

Appendix M

Water Supply Analysis





SB610 Water Supply Assessment San Luis Ranch **FINAL**

Prepared for
San Luis Ranch

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Date
November 7, 2016

WATER SUPPLY ASSESSMENT

Water Code §10910 et seq.

To: City of San Luis Obispo
990 Palm Street
San Luis Obispo, CA 93401

Project Title: San Luis Ranch Water Supply Assessment

The following determination has been made regarding the above-described project:

- The projected water demand for the project was included in the City's most recently adopted urban water management plan.
- Based on additional sources of information, a sufficient water supply is available for the project. The total water supplies available to the City during normal, single-dry, and multiple-dry years within a 20-year projection will meet the projected water demand under the project in addition to the demand of existing and other planned future uses, including, but not limited to, agricultural uses.
- A sufficient water supply is not available for the project. *[Plan for acquiring and developing sufficient supply attached. Water Code§ 10911 (a)].*

The foregoing determination is based on the following Water Supply Assessment (WSA) Information and supporting information in the San Luis Obispo General Plan Update Background Report Section 5.1, Water and 5.3 Wastewater, as well as the records of the City of San Luis Obispo. The Land Use Circulation Plan (LUCE) WSA covers the cumulative water supply impacts, and this WSA will cover the project specific impacts.

Signature

Date

Title

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1. INTRODUCTION

This Water Supply Assessment was prepared for the proposed San Luis Ranch project for the City of San Luis Obispo, pursuant to the requirements of Section 10910 of the State Water Code, as amended by Senate Bill No. 610, Chapter 643 (2001).

1.1 Background

Senate Bill No. 610, effective January 1, 2002, requires a city or county, which determines that a “project” (as defined in Water Code § 10912) is subject to the California Environmental Quality Act (CEQA), to identify any public water system that may supply water for the project and to request those public water systems to prepare a specified water supply assessment. The assessment is required to include an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts. The assessment must be approved by the governing body of the public water system supplying water to the project. If the projected water demand associated with the project was included as part of the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in the water supply assessment.

The bill requires the city or county, if it is not able to identify any public water system that may supply water for the project, to prepare the water supply assessment after a prescribed consultation. If the public water system concludes that water supplies are, or will be, insufficient, plans for acquiring additional water supplies are required to be submitted to the city or county. The city or county must include the water supply assessment in any environmental document prepared for the project pursuant to the act. It also requires the city or county to determine whether project water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.

A “project” under Section 10912 includes the following:

- a. A proposed residential development of more than 500 dwelling units.
- b. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- c. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- d. A proposed hotel or motel, or both, having more than 500 rooms.
- e. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- f. A mixed-use project that includes one or more of the projects specified in this subdivision.
- g. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The San Luis Ranch project is a mixed use site that includes single and multi-family residential development totaling approximately 580 units, 250,000 square feet of commercial space

including office and retail, and a 200 room hotel. San Luis Ranch meets the definition of a project under Section 10912.

1.2 Project Location and Description

The proposed San Luis Ranch project is located in the City of San Luis Obispo along the north side of Highway 101, extending to Madonna Rd and between Dalidio Road and Perfumo Creek. The site consists of 131 acres, 53 acres of which are proposed to remain as agricultural use. The proposed project includes over 500 dwelling units and several land use categories triggering the need to prepare a Water Supply Assessment under the requirements of Section 10910 of the California Water Code.

2. WATER SUPPLY

Water Code Section 10910(b) requires the identification of the public water system that may serve the project. The City is the sole water purveyor within the city limits and will provide water to the proposed San Luis Ranch project. The City's potable water is supplied from multiple surface water sources. In addition, recycled water and groundwater are used to supplement irrigation demands.

The Water and Wastewater Management Element of the General Plan, first adopted in 1987 and most recently updated in 2016, specifies that the City utilize multiple water resources to meet its water supply needs. Having several sources of water avoids dependence on any one source that may be impacted by drought or other water supply reduction or emergency. With the update of the Water and Wastewater Management Element, the City Council reaffirmed the policy for a multi-source water supply. Consistent with the multi-source water supply concept, the City obtains water from five sources:

- Salinas Reservoir (Santa Margarita Lake) and Whale Rock Reservoir: Combined Safe Annual Yield 6,940 acre-feet (AF)/year
- Nacimiento Reservoir: 5,482 AF/year dependable yield/ contractual limit
- Recycled water from the City's Wastewater Resource Recovery Facility (WRRF): 187 AF/year 2015 Annual Usage
- Groundwater: Supplemental usage, 43 AF/year in 2015

2.1 Surface Water Supply:

The Salinas Dam was built in 1942 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 an 112-square mile watershed and can store up to 23,843 AF. Since the late 1940s, the San Luis Obispo County Flood Control and Water Conservation District has operated the Salinas Reservoir under a lease from the U.S. Army Corps of Engineers. Water from the reservoir is pumped through the one-mile long Cuesta Tunnel, and then flows by gravity to the City's Water Treatment Plant on Stenner Creek Road.

The Whale Rock Reservoir is a 40,662 AF reservoir created by the construction of an earthen dam on Old Creek near the town of Cayucos. The Whale Rock Dam captures water from a 20.3 square mile watershed and water is delivered through 17.6 miles of 30-inch pipeline and by 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 two State agencies, with Cal Poly owning 33.71 percent and the California Men's Colony owning 11.24 percent.

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 AF/year of water from the reservoir for use in San Luis Obispo County. Approximately 1,750 AF/year have been designated for uses around the lake, leaving 15,750 AF/year for allocation to other areas within the County of San Luis Obispo. The City's contractual supply is 5,482 AF.

2.2 Recycled Water Supply:

Recycled water has been envisioned as part of the City's overall water supply strategy since the 1980s. In 1994, the City began a major capital improvement project at the WRRF that included addition of tertiary treatment and other unit processes required to meet stringent effluent quality limits, set forth by the Regional Water Quality Control Board, intended to protect and enhance the receiving waters of San Luis Obispo Creek. The City completed construction of the project in 2006 and recycled water deliveries began in May that year. The main non-potable water source is the City's WRRF which has a design flow rate of 5,700 AF/year (5.1 mgd). The City is required to release 1,807 AF/year of flow to San Luis Creek for environmental enhancement. The recycled water usage for 2014 and 2015 totaled 185 AF/year and 187 AF/year, respectively.

2.3 Groundwater Supply:

The City stopped the use of groundwater as part of its drinking water system in April 2015 due to new regulatory requirements that require additional costly treatment of the wells before the water could be used. The groundwater wells remain in operable standby condition should use of groundwater be required in the future. The City no longer relies on groundwater for long-term community water demands because of water quality and reliability issues and does not consider this source of supply as part of its water resources planning.

3. URBAN WATER MANAGEMENT PLAN APPLICABILITY

Water Code Section 10910(c)(1) requires a determination of whether or not a project was included as part of the most recently adopted Urban Water Management Plan (UWMP). The City's most recently adopted UWMP was adopted on June 14, 2016, and provides a description of the City's service area, demographics, multi-source water supply, treatment, and conveyance/distribution facilities. The UWMP also includes historical and future water demand to serve the buildout of the City consistent with the General Plan which includes the San Luis Ranch Project.

Since 1987, the City's General Plan has included a Water and Wastewater Management Element. The water section of the Element includes policies related to present water demand and overall projected water demand. The Element also addresses water conservation, water resource availability, accounting for siltation, multi-source water supply, and recycled water.

The 2014 LUCE update included a Water Supply Assessment for the areas within the City’s Urban Reserve Line (URL). This WSA was for undeveloped and developed lands to be developed pursuant to the LUCE.

4. WATER RESOURCE AVAILABILITY

As described in the Water Supply Section 2, the City has five water resources to meet current and future City water demands: Salinas Reservoir (Santa Margarita Lake), Whale Rock Reservoir, Nacimiento Reservoir, recycled water from the City’s WRRF, and groundwater. In order to ensure water supply reliability, the City determined 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, due to the limitations on its use, the City will not consider this supply in estimating available water resources to meet community needs.

Table 4-1 is a summary of the City’s available water resources.

Table 4-1. City Water Resource Availability

Water Resource	2014 Annual Availability	
Salinas Reservoir and Whale Rock Reservoir	6,940 AF	Safe Annual Yield
Nacimiento Reservoir	5,482 AF	Contractual Limit
Siltation to 2060	(500 AF)	Policy A 4.2.2
Recycled Water Use	187 AF	2015 Annual Usage
TOTAL	12,109 AF	

Source: 2015 Urban Water Management Plan

5. WATER SUPPLY RELIABILITY

The water supply and reliability analysis provided by the 2010 UWMP uses historical information since 1941 for evaluation of water supply availability and safe annual yield for the Salinas and Whale Rock Reservoirs. The analysis of water supply availability is based on the controlled drought period of the two reservoirs, which occurred between 1987 and 1991. Table 5-1 below summarizes the results of that analysis and indicates the City’s water resources are reliable during extended drought periods. Through the coordinated operation of Salinas and Whale Rock Reservoirs and the ability to use other available water supplies (Nacimiento, recycled water, and limited groundwater), climatic conditions such as prolonged drought do not impact the City’s water supply.

As required by Section 5 of the City’s Water and Wastewater Management Element, the City accounts for water supplies necessary to meet three specific community needs, including primary water supply, secondary water supply, and reliability reserve, see Table 5-2. The

primary water supply is defined as the amount of water needed to serve the build-out population of the city as identified in the Land Use Element of the General Plan. The quantity of water needed for the primary water supply is calculated using the maximum allowed per capita water use under Senate Bill X7-7 and the city’s build-out population. The maximum allowed per capita water use is 117 gallons per capita per day (gpcd). The proposed Land Use Element build-out population is estimated to be 57,200, and the primary water supply is estimated to be 7,496 AF in the 2015 Water Resources Status Report.

The reliability reserve provides a buffer for future unforeseen or unpredicted long-term impacts to the City’s available water supply. The quantity of water for the reliability reserve is established using twenty percent of the ten-year average of current per capita water use and the City’s current population (45,802 in 2015). The reliability reserve provides as reserve above and beyond the existing needs of the community and may not be used for future development. In 2015, the reliability reserve is 1,201 AF.

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

Table 5-1. Water Supply Reliability

Average/Normal Water Year (acre feet)	Single Dry Water Year (acre feet)	Multiple Dry Water Years		
		Year 1	Year 2	Year 3
12,622	12,622	12,622	12,622	12,622
Percent of Average/Normal Year	100%	100%	100%	100%

Source: 2015 Urban Water Management Plan

Table 5-2. 2015 City Potable Water Supply Availability

Total	2015 Actual Usage (acre feet)	Primary Water Supply (acre feet)	Reliability Reserve (acre feet)	Secondary Water Supply (acre feet)
12,109	4,908	7,496	1,201	3,412

6. WATER USAGE

Water use in the city includes single-family, multi-family, commercial (including institutional and industrial), and irrigation customers. No agricultural uses are supplied by City water and the City does not sell water to other agencies. The City does not have additional water demands such as water use for saline barriers, groundwater recharge, etc. In 2014, the total water demand for the city was 5,524 AF, and total demand in 2015 was 4,908 AF (during drought conditions).

The City's water use factors for each land use category are provided below.

Single-family residences (Traditional)	0.3 AF/year/unit
Single Family (Small Lot)	0.21 AF/year/unit
Apartment (Multi-Family/Affordable)	0.18 AF/year/unit
Neighborhood Commercial	0.3 AF/year/1,000 SF
Parkland	2 AF/year/acre
Hotel	0.122 AF/room/day
Office Space	0.1 AF/day/1,000 SF

These numbers were developed in 2008 and are the basis upon which the City reviews proposed usage. They do not necessarily reflect projected demands for this project which will implement more recently developed conservation practices.

6.1 Water Conservation Program:

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.

The City developed a Water Shortage Contingency Plan to deal with water shortage conditions that could occur due to drought, earthquake, infrastructure failure, or other emergency. The Plan provides the foundation for a staged response to worsening water shortage conditions. The City uses a water projection model to analyze current water storage at the reservoirs and to predict how long the water supplies are available to determine the necessary level of response. There are six stages of the Plan: Monitor, Watch, Warning, Severe, Extreme, and Critical. Each stage provides different levels of response for a water shortage event ranging from a ten percent supply deficiency up to a 50 percent or greater deficiency. The Plan is also a required component of the City's UWMP which is updated every five years per State Water Code. The City also recognizes the importance of long-term water efficiency by supporting programs that will enhance water supply reliability and comply with any current and/or future state mandates in water use reductions.

In 2009, Senate Bill X7-7 was passed requiring water agencies to reduce per capita water use by 25 percent by the year 2020. The City's target per capita water use would be 117 gpcd. In 2013, the City already met that target with a use of 116 gpcd. In 2014, the City's use was estimated to be 95.8 gpcd. In terms of water supply reliability the City was one of the original signatories to the Memorandum of Understanding (MOU) Regarding Urban Water Conservation 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, and
- Water audits.

On July 15, 2014, the California State Water Resources Control Board adopted emergency drought regulations that were to be implemented by all urban water suppliers who have over 3,000 water connections regardless of that community's water supply situation. Water purveyors who do not implement the mandatory requirements face up to \$10,000 per day in fines and other penalties. The Emergency Regulations are in effect for 270 days but can be rescinded, extended or amended based on drought conditions.

Notwithstanding the city's stable water supply position, the Emergency Regulations specifically mandate that the City implement mandatory outdoor water restrictions and water waste prohibitions or face fines up to \$10,000 a day and no access to state grants and loans. Accordingly, city council adopted an ordinance limiting the outdoor irrigation of ornamental landscape and turf with potable water to three days a week, and allocated funding for education and public outreach effects.

In response to the continued drought conditions, the State Water Board extended the 2014 emergency regulations and added new measures on March 17, 2015. As a result of these new measures, the City is required to reduce its water use by an average of 12 percent from June 2015 to February 2016. To achieve this reduction, the City Council adopted a drought response strategy in June 2015. This strategy includes:

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

7. ENTITLEMENTS/REGULATORY APPROVALS

Water Code Section 10910(d)(2) requires the identification of existing water supply entitlements, water rights, or water service contracts, federal, state, and local permits for construction of necessary infrastructure, and any regulatory approvals required in order to be able to deliver the water supply. The City's entitlements are described above in the section describing water supply.

8. SAN LUIS RANCH PROJECT

The San Luis Ranch site is proposed to be developed into single-family and multi-family dwelling units, commercial properties including retail, office, and hotel space, parks, and open space. 50% of the project is proposed to remain in agricultural use. Table 8-1 was developed to project San Luis Ranch’s water demand using the City’s water use factors. Using these water demand factors shows that the total water use of San Luis Ranch would be 219.2 AF/year.

Table 8-1. San Luis Ranch Project Water Demand by Use Factors

AREAS	Water Use Factor	Quantity (AF/yr)	Water Demand (AF/yr)
Single-Family Residences (Traditional)	0.3 AF/year/unit	200	60.0
Single Family (Small Lot)	0.21 AF/year/unit	102	21.4
Apartment (Multi-Family & Affordable)	0.18 AF/year/unit	270	48.6
Neighborhood Commercial	0.3 AF/year/1,000 SF	155,000 SF	46.5
Office Space	0.1 AF/year/1,000 SF	100,000 SF	10
Hotel	0.122 AF/year/room	200 room	24.4
Parkland	2 AF/year/acre	4.13	8.3
Total (acre-feet/year):			219.2

For comparison, Table 8-2 shows a summary of the project water demands under each land use area of the proposed site with demands reflecting the implementation of water saving programs. The irrigation demands were calculated and presented in the Preliminary Irrigation Water-Use Estimate, see Appendix A. The residential indoor domestic demands were calculated with a water use of 37 GPCD. This water use is the result of the average indoor and outdoor customer use of 50 GPCD minus the irrigation use of 13 GPCD from Appendix A. The 50 GPCD is provided by the AWWA “A Guide to Customer Water-Use Indicators for Conservation and Financial Planning” as the average water use for a single-family customer with a high water efficiency home and minimal irrigation. The indoor demands for the Hotel, Commercial, and Agricultural Heritage Center were estimated assuming that the water saving program would be able to reduce the water usage by approximately 30 percent from the city water use factors. The estimated total water demand for the San Luis Ranch Project is shown in Table 8-2.

Table 8-2. San Luis Ranch Water Demand – Project Specific

AREAS	Person Per Unit	Water Use (GPCD)	Irrigation Demand Potable (gal/yr)	Irrigation demand non-potable (gal/yr)	Indoor Domestic Demand (gal/yr)	Total
201 SFR Traditional	2.29*	37	2,166,084		6,185,290	8,351,374
109 SFR Small Lot	2.29	37	803,191		3,154,498	3,957,689
190 Multi-Family/80 Affordable (420 SF max)	2.29 (Multi-Family) 1.25 (Affordable)	37		1,348,991	7,226,526	8,575,517
Hotel				495,325	5,070,210	5,565,535
Commercial				1,758,104	8,164,059	9,922,163
Community Garden Orchards			317,056			317,056
Open Space Pocket/ Connections				12,197,892		12,197,892
Agricultural Heritage Center				2,768,937	3,423,656	6,192,593
Community Park Turf				403,330		403,330
Community Park Drought Tolerant				605,300		605,300
Drought Tolerant Parkways				4,085,832		4,085,832
Total (gallons/year):			3,286,331	23,662,711	33,224,239	60,174,281
Total (acre-feet/year):			10.1	72.6	102	184.7

*Source: City of SLO 2035 Land Use and Circulation Element Appendix I Water Supply Assessment (Page 9)

Table 8-3 compares the City’s available water with San Luis’s projected usage. San Luis Ranch’s potable water use was included in the buildout population and associated water demands of the City’s available water.

Table 8-3. City Water Supply Availability and San Luis Ranch Water Usage (AF/yr)

City Water Supply	City Water Usage	City Water Available	San Luis Ranch Use (project specific)	San Luis Ranch Use (calculated by use factors)
7,496	4,908	2,588	184.7	219.2

As shown in Table 8-2 above, 72.6 AF/year is planned to come from non-potable sources with the use of recycled water lines to the site. Appendix B shows the recycled water use areas within San Luis Ranch. Irrigation of the remaining agricultural fields will be provided by groundwater from existing onsite wells.

Potential water-saving programs will be implemented for the project in an attempt to reduce the water demand use even further as part of the Water Conservation statement within Section 2.4 Environmental Sustainability of the San Luis Ranch in the Specific Plan. This involves using recycled water for landscape areas except the single-family residential lots, and installation of water saving devices and features in the design of the homes and businesses. All plant species selected for the parkways, and drought tolerant open space areas of the site will meet the Very Low Water Needs categories under the California Water Use Classification of Landscape Species (WUCOLS) list. All of the landscape areas except the turf play areas and portions of the community garden beds are intended to be irrigated using drip and/or low-volume irrigation equipment. In addition, it is anticipated that the native plantings in the riparian open space areas will receive temporary establishment irrigation that will be reduced over time and eventually activated only during periods of extended drought or prolonged periods of high temperatures.

The irrigation design will implement all appropriate and available tools and techniques towards achieving maximum water application uniformity (distribution uniformity). Such measures will include utilizing dedicated landscape water meters, soil moisture sensors, central irrigation controllers and master valves combined with flow sensors. Weather based irrigation controllers that are tied to CIMIS (California Irrigation Management Information System) weather data will be used for the larger landscape areas. This type of controller communicates with a nearby CIMIS weather station and adjusts irrigation application based on real-time weather conditions. Other smaller landscape areas or POC's (Points of Connection) may utilize basic weather based 'smart' irrigation controllers, that adjust water application based on historic Eto data pre-programmed into the controller, as opposed to actual real-time weather data.

Irrigation zones will be determined by means of defining hydrozones, whereby all irrigation circuits will be spatially defined by virtue of grouping plants with the same water needs and similar climatic and soil conditions (and/or other factors that impact watering needs).

Per Appendix A, the MAWA calculation is using the ETAF (evapotranspiration adjustment factor) of 0.55 in place of the previous State of California recognized ETAF of 0.7.

9. CONCLUSION

The water supply demand for the San Luis Ranch project was included in the City's Land Use and Circulation Element Update Water Supply Assessment. A sufficient water supply is available to serve the project no matter which method is used to calculate the demand.

Using the City's land use water factors, the San Luis Ranch project's total water demand is 219.2 AF/year. The Applicant projects the San Luis Ranch project will demand 184.7 AF/year of the City's available supply. Based on these water demand projections, there is a sufficient supply of water to meet the project's needs.

Using project-specific water demand information, 112.1 AF/year of the City's available supply is required, and 72.6 AF/year of the available recycled water would be utilized. Both of these water needs are within the water demand calculated as part of the primary water supply.

This conclusion was determined based on this Water Supply Assessment and supporting information in the records of the City of San Luis Obispo.

REFERENCES

San Luis Obispo, City of. General Plan – Chapter 8 Water and Wastewater Management Element. Adopted February 24, 1987, Revised June 15, 2016

San Luis Obispo, City of. 2015 Urban Water Management Plan. Adopted June 14, 2016

San Luis Obispo, City of. Land Use and Circulation Element Update Water Supply Assessment. Adopted June 2014

San Luis Obispo, City of. Orcutt Area Specific Plan – Water Supply Assessment. Approved March 5, 2008

San Luis Obispo, City of. 2015 Water Resources Status Report

Memorandum of Understanding Regarding Urban Water Conservation in California. Amended September 17, 2014

AWWA. A Guide to Customer Water-Use Indicators for Conservation and Financial Planning. October 2013

TECHNICAL APPENDICES

The following technical appendices are included:

- Appendix A: Preliminary Irrigation Water-Use Estimate
- Appendix B: San Luis Ranch Recycled Water Use Areas

APPENDIX A: PRELIMINARY IRRIGATION WATER-USE ESTIMATE

SAN LUIS RANCH

Preliminary Irrigation Water-Use Estimate (Using ETAF of 55%)

March 3, 2016

REFERENCE TRANSPIRATION (ETo) =	49.35	Inches / Year (City of SLO)
EVAPOTRANSPIRATION ADJUSTMENT FACTOR (ETAF) =	0.55	
LANDSCAPE AREA (LA) =	1,077,824	S.F.
SPECIAL LANDSCAPE AREA (SLA) =	773,367	S.F.

MAXIMUM ALLOWABLE L WATER USE CALCULATION	
MAWA=	(ETo) x (0.62) * ((ETAF x LA) + (0.45 x SLA))

MAWA: MAXIMUM ALLOWABLE WATER USE = 28,786,219 GAL. / YEAR

ESTIMATED LANDSCAPE WATER USE (ETWU) :

CONVENTIONAL LANDSCAPE AREAS

HYDROZONE AREA	PLANT WATER-USE TYPE	PLANT FACTOR	IRRIGATION EFFICIENCY	HYDROZONE PLANTER AREA (S.F.)	PF X HA	WATER SOURCE	ETWU (Gallons/ Yr.)	GPCD* (Gallons/Day)
SINGLE FAMILY TRADITIONAL LOTS	LOW	0.3	0.9	212,382	63,715	POTABLE	2,166,084	13
SMALL LOT FRONT LOADED	LOW	0.3	0.9	57,670	17,301	POTABLE	588,176	10
SMALL LOT ALLEY LOADED	LOW	0.3	0.9	21,082	6,325	POTABLE	215,015	7
COMMUNITY GARDEN & ORCHARDS	HIGH	0.7	0.9	13,323	9,326	POTABLE	317,056	
SUM OF CONVENTIONAL AREA :					96,666		3,286,332	

SPECIAL LANDSCAPE AREAS

HYDROZONE AREA	PLANT WATER-USE TYPE	PLANT FACTOR	IRRIGATION EFFICIENCY	HYDROZONE PLANTER AREA (S.F.)	PF X HA	WATER SOURCE	ETWU (Gallons/ Yr.)
MULTI-FAMILY RESIDENTIAL	SLA	1.0	0.9	44,089	44,089	RECLAIMED	1,348,991
HOTEL (10% of Total SF)	SLA	1.0	0.9	16,156	16,156	RECLAIMED	494,325
COMMERCIAL (10% of Total SF)	SLA	1.0	0.9	57,460	57,460	RECLAIMED	1,758,104
OPEN SPACE POCKET/CONNECTIONS	SLA	1.0	0.9	38,857	38,857	RECLAIMED	1,188,908
OPEN SPACE	SLA	1.0	0.9	359,806	359,806	RECLAIMED	11,008,984
AGRICULTURAL HERITAGE CENTER	SLA	1.0	0.9	90,497	90,497	RECLAIMED	2,768,937
COMMUNITY PARK TURF	SLA	1.0	0.7	13,182	13,182	RECLAIMED	403,330
COMMUNITY PARK DROUGHT TOLERANT	SLA	1.0	0.9	19,783	19,783	RECLAIMED	605,300
DROUGHT TOLERANT PARKWAYS	SLA	1.0	0.9	133,537	133,537	RECLAIMED	4,085,832
SUM OF SPECIAL LANDSCAPE AREAS :					773,367		23,662,710

ESTIMATED TOTAL WATER USE CALCULATION	
ETWU=	(ETo) x (0.62) x ((PF+HA/IE) + SLA)

ETWU: ESTIMATED LANDSCAPE WATER USE = Conventional & SLA Landscape Areas 26,949,042 GAL. / YEAR

ESTIMATED AGRICULTURAL WATER USE :

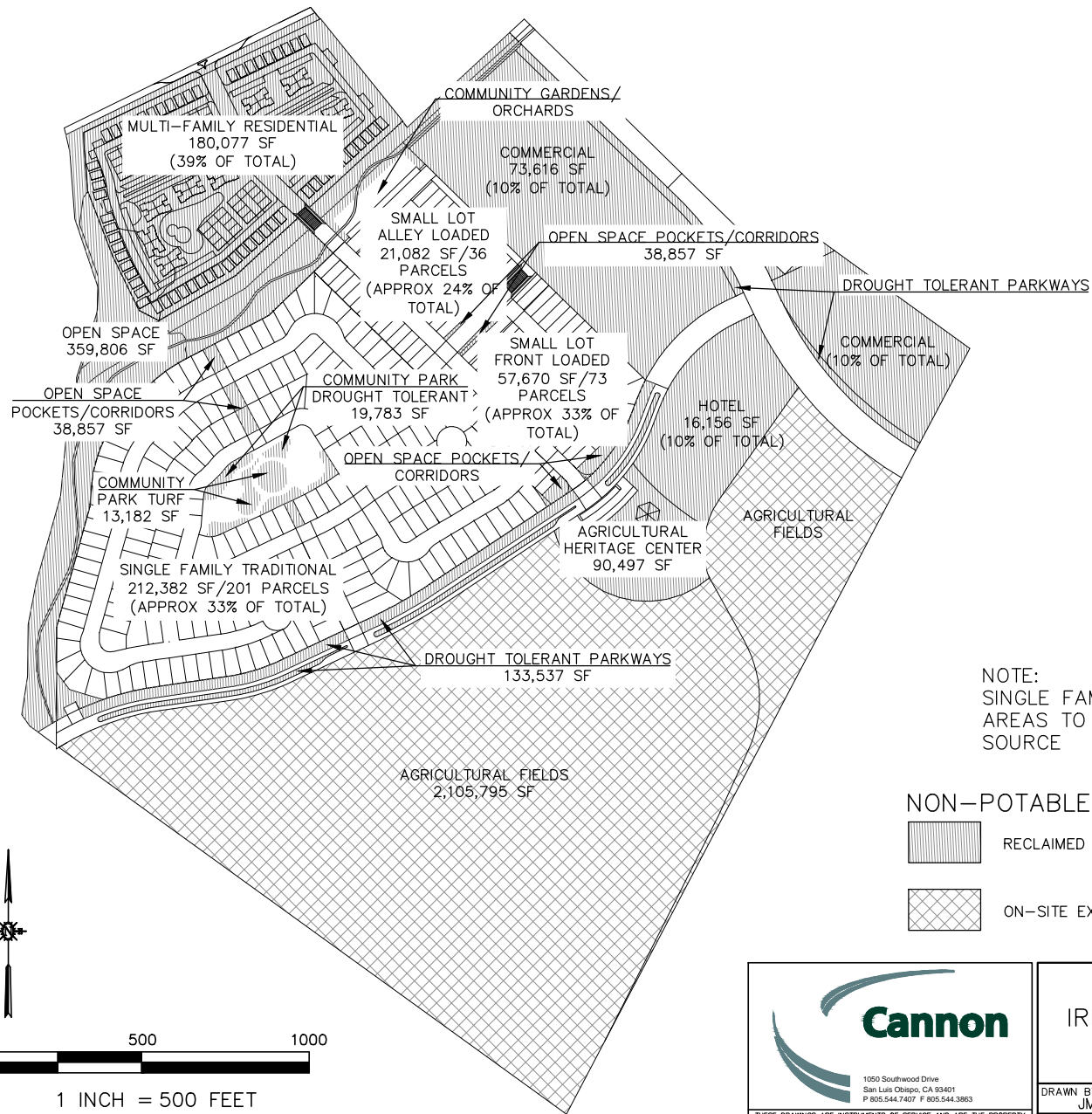
AGRICULTURAL FIELDS	HIGH	0.8	0.65	2,105,795	1,684,636	WELL ON SITE	79,299,704
ESTIMATED AGRICULTURAL WATER USE =							80,538,762 GAL. / YEAR

*Gallons per capita per day (GPCD) derived by dividing the estimated water use of each residential area by lot count, 365 days, and the City's average for occupants/residence (2.29).

IRRIGATION DESIGN APPROACH:



- ALL PLANTER AREAS (EXCEPT TURF PARK AREAS) ARE INTENDED TO BE IRRIGATED USING DRIP AND/OR LOW-VOLUME IRRIGATION EQUIPMENT.
- TURF WILL LIKELY BE IRRIGATED WITH ROTOR OR ROTARY SPRAY POP-UP NOZZLES.
- RECLAIMED WATER WILL BE UTILIZED FOR ALL LANDSCAPE AREAS, WITH THE EXCEPTION OF THE SINGLE-FAMILY RESIDENTIAL LOTS AND COMMUNITY GARDEN.
- WEATHER BASED IRRIGATION CONTROLLERS WILL BE UTILIZED AND WILL INCLUDE A WEATHER SENSOR OVERRIDE DEVICE.
- ALL SYSTEMS WILL INCLUDE (1) MASTER VALVE AND FLOW SENSOR AT EACH POINT OF CONNECTION.
- ALL TREES THAT ARE NOT LOCATED AMONG SHRUB BEDS AREAS SHALL RECEIVE DEEP ROOT BUBBLER IRRIGATION.
- A PLANT ESTABLISHMENT (FIRST 6 MONTHS) AND POST-ESTABLISHMENT IRRIGATION SCHEDULE WILL BE PROVIDED WITH CONSTRUCTION DRAWINGS.

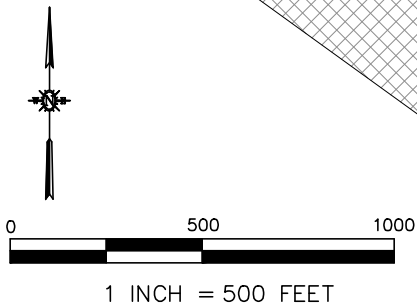

APPENDIX B: SAN LUIS RANCH RECYCLED WATER USE AREAS



NOTE:
SINGLE FAMILY AND SMALL LOT RESIDENTIAL
AREAS TO USE POTABLE WATER AS IRRIGATION
SOURCE

NON-POTABLE IRRIGATION WATER SOURCES

-  RECLAIMED WATER
-  ON-SITE EXISTING WATER WELLS

1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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<p>SAN LUIS RANCH IRRIGATION SOURCES EXHIBIT SAN LUIS OBISPO, CA</p>		
DRAWN BY JMD	DATE 2/26/2016	CA JOB NO. 140310
CHECKED BY MM	SCALE 1" = 500'	SHEET 1 OF 1