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Ms. Shawna Scott
Planning Program Manager
SWCA Environmental Consultants
1422 Monterey Street C200
San Luis Obispo, CA 93401

Subject: Review of Laetitia Residential Water Demand

Dear Ms. Scott:

Geosyntec Consultants calculated potential indoor and outdoor residential water demand for the 102 residential units of the proposed Laetitia Agricultural Cluster Subdivision project (Laetitia project) in San Luis Obispo County. We then compared our calculated range of potential residential water demand to the values presented in the Recirculated Draft EIR (RDEIR) for the Laetitia project.

The low range estimates by Geosyntec for outdoor and indoor duty factors for the proposed Laetitia residences are 0.069 and 0.14 acre feet per year per unit (AF/yr/unit), respectively, for a combined duty factor of 0.21 AF/yr/unit and a total annual residential water demand of approximately 21 AF/yr.

The high range estimates by Geosyntec for outdoor and indoor duty factors for the proposed Laetitia residences are 0.072 and 0.29 AF/yr/unit, respectively, for a combined duty factor of 0.36 AF/yr/unit and a total annual residential water demand of approximately 37 AF/yr.

The RDEIR presents values for outdoor and indoor duty factors of 0.0626 and 0.381 AF/yr/unit, respectively. Although the RDEIR provides limited detail on how these values were developed, comparing these values with those calculated by Geosyntec it appears that the outdoor water demands presented in the RDEIR may be underestimated while the indoor water demands were over-estimated. The combined duty factor of 0.444 AF/yr/unit presented in the RDEIR falls just above the range of 0.21 to 0.36 AF/yr/unit calculated by Geosyntec and the total estimated demand of 45.29 AF/yr for the 102 residential units appears reasonable.

Below is a summary table of the estimated outdoor and indoor water demands and duty factors. The methods used and assumptions made to arrive at these values are provided. Geosyntec recommends that to meet the necessary water conservation goals dictated by a duty factor in the range of 0.21 and 0.36 AF/yr/unit, the Laetitia project should incorporate a water management plan along with a well-defined process to monitor and enforce the plan.

TABLE - SUMMARY OF ESTIMATED DUTY FACTORS AND TOTAL DEMAND FOR RESIDENTIAL WATER USE

Source	Outdoor Use (AF/yr/unit)	Indoor Use (AF/yr/unit)	Combined Use (AF/yr/unit)	Total Res. Demand (AF/yr)
Draft EIR			*1.12*	*114.24*
RDEIR	**0.0626**	**0.381**	**0.444**	**45.29**
CA DWR - Efficiency Landscape Ordinance	0.069			
US DE - Estimating Unmetered Landscaping	0.072			
CA DWR - Calculating Baseline Per Capita Use		0.25		
US EPA - Water Conservation Plan Guidelines		0.20 – 0.29		
CHBF - Water Use in the CA Residential Home		0.14		
Geosyntec Estimates – Low Range	**0.069**	**0.14**	**0.21**	**21.4**
Geosyntec Estimates – High Range	**0.072**	**0.29**	**0.36**	**36.7**

Should you have any questions do not hesitate to contact me at mhanna@geosyntec.com or (310) 957-6113.

Sincerely,

Mark Hanna, PhD, PE, LEED AP
Associate, Geosyntec Consultants

Avery Blackwell
Staff Engineer, Geosyntec Consultants

Attachment 1: Project Details, Assumptions, Methodologies & References

CC: Gordon Thrupp, Geosyntec Consultants

ATTACHMENT 1
Review of Laetitia Residential Water Demand

PROJECT DETAILS

According to the Draft EIR, 2008 (DEIR) and RDEIR, 2012, the following attributes were used to estimate the residential portion of the Laetitia project water demand.

Outdoor water use attributes

1. Residential lots are approximately one-acre (RDEIR, Table V.B.-5)
2. Irrigated landscaping is approximately 1,500 square feet per lot (RDEIR, pg. V-63)
3. Warm-season turf is approximately 300 square feet per lot (RDEIR, pg. V-63)
4. The remaining landscaping is drought-tolerant, low water-use plants (RDEIR, pg. V-64)
5. Automatic irrigation sprinklers (RDEIR, pg. V-63)

Indoor water use attributes

1. Home size ranges from 3,000 to 5,000 square feet (DEIR, pg. iii-10)
2. All appliances and fixtures are low flow (RDEIR, pg. V-63)

PROJECT ASSUMPTIONS

The following assumptions were made using industry standards and best professional judgment.

Outdoor water use attributes

1. The warm-season turf is included as part of the 1,500 square feet of irrigated landscaping
2. Irrigation efficiency of turf (Automatic Sprinklers) – 65% (Section 2.6 of US DE, 2010)
3. Irrigation efficiency of landscaping (Micro-irrigation) – 85% (Section 2.6 of US DE, 2010)

Indoor water use attributes

1. Residential homes will include on average four year-round residents

RESIDENTIAL OUTDOOR WATER USE CALCULATION METHODOLOGIES

CA Department of Water Resources – Model Water Efficiency Landscape Ordinance

The California Department of Water Resources (DWR) developed a Model Water Efficient Landscape Ordinance to ensure the creation of efficient landscapes in new and redeveloped areas. The Model Ordinance, which went into effect in 2009, contains a worksheet for calculating the Estimated Total Water Use (gallons/year) of the landscaping of a site.

$$\text{Estimated Total Water Use} = (\text{ETo})(0.62)\left(\frac{\text{PF x HA}}{IE}\right)$$

ETo - Reference Evapotranspiration – 52.10 inches/year for the Nipomo area (Model Ordinance, Appendix A)

PF – Plant Factor

1. Warm-season turf – 0.60 (WUCOLS III, 1999 edition pg. 137)
2. Low water-use irrigated landscaping – 0.30 (Model Ordinance, Section 492.4[b][1])

HA – Hydrozone Areas, the square feet of each landscaped area (see Project Details section for values)

IE – Irrigation System Efficiencies, the percent of irrigation water that is effectively applied to landscaping (see Project Assumptions section for values)

US Department of Energy – Guidelines for estimating unmetered landscaping water use

The US Department of Energy developed this methodology to assist federal agencies in estimating the water used for landscape irrigation from unmetered sites. The document, published in 2010, includes regional specific information.

$$\text{Landscape Water Use} = \frac{(\text{Irrigation Factor})(\text{Irrigation Area})}{\text{Irrigation Efficiency}}$$

Irrigation Factor – LA region, average density, open microclimate (Unmetered Landscaping)

1. Warm-season turf – 14.64 gallons/sqft/year (Table 3)
2. Low water use irrigated landscaping – 11.75 gallons/sqft/year (Table 5)

Irrigation Area, the square feet of each landscaped area (see Project Details section for values)

Irrigation System Efficiencies, the percent of irrigation water that is effectively applied to landscaping (see Project Assumptions section for values).

RESIDENTIAL INDOOR WATER USE CALCULATION METHODOLOGIES

CA Department of Water Resources – Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use

In 2009 the California Water Conservation Act was passed to decrease urban per capita water use by 20 percent. The legislation describes multiple methodologies for establishing the water use targets. Methodology 5, which addresses indoor residential water use, establishes a provisional standard of 55 gallons per capita per day (gpcd).

Assuming the new construction will be aimed at achieving this standard through low flow appliances and fixtures, the duty factor per unit (assuming four year-round residents) will be 0.25 acre-feet per unit per year.

US EPA – Water Conservation Plan Guidelines

In 1998 the US EPA published the Water Conservation Plan Guidelines to assist water system planners in future planning. Appendix B of the guidelines provides indoor water use bench marks to use in the conservation planning process. According to these estimates, indoor water use without conservation is approximately 65 gpcd and with conservation the amount reduces to 45 gpcd.

Assuming the new construction will use all low flow appliances and fixtures, the duty factor per unit (assuming four year-round residents) will be 0.20 acre-feet per unit per year. If conventional appliances and fixtures are used, the duty factor will be 0.29 acre-feet per unit per year.

California Homebuilding Foundation – Water Use in the California Residential Home

In 2011 the California Green Building Standards Code (CGBSC) came into effect with significant changes to the water use efficiency of standard appliances and fixtures. Based on these new standards and common water use assumptions it is estimated that the total annual indoor water use of a family of four is 46,849 gallons.

Assuming the new construction will incorporate the CGBSC low flow appliances and fixtures, the duty factor per unit (assuming four year-round residents) will be 0.14 acre-feet per unit per year.

REFERENCES

California Department of Water Resources, 2000. A guide to estimating irrigation water needs of landscape plantings in California. August 2000.

California Department of Water Resources, 2009. Model Water Efficient Landscape Ordinance.

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California Homebuilding Foundation, 2010. Water Use in the California Residential Home. Prepared by Consol. January 2010.

County of San Luis Obispo, Department of Planning and Building, 2008. Laetitia Agricultural Cluster Subdivision Tentative Tract Map and Conditional Use Permit, Draft Environmental Impact Report. Prepared by Morro Group. September 2008.

County of San Luis Obispo, Department of Planning and Building, 2012. Laetitia Agricultural Cluster Subdivision Tentative Tract Map and Conditional Use Permit, Recirculated Draft Environmental Impact Report. Prepared bySWCA Environmental Consultants. April 2012.

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US EPA, 1998. Water Conservation Plan Guidelines, Appendix B. August 6, 1998.