public awareness of problems associated with excessive infiltration and inflow (I & I) into the wastewater collection system and the City's efforts to reduce I & I.

**B 4.3.3** Support the retrofit of commercial and residential sewer laterals to reduce infiltration and inflow into the wastewater collection system.

**B 4.3.4** Update the Sewer System Management Plan to maintain its applicability.

**B 4.3.5** Maintain, and revise as necessary, master plans for the extension of wastewater services to developing areas of the City and to ensure orderly replacement of aged infrastructure.

**B 4.3.6** Review development proposals to ensure new development does not adversely impact existing infrastructure and that necessary infrastructure will be in place to support the development.

**B 4.3.7** Provide a Pretreatment Program pursuant to the Clean Water Act to ensure that all discharge requirements are met.

*Please see the next page.*