

Water And Energy Savings and Green House Gas Calculations STPUD Commercial/Industrial Water Use Efficiency Project

Project Assumptions:

Baseline (pre-project) volume of water associated with the project:

The baseline volume of water of 13.75 MG/year was calculated using 110 gallons per year per square foot x the 125,000 square foot of turf that is proposed under this project. The 110 gallons per year per square foot calculation is based on the estimates for water savings as provided below and the data as provided by the California Urban Water Conservation Council (Evaluation of Potential Best Management Practices, Turf Removal, September 2013) that turf removal of approximately 50% saves approximately 20% of total water use. (See (2a) in the table below) STPUD turf removal participants are required to replace turf with at least 50% native plantings to avoid erosion control scenarios.

As STPUD is not fully metered, water savings estimates were made from areas that are fully metered and provided water savings calculations from turf removal programs in which data could be collected and analyzed. STPUD chose the Water Smart Landscape Rebates program from Las Vegas, NV for their water savings data as they were fully metered and had tracked their program for several years. We then applied a regional weather/irrigation days calculation to better estimate water savings in the Lake Tahoe region. This is more fully explained in the Volume of Water Delivered After the Project is Implemented section below. This data can also be found in the document as cited above available on the CUWCC website: www.cuwcc.org

If 22 gallons per square foot per year could be assumed to be a 20% water savings, then the estimate of 110 gallons per square foot per year could be used for total irrigation water use per season, per square foot.

Table 5. Estimated outdoor water savings for single-family residences in California.

Scenario	Water Use*		Savings		% Reduction	
	kgal per yr	MAF per yr	kgal per yr	MAF per yr	Outdoor use	Total* use
(1) Reduced rate of over-irrigation by 50%	62.15	1.62	24.95	0.63	28%	14%
(2) Reduced avg. landscape ratio to 0.8	80.82	2.13	6.28	0.16	7%	4%
(2a) Reduced avg. landscape ratio to 0.5	50.51	1.32	36.59	0.96	42%	20%
(3) Reduce avg. irrigated area by 20%	77.92	2.01	9.18	0.23	10%	5%
(1)+(2) Reduced rate of over-irrigation by 50% and avg. landscape ratio to 0.8	55.87	1.48	31.23	0.79	35%	18%

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(1)+(2a) Reduced rate of over-irrigation by 50% and avg. landscape ratio to 0.5 25.56 0.67 61.54 1.59 71% 37%

(1)+(2)+(3) Reduced rate of over-irrigation by 50%, avg. landscape ratio to 0.5, and avg. irrigated area by 20% 46.69 1.22 40.41 1.02 45% 23%

to 0.8, and avg. irrigated area by 20%

(1)+(2a)+(3) Reduced rate of over-irrigation by 50%, avg. landscape ratio to 0.5, and avg. irrigated area by 20% 16.38 0.43 70.72 1.82 81% 42%

* Annual water use is income corrected based on statewide census data.

** Total use denotes the sum of both indoor and outdoor use.

Source: Adapted from DeOreo et al. (2011).

Volume of Water delivered after the project is implemented:

The Southern Nevada Water Authority estimates an average yearly savings of 55 gallons of water for every square foot of grass replaced with water-smart trees, shrubs and flowers. Since Southern Nevada is able to irrigate 365 days a year and Tahoe's climate only allows irrigation for approximately 150 days a year the calculation below converts the water savings to .15 gallons per day and applies this to Tahoe's usage which is a shortened irrigation season of approximately 150 days per year. See chart below.

Turf Buy Back Water Savings:				
55 gallons/square foot/year	/	365 days/year	=	.15 gallons/square foot/day
.15 gallons/square foot/day	x	150 days/year	=	22 gallons/square foot/year

Source: *Smart Savings Water Conservation Measures that Make Cents*, Western Resources Advocates, 2008 (pg. 24, Southern Nevada Water Authority, *Water Smart Landscapes Rebates*, Las Vegas, NV)

This program proposes to remove 125,000 square ft. of turf, so the following annual water savings will be achieved:

125,000 square feet of turf x 22 gallons of water per foot = 2,750,000 gallons of water saved annually or 2.75 MG

As baseline water usage was 13.75 MG/year, then subtracting 2.75 MG/year in water savings would result in 11 MG/year volume delivered after our project is implemented.

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Useful life in years for the project:

50 years was used as the useful life of the project as the implementation is for native, low water use landscaping trees, bushes, shrubs and flowers. Because these plantings are native and an efficient irrigation system is a requirement of the turf removal program, we can expect full life for these landscapes regardless of maintenance or the lack of. As per the Department of Commerce/Office of Affordable Housing in their 2011 Architectural Manual for asset management useful life, 50 years was listed as the useful life for all landscaping in the Useful Life Table, so we used that useful life number for our newly-landscaped properties. The Internal Revenue Service allows for a 39 year depreciation on landscaping, so 50 years is an accurate assumption of expected useful life.

Energy Intensity of the System associated with the projects water savings:

The energy production costs are estimated to be 3,950 kWh per MG of water (as per the California Energy Commission Integrated Energy Policy Report for Northern California water suppliers) or 10,863 kWh per year in energy savings based on the lowered water production required.

Total Output Emission rate:

The default rate of .278 was used as we do not have emission rates specific to the power supplier.