“E”

Water Availability Analysis

Sleeping Giant Winery P15-00284
Planning Commission Hearing September 7, 2016

TIER 1 & 2 WATER AVAILABLITY ANALYSIS

SLEEPING GIANT WINERY
2258 LAS AMIGAS ROAD
NAPA, CALIFORNIA

APN 047-290-031

PROPERTY OWNER:

Chris Dearden
P.O. Box 4364
Napa, CA 94558

Project# 4115030.0
August 27, 2015
Revised April 29, 2016

These calculations demonstrate the proposed water use of the Sleeping Giant Winery. The existing and proposed water use for the Sleeping Giant Winery on APN: 047-290-031 are as follows:

Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Residential	0.75	0.75
Vineyard		
Irrigation	4.85	4.41
Recycled Process Wastewater	0.00	-0.65
Los Carneros Recycled Water Pipeline	0.00	-1.24
Winery		
Process Water	0.00	0.65
Landscaping	0.00	0.39
Employees	0.00	0.09
Visitors	0.00	0.03
Events	0.00	0.03
Net Use (Acre-ft per Year)	**5.60**	**4.46**

The methods used in this analysis are based on the May 12, 2015 Napa County Water Availability Analysis guidance document, and detailed calculations can be found in the attached Tier 1/Water Availability Analysis Additional Information sheet.

Water use will be reduced by irrigation with recycled process wastewater and recycled water from the Los Carneros Water District. See attached Will Serve letter from Los Carneros Water District for details on the recycled water to be provided to the Sleeping Giant Winery.

Residential – Primary Residential only – (0.75 af/yr) = 0.75 af/yr

Existing Vineyard – Irrigation only – (0.5af/ac-yr * 9.71 acres of vineyard) = 4.85 af/yr

Proposed Vineyard – Irrigation only – (0.5af/ac-yr * 8.82 acres of vineyard) = 4.41 af/yr

Winery – Process Water – (2.15af/100,000 gal wine * 30,000 gal) = 0.65 af/yr

Winery – Landscape Irrigation Water – (See Attached WELO Calculations) = 0.39 af/yr

Winery Domestic Water

FT Employees – (5 @ 15gpd x 300 days/yr) = 22,500 gpy

PT Employees – (1 @ 15 gpd x 300 days/yr) = 4,500 gpy

Harvest Employees – (2 @ 15gpd x 45 days/yr) = 1,350 gpy

Visitors – (8 @ 3gpd x 365 days/yr) = 8,760 gpy

Food & Wine Pairing Events – (50 @ 15gpd x 12 days/yr) = 9,000 gpy

Total = 46,110 gpy

Existing = (*Residential + Vineyard)* = (0.75 + 4.85) = **5.60 ac-ft/yr**

Proposed = (*Residential + Vineyard + Winery + Landscaping + Employees + Visitors + Events)*

= (0.75 + 4.41 + 0.65 + 0.39 + 0.09 + 0.03 + 0.03) = **6.35 ac-ft/yr**

Note 1: 0.65 af/yr of treated process wastewater will be used to irrigate 7.7 acres of vineyard. (See attached exhibit.)

Note 2: 1.24 af/yr of irrigation water will come from the recycled water pipeline from the Carneros Water District (see attached Will Serve letter).

Note 3: Landscape water demand from WELO analysis. (See attached calculations.)

Dedicated to Preserving the Napa River for Generations to Come

April 22, 2016

Conservation, Development and Planning Department – County of Napa
1195 Third Street, Room 210
Napa, CA 94559

SUBJECT: APN 047-290-031 – Sleeping Giant Winery
NSD Will Serve #53 – Recycled Water

To Whom It May Concern:

The Napa Sanitation District (District) has received a request to provide a "Will Serve" letter for a proposed winery located on the subject parcel. The District will provide recycled water service to this parcel.

The following items will be required by the owner/developer:

1. Install the recycled water improvements as specified in the District's Conditions of Approval for the project.
2. Pay the appropriate development fees. The facility shall be subject to all applicable rules and regulations of the District.
3. Enter into a Recycled Water User Agreement with the District for purchase and use of recycled water.

This parcel is within the Los Carneros Water District (LCWD). The development will be required to install the necessary facilities to utilize recycled water for irrigation.

The District currently has an irrigation season (May 1 – October 31) supply of recycled water of 3,700 acre-feet. The District's source for recycled water is wastewater generated by sewer customers within the District's sewer service area.

LCWD was issued a will-serve letter for 450 acre-feet of recycled water during the irrigation season which is a portion of the 3,700 acre-feet supply. The subject parcel is allocated 1.24 acre-feet of recycled water during the irrigation season which is a portion of the LCWD allocation. The District will provide recycled water service to this parcel.

This "Will Serve" letter for sanitary sewer and recycled water service is valid for a period of three (3) years from the date of this letter. If the proposed development has not obtained its required Connection Permits from the District at the end of this time, this "Will Serve"

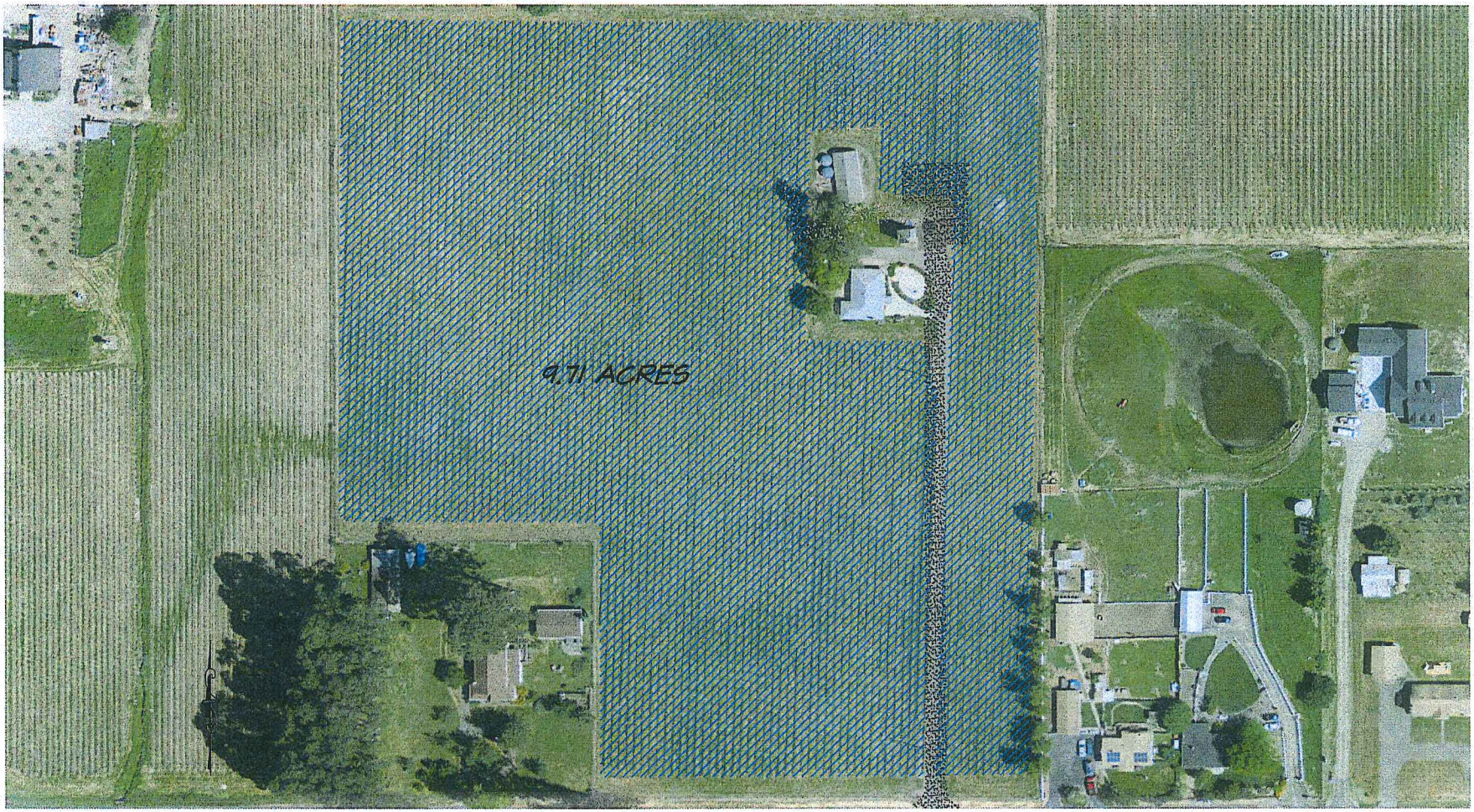
letter shall become void. If you have any questions regarding this matter, please contact me at (707) 258-6007 or adamron@napasan.com.

Sincerely,

Andrew Damron, P.E.
Senior Civil Engineer

cc: Bruce Fenton, RSA+

SLEEPING GIANT WINERY
EXISTING VINEYARD AREA



GRAPHIC SCALE

150 0 150 300

(IN FEET)
1 inch = 150 FT

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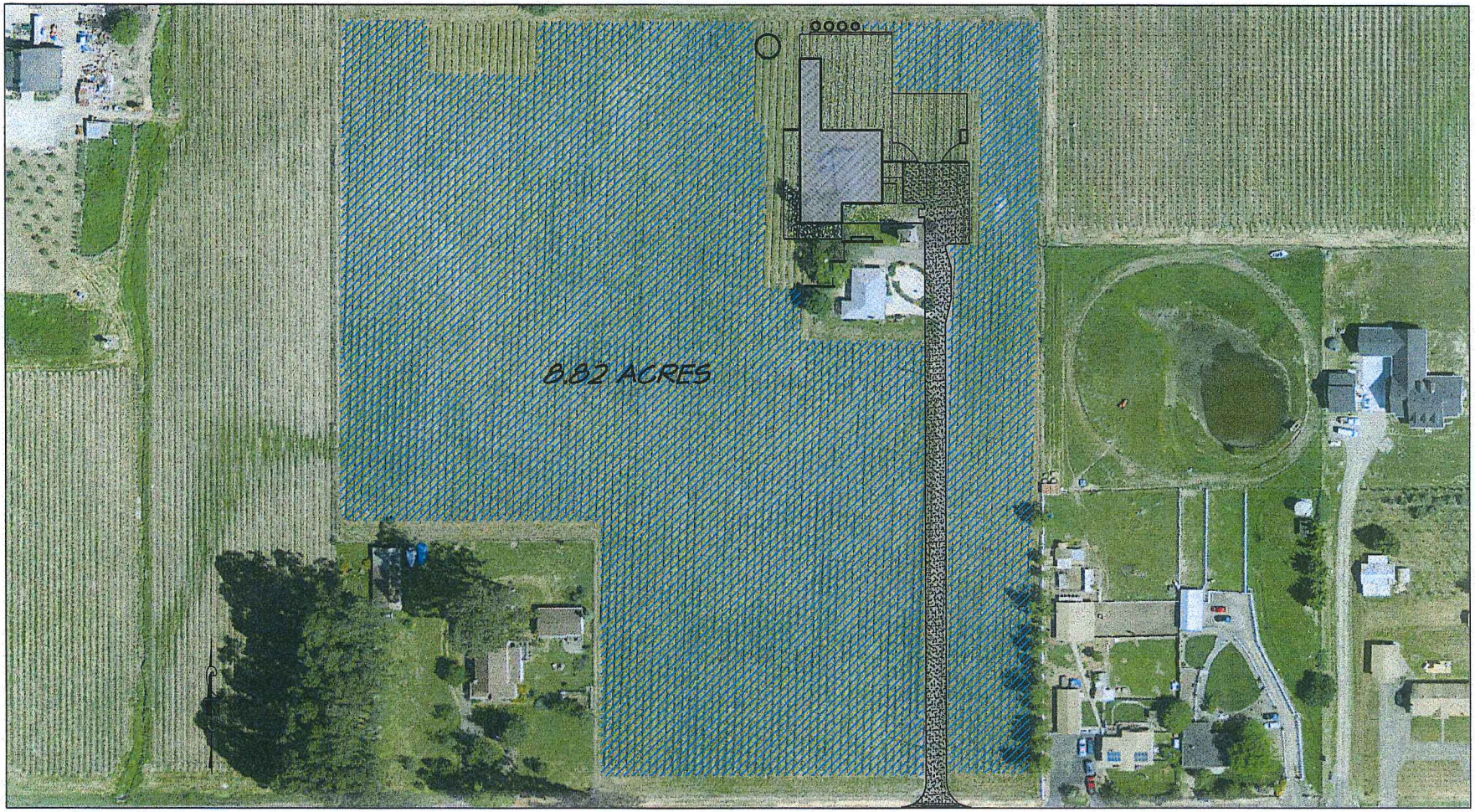
SLEEPING GIANT WINERY
PROPOSED VINEYARD AREA
CALIFORNIA



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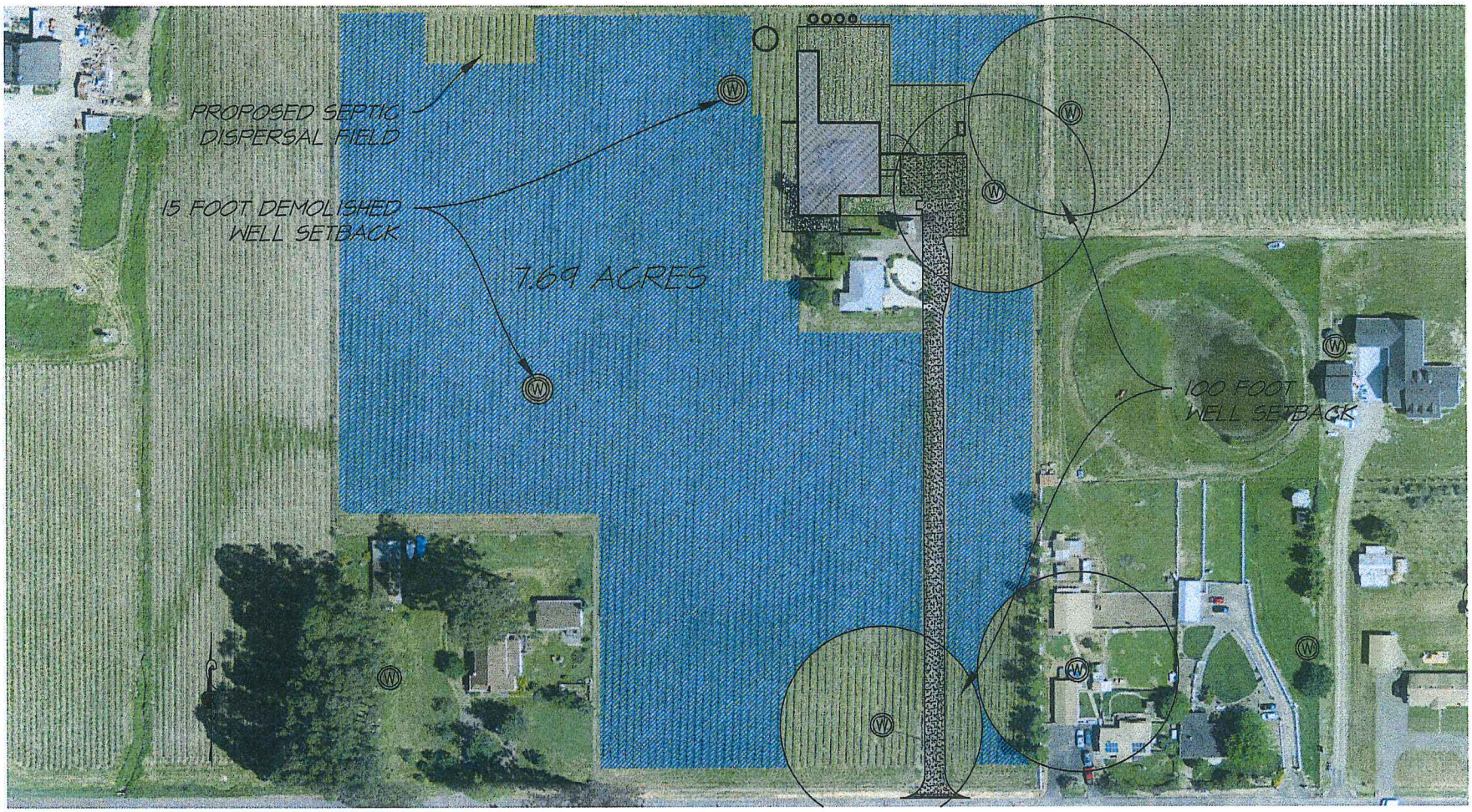
SLEEPING GIANT WINERY
VINEYARD TO RECEIVE RECYCLED WATER



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SECTION B: WATER EFFICIENT LANDSCAPE WORKSHEETS

Section B1. Hydrozone Information Table

Please complete the hydrozone table(s) for each hydrozone. Use as many tables as necessary to provide the square footage of landscape area per hydrozone.

Hydrozone*	Zone or Valve	Irrigation Method**	Area (Sq. Ft.)	% of Total Landscape Area
LW	Bioretention	D	990	9.3%
LW	Landscape	D	9,659	90.7%
		Total (Sq. Ft.):	10,649	100%

Summary Hydrozone Table		
Hydrozone*	Area (Sq. Ft.)	% of Total Landscape Area
High Water Use	---	---
Moderate Water Use	---	---
Low Water Use	10,649	100%
Total:	10,649	100%

** Hydrozone*
HW = High Water Use Plants
MW = Moderate Water Use Plants
LW = Low Water Use Plants

***Irrigation Method*
MS = Micro-spray
S = Spray
R = Rotor
B = Bubbler
D = Drip

Section B2. Maximum Applied Water Allowance (MAWA)

The project's Maximum Applied Water Allowance shall be calculated using this equation:

$$MAWA = (ETo)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$$

where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration from *Appendix A* (inches per year)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscaped Area includes Special Landscape Area (square feet)
0.62 = Conversion factor (to gallons per square foot)
SLA = Portion of the landscape area identified as Special Landscape Area (square feet)
0.3 = the additional ET Adjustment Factor for Special Landscape Area (1.0 - 0.7 = 0.3)

Maximum Applied Water Allowance = 211,702 **gallons per year**

Show calculations.

MAWA = (ETo) (0.62) [(0.7xLA) + (0.3 x SLA)]
MAWA = (45.8) (0.62) [(0.7 x 10,649) + (0.3 x 0)]
MAWA = 28.4 [7454.3]
MAWA = 211,702 gal/yr

Effective Precipitation (Eppt)

If considering Effective Precipitation, use 25% (0.25) of annual precipitation. Use the following equation to calculate the Maximum Applied Water Allowance (see Appendix B for rainfall map):

$$MAWA = (ETo - Eppt)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$$

Maximum Applied Water Allowance = 185,675 **gallons per year**

Show calculations.

MAWA = (45.8 - 5.625) (0.62) [0.7 x 10,649) + (0.3 x 0)]
MAWA = (40.175) (0.62) [7454.3]
MAWA = 185,675 gal/yr

Section B3. Estimated Total Water Use (ETWU)

The project's Estimated Total Water Use is calculated using the following formula:

$$ETWU = (ETo)(0.62)\left(\frac{PF \times HA}{IE} + SLA\right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
PF = Plant Factor from WUCOLS[2] (*Water Use Classification of Landscape Species, UCCE 2000*)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor (to gallons per square foot)
IE = Irrigation Efficiency (minimum 0.71)

Hydrozone Table for Calculating ETWU

Please complete the hydrozone table(s). Use as many tables as necessary.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Area (HA) (square feet)	PF x HA (square feet)
Bioretention	LW	0.3	990	297
Landscape	LW	0.3	9,659	2,897.7
			Sum	3,194.7
	SLA	N/A	0	0

Estimated Total Water Use = 127,788 **gallons**

Show calculations.

ETWU = (ETo) (0.62) [PF x HA / IE + SLA]

ETWU = 45.8 (0.62) [3,194.7 / 0.71 + 0]

ETWU = 28.4 (4,499.6)

ETWU = 127,788

[2] To obtain plant factors from WUCOLS, see http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf - *Water Use Classification of Landscape Species, UCCE 2000.*

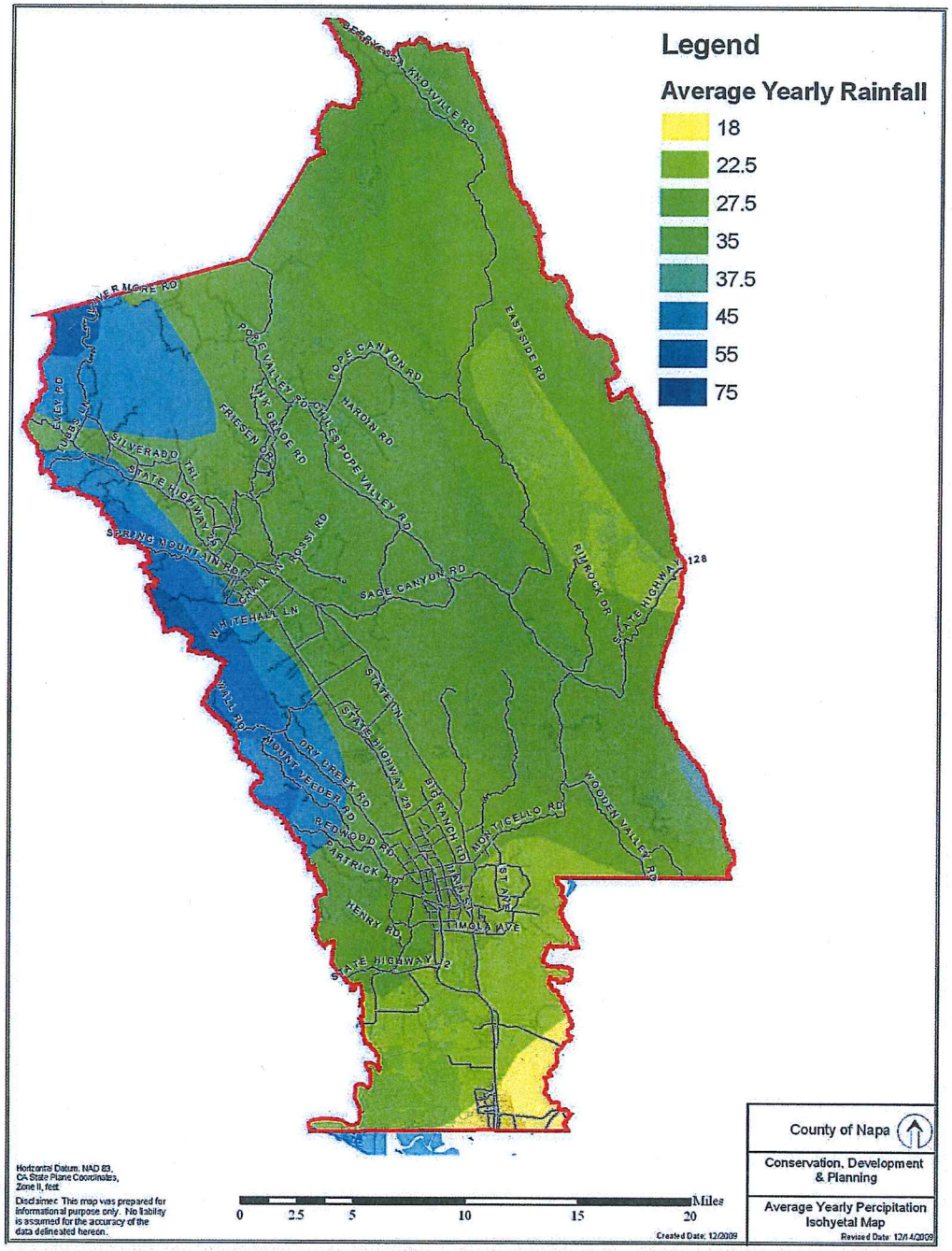
APPENDIX A: NAPA COUNTY REFERENCE EVAPOTRANSPIRATION (ETO) TABLE*

The following table can be used to determine the Reference Evapotranspiration (ETo) in inches per year for various locations in Napa County. Select the reference location nearest your project or interpolate between two sites as appropriate to determine the Annual ETo for your particular project. Projects located in the eastern portion of the County will most likely use the highest of the five values (54.9) due to the hot dry summer climate in those areas. Annual ETo is used to calculate your project's Maximum Applied Water Allowance (MAWA) (see Section C1).

Nearest Reference Location	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	**Annual ETo (in/yr)**
Angwin	1.8	1.9	3.2	4.7	5.8	7.3	8.1	7.1	5.5	4.5	2.9	2.1	**54.9**
Carneros	0.8	1.5	3.1	4.6	5.5	6.6	6.9	6.2	4.7	3.5	1.4	1.0	**45.8**
Oakville	1.0	1.5	2.9	4.7	5.8	6.9	7.2	6.4	4.9	3.5	1.6	1.2	**47.7**
St Helena	1.2	1.5	2.8	3.9	5.1	6.1	7.0	6.2	4.8	3.1	1.4	0.9	**44.1**
Yountville	1.3	1.7	2.8	3.9	5.1	6.0	7.1	6.1	4.8	3.1	1.5	0.9	**44.3**

* Table excerpted from *Appendix A – Reference Evapotranspiration Table, California Code of Regulations, Title 23. Waters, Division 2. Department of Water Resources, Chapter 2.7 - Model Water Efficient Landscape Ordinance* (09/10/09). The values in this table were derived from: 1) California Irrigation Management Information System (CIMIS); 2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999; and 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922, 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426

APPENDIX B: AVERAGE YEARLY RAINFALL MAP[4]



[4] Napa County Baseline Data Report, 2005, Map Data 3-2 developed from County GIS 12/14/2009

Chapter 3—
Using the Landscape Coefficient Formula

The landscape coefficient formula was introduced in Chapter 2, and the three factors which determine its value were discussed. Now these factors are used to calculate values for the landscape coefficient. A series of field cases show the range of values that can be determined for K_L. In Chapter 4, calculations using the landscape coefficient in the ET_L formula are presented.

Using the information presented in Chapter 2, values for the landscape coefficient can be calculated. The following cases show how the landscape coefficient is used for a variety of species, density, and microclimate conditions. Species factor values will be taken from the WUCOLS list, while density and microclimate values are based on the planting and site conditions described. For quick reference, the following table gives values for each factor.

Landscape Coefficient Factors

	Species	Density	Microclimate
High	0.7 - 0.9	1.1 - 1.3	1.1 - 1.4
Mod./Ave.	0.4 - 0.6	1.0	1.0
Low	0.1 - 0.3	0.5 - 0.9	0.5 - 0.9
Very Low	< 0.1		

PF = 0.3 × 1.0 × 1.0 = 0.3

Case 1—A large, mature planting of star jasmine in a park in San Jose. It is in full sun and has little wind exposure.

$k_s = 0.5$
$k_d = 1.0$
$k_{mc} = 1.0$
$K_L = 0.5 \times 1.0 \times 1.0 = 0.5$

Analysis: Star jasmine is classified as moderate in the WUCOLS list (moderate range = 0.4 to 0.6) and a midrange k_s value of 0.5 is assigned. Since the planting is mature it will be considered full (i.e., canopy cover = 100%), and being of one vegetation type, it is classified as an average density and k_d is 1.0. The microclimate is similar to reference evapotranspiration conditions (full sun, open area, no extraordinary winds) and, therefore, is classified as average and k_{mc} is 1.0.

Case 2—A mixed planting of dwarf coyote brush, Pfitzer juniper, oleander, purple hopseed, and olive in an office park in Los Angeles. The planting is full, exposed to sun all day, but not to extraordinary winds.

$k_s = 0.2$
$k_d = 1.2$
$k_{mc} = 1.0$
$K_L = 0.2 \times 1.2 \times 1.0 = 0.24$

Analysis: All species are classified as low in the WUCOLS list and are assigned a midrange value of 0.2. Canopy cover is 100%, and since all three vegetation types occur, this is classified as a high density planting and a k_d value of 1.2 is assigned. The microclimate is average and a value of 1.0 is assigned.

Case 3—A mature planting of rockrose, star jasmine, and dichondra in an amusement park in Sacramento. The planting is in full sun and atypical winds are infrequent.

$k_s = 0.8$
$k_d = 1.0$
$k_{mc} = 1.0$
$K_L = 0.8 \times 1.0 \times 1.0 = 0.8$

Analysis: Species in this planting are in three different WUCOLS categories: low (rockrose), mod-

SLEEPING GIANT WINERY
LANDSCAPE AREAS EXHIBIT

LEGEND	
LANDSCAPE TYPE	AREA (SF)
BIORETENTION FACILITY	990
LANDSCAPED AREA	9,659

GRAPHIC SCALE

40 0 40 80

(IN FEET)
1 inch = 40 FT

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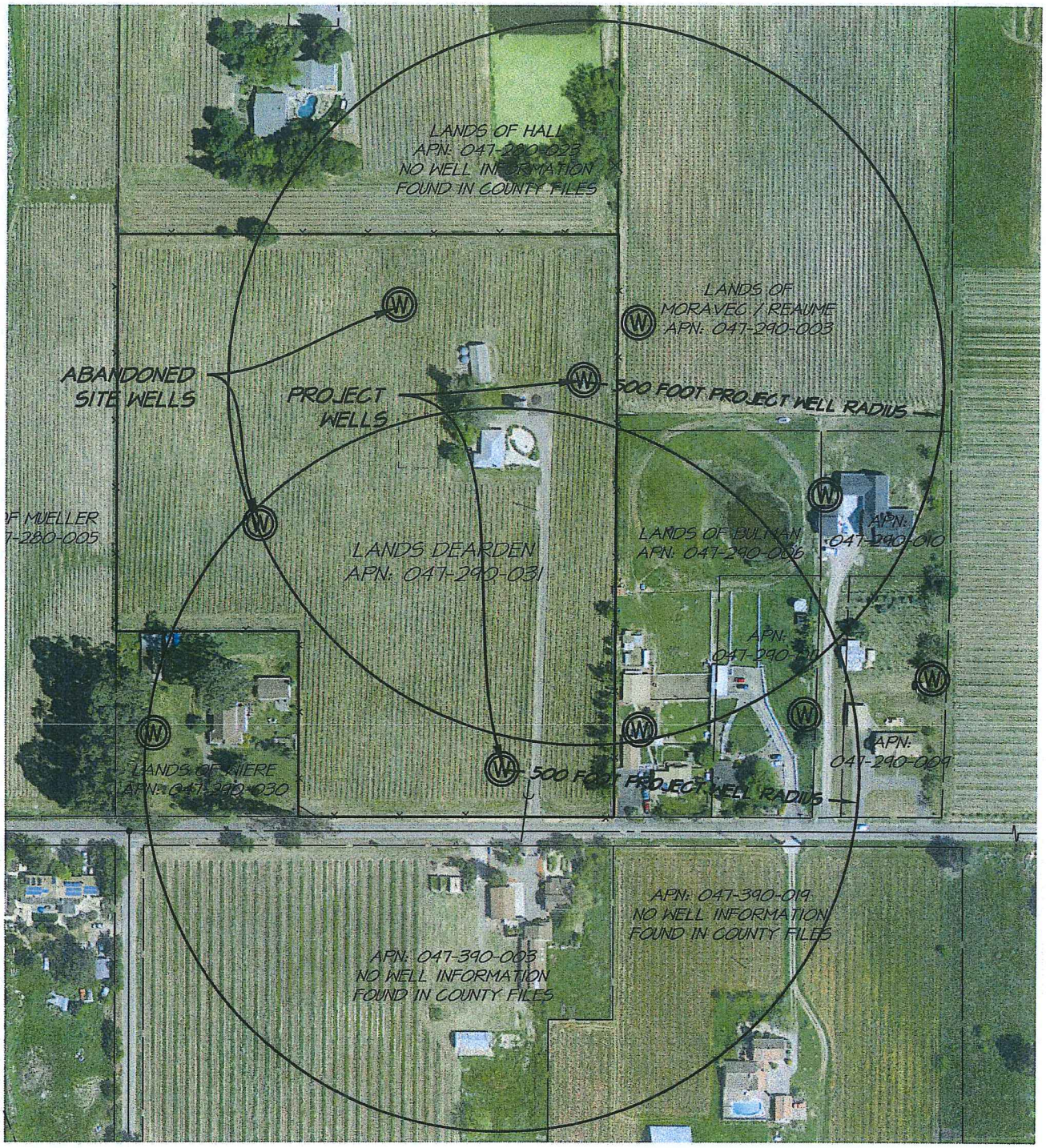
SLEEPING GIANT WINERY

WATER AVAILABILITY ANALYSIS TEIR 2 WELL EXHIBIT



SCALE: 1"=200'

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