DELTA CONSULTING & ENGINEERING
OF ST. HELENA

WATER USE REPORT

FOR THE

CARMEL ART GALLERY

LOCATED AT

1329 LINCOLN AVENUE
CALISTOGA, CA 94515

COUNTY: NAPA
APN: 011-221-023

MARCH 7, 2011

PREPARED FOR REVIEW BY:

CITY OF CALISTOGA PUBLIC WORKS DEPARTMENT
414 WASHINGTON STREET
CALISTOGA, CA 94515

1104 ADAMS STREET, SUITE 203, ST. HELENA, CALIFORNIA 94574
707-963-8456 TELE + WWW.DELTACIVIL.COM 707-963-8528 FAX

TABLE OF CONTENTS

I. BACKGROUND & INTRODUCTION

The owner's of the subject parcel, Elizabeth and Olof Carmel, propose to construct a two-story 2,600 ft² building on the vacant parcel located at 1329 Lincoln Avenue also known as Napa County Assessor's Parcel 011-221-023. The first floor (1,300 ft²) of the proposed building shall be a single retail space for the owner's art gallery and the second floor (1,300 ft²) shall be for used for storage. The only area open to the public will be the first floor. Staff restrooms shall be located on the first floor only; these facilities shall not be available to the public and shall be posted as such. The second floor shall have no water using facilities (no sinks or toilets) and shall not be accessible by the public. The building shall have no rental offices, apartments, or commercially leasable space other than the 2,600 ft² itself. No landscaping is proposed as the proposed building is an infill commercial project to be built at the back of sidewalk. As such, there is no available area for landscaping.

The parcel is zoned Downtown Commercial with a Design District overlay, located along the northern side of Lincoln Avenue currently, and currently has no structures. The project is in its due diligence phase and no building plans have been prepared as of this writing. If the submitted plans are significantly different from what is described herein, a new use report shall be submitted.

Historically, the parcel had a building which was known as Ding's Market. According to the parcel's title report, the building was demolished on January 15, 1981. The original municipal water and sanitary sewer connections remain in place, but both are on 'stand-by' status.

II. WATER ALLOCATION

A. Usage Baseline

In 2004, based on the Resource Management System of the Calistoga Municipal Code, the City Council directed the Public Works staff to prepare a parcel by parcel water and sewer allocation system in order to create an inventory allocation system to regulate and monitor annual water and sewer demand. The major outcome of this directive was the creation of individual water and sewer baseline usage for all commercial and industrial parcels. These baselines are the volumes of water and wastewater that a given parcel is entitled to on an annual basis and the wastewater baseline was set at 90% of the water baseline.

The baselines were determined by reviewing the individual parcel's water usage for the fiscal years of 1998/1999 though 2002/2003 (prior 5 years as the City's fiscal year end on June 30) and taking the highest demand year as the baseline. If the highest use year was more than 25% greater than the second highest use year, the second highest use year was determined to the baseline.

III. WATER USE

A. Parcel's Current Allocation

For the subject parcel, the water use during the review period was zero as there was no structure and the meter was in 'stand-by' status. As such, the City determined the baseline based on 'former use' and set the value at 26. Based on this, the sewer baseline was set at 23.4.

The baseline values are actually units of water or wastewater per year. A single unit is 100 cubic feet (ft³) or 748 gallons. For the subject parcel, the annual allocation of water is 19,448 gallons or 53 gallons per day.

B. City's Water Use Table

In 1999, the City adopted guidelines for determining annual water and wastewater usage under resolution #99-65. Under this provision, Standard Use Tables were adopted for various types of typical developments within the City: Mobile Home Parks, Apartments, Condominiums, Townhomes, Granny Units, Single Family Dwellings, Four Bedrooms, Transient Lodging Rooms, Commercial, Bar, and Restaurants. For the proposed 2,600 ft² retail building, the closest use listed in the table is 'Commercial'. Using this listing, the water and wastewater allocations are:

Use	Use Table Allocation (gpd)		2,600 ft² Building (gpd)	
	Water*	Wastewater*	Water	Wastewater
Commercial	98	88	255	229

*per 1,000 ft²

Based on a 'Commercial' designation, the proposed building water use would be 255 gallons per day and wastewater would be 229 gallons per day.

C. County of Napa Use Tables

Napa County Environmental Management Department has design guidelines used for designing on-site wastewater systems. Table 4 of Appendix 1 of the Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems lists various types of occupancies and their associated gallons per day. According to this table, a retail store uses 20 gallons of water per employee per day. There is no listing for customers.

D. Additional Sources of Water Use Tables

Research yielded the following table which provides additional estimates to determine the theoretical water use for a retail building. The additional sources are noted as:

1. Department Store: 30-50 liters (7.9-13.2 gallons) per employee per day[1].
2. Shopping Center: 7-13 gallons per employee per day[2]
3. Department Store: 8-15 gallons per employee per day[3]
4. Department Store: 8-15 gallons per employee per day[4]
5. Shopping Center: 7-13 gallons per employee per day[5]

Averaging each individual range yields an average range of 10–11.5 gallons per day per employee for retail type establishments.

IV. CONCLUSION

Assuming the art gallery has a single employee, the cumulative daily water use is estimated to vary between 10-20 gallons per day per employee depending on the source of the use table. For the proposed project with two employees, the cumulative estimated water use is between 20 and 40 gallons of water per day. According to the owners, they anticipate having a single employee which reduces the estimate to between 10-20 gallons of water per day.

---

[1] Schroeder, Edward, and Tchobanoglaus, George. Water Quality. Menlo Park: Addison-Wesley, 1985. Table 1.4, page 8.
[2] Crites, Ron, and Tchobanoglaus, George. Small and Decentralized Wastewater Management Systems. McGraw-Hill, 1988. Table 4.2, page 171.
[3] Crites. Table 4.2, page 171.
[4] Tchobanoglaus, George, Burton, Franklin, and Stensel, David. Wastewater Engineering: Treatment and Reuse. McGraw-Hill, 2003. Table 3-2, page 157.
[5] Tchobanoglaus. Wastewater Engineering. Table 3-2, page 157.

Using the estimated water use ranges above and extrapolating the values to units yields the following table:

# Employees	Estimated Water Use (gal/day)	Annual Estimated Water Use (gal/year)	Annual Estimated Water Units
1	10-20	3,650-7,300 gpy	4-9-9.8
2	20-40	7,300-14,600 gpy	9.8-19.6

Given the existing water baseline of 26 units or 19,448 gallons of water per year is allotted to the parcel, under the worst case scenario of two employees using a cumulative of 40 gallons per day, the estimated water use is 75% of the existing water baseline. If there is a single employee, using the 20 gallons per day per employee value, the estimated water use is reduced to 37.5% of the existing water baseline.

In either case, the estimated water use will be below the existing water allotment of 26 units. Add in the required low flow fixture which will be installed in the lavatories, the estimated water use for the proposed building will be below the existing water baseline.

Using the City's estimated use tables for a 'commercial' building yields an estimated daily use of 255 gallons per day (93,075 gallons per year) or 124 units. The proposed building does not fit into the 'commercial' category as this estimated water use is not an accurate depiction of the future water demand of the building. Using the 'commercial' category for water use creates a statistical outlier.

The water use estimates noted herein are the upper end of the referenced sources and follow the guidelines of Napa County Environmental Management for a retail establishment. The City's estimate for a 'commercial' building should not apply to the proposed improvements described herein as it is not a realistic depiction of the projected water demand of the building. The parcel's existing baseline is adequate for the proposed use given the stated staff level. Please note that any proposed improvements with a different description will require a new water and sewer allocation analysis.

TABLE 4

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports	5 per passenger
Campgrounds:	
Campground with central comfort station	35 per person
Campground with flush toilet, no showers	25 per person
Day Camps (no meals)	15 per person
Luxury Camp, private bath	100 per person
Summer and seasonal	50 per person
Churches (sanctuary)	5 per seat
With kitchen wastes	7 per seat
Country Club	125 per person
Factories	35 per person per shift
Hospitals	250 per bed space
Kitchen waste only	25 per bed
Laundry waste only	40 per bed
Hotels/Motels with private bathroom (no kitchen waste)	60 per two person room
Hotels/Motels without private bathroom (no kitchen waste)	50 per two person room
Hotel/Motel with private bath and kitchen	75 gallons per person
Institutions other than hospitals	125 per bed space
Movie Theaters	5 per seat
Offices	20 per employee
Picnic parks with toilets and showers	10 per person
Picnic parks with toilet waste only	5 per person
Resort camps with limited plumbing	50 gallons per person
Restaurants:	
Kitchen waste (multi-use utensils)	5 per meal served
Kitchen waste (disposable utensils)	3 per meal served
And add the following for type of facility present:	
Conventional sit down	10 per person
Short Order	8 per person
Bar and Cocktail	3 per person
School (non-boarding	20 per student
With gym and showers add	5 per student
With cafeteria using disposable utensils	3 per meal served
Self service laundries	50 gallons per wash
Service station	10 gallons per vehicle served
Retail stores	20 per employee
For public restrooms add	1 per 10 square feet
Swimming pools and bathhouses	10 per person
Tourist camps or mobile home parks with individual bath units	100 per person
Tourist camps or trailer parks with central bathhouse	75 per person
Work or construction camps (semi-permanent)	50 per person
Wine tasting facility (no meals served)	3 per person
Employee	15 per employee

TABLE 1.3

Typical Distribution of Domestic Household Water Use in the United States

USE	FLOW, L/capita · d	PERCENT OF TOTAL
Toilet	88	40.0
Hand and body washing	75	34.1
Kitchen	16	7.3
Drinking*	10	4.5
Clothes washing	16	7.3
House cleaning	3	1.4
Garden watering†	10	4.5
Car washing	2	0.9
Total	220	100

*Includes running tap to obtain cold water, spillage, etc.

†Areas not requiring extensive irrigation.

TABLE 1.4

Typical Water-Use Values for Commercial Facilities

FACILITY	UNIT	FLOW, L/unit · d	
		Range	Typical
Airport	Passenger	8–15	10
Automobile service station	Vehicle served	30–60	40
	Employee	35–60	50
Bar and cocktail lounge	Customer	5–20	8
Boarding house	Resident	80–200	150
Hotel	Guest	150–220	190
	Employee	30–50	40
Industrial building (excluding industry and cafeteria)	Employee	30–65	55
Laundry (self-service)	Machine	1500–2500	2000
	Wash	180–200	190
Motel	Person	90–150	120
Motel with kitchen	Person	190–220	120
Office	Employee	30–65	55
Public lavatory	User	10–25	15
Restaurant (including toilet)			
Conventional	Meal	30–40	35
Short-order	Meal	10–30	15
Tavern	Seat	60–100	80
Rooming house	Resident	80–200	150
Department store	Toilet room	1600–2400	2000
	Employee	30–50	40
Shopping center	Parking space	2–8	4
	Employee	30–50	40
Theater			
Indoor	Seat	8–15	10
Drive-in	Car	10–20	15

Source: Adapted in part from Refs. [1.9] and [1.12].

TABLE 4-2
Typical wastewater flowrates from commercial sources*

Facility	Unit	Flow, gal/unit·d		Flow, L/unit·d	
		Range	Typical	Range	Typical
Airport	Passenger	2–4	3	8–15	11
Apartment house	Person	40–80	50	150–300	190
Automobile service station	Vehicle served	8–15	12	30–57	45
	Employee	9–15	13	34–57	49
Bar	Customer	1–5	3	4–19	11
	Employee	10–16	13	38–61	49
Boardinghouse	Person	25–60	40	95–230	150
Department store	Toilet room	400–600	500	1500–2300	1900
	Employee	8–15	10	30–57	38
Hotel	Guest	40–60	50	150–230	190
	Employee	8–13	10	30–49	38
Industrial Building (sanitary waste only)	Employee	7–16	13	26–61	49
Laundry (self-service)	Machine	450–650	550	1700–2500	2100
	Wash	45–55	50	170–210	190
Office	Employee	7–16	13	26–61	49
Public lavatory	User	3–6	5	11–23	19
Restaurant (with toilet)	Meal	2–4	3	8–15	11
Conventional	Customer	8–10	9	30–38	34
Short order	Customer	3–8	6	11–30	23
Bar/cocktail lounge	Customer	2–4	3	8–15	11
Shopping center	Employee	7–13	10	26–49	38
	Parking space	1–3	2	4–11	8
Theater	Seat	2–4	3	8–15	11

*Adapted in part from Tchobanoglous and Burton (1991).

Institutional facilities. Typical flowrates for institutional facilities are presented in Table 4-3. As noted above, whenever possible, actual flowrates from similar facilities should be evaluated and adjusted to reflect local conditions.

Recreational facilities. Flowrates from recreational facilities are highly variable and usually seasonal in nature. If the recreational area has a plentiful water supply, values in Table 4-4 can be used. If the water supply is limited and water conservation is employed, actual water use records should be used for estimating wastewater flowrates.

Table 3-2
Typical wastewater flowrates from commercial sources in the United States[a]

Source	Unit	Flowrate, gal/unit·d		Flowrate, L/unit·d	
		Range	Typical	Range	Typical
Airport	Passenger	3–5	4	11–19	15
Apartment	Bedroom	100–150	120	380–570	450
Automobile service station	Vehicle served	8–15	10	30–57	40
	Employee	9–15	13	34–57	50
Bar/cocktail lounge	Seat	12–25	20	45–95	80
	Employee	10–16	13	38–60	50
Boarding house	Person	25–65	45	95–250	170
Conference center	Person	6–10	8	40–60	30
Department store	Toilet room	350–600	400	1300–2300	1500
	Employee	8–15	10	30–57	40
Hotel	Guest	65–75	70	150–230	190
	Employee	8–15	10	30–57	40
Industrial building (sanitary waste only)	Employee	15–35	20	57–130	75
Laundry (self-service)	Machine	400–550	450	1500–2100	1700
	Customer	45–55	50	170–210	190
Mobile home park	Unit	125–150	140	470–570	530
Motel (with kitchen)	Guest	55–90	60	210–340	230
Motel (without kitchen)	Guest	50–75	55	190–290	210
Office	Employee	7–16	13	26–60	50
Public lavatory	User	3–5	4	11–19	15
Restaurant					
Conventional	Customer	7–10	8	26–40	35
With bar/cocktail lounge	Customer	9–12	10	34–45	40
Shopping center	Employee	7–13	10	26–50	40
	Parking space	1–3	2	4–11	8
Theater (indoor)	Seat	2–4	3	8–15	10

[a] From Metcalf & Eddy (1991), Salvato (1992), and Crites and Tchobanoglous (1998).