

Appendix E



WATER RESOURCE ENGINEERING ASSOCIATES

CONSULTING CIVIL AND ENVIRONMENTAL ENGINEERS IN WATER AND WASTEWATER
COLLECTION, CONSERVATION, DISTRIBUTION AND TREATMENT

July 24, 2019

Town of Windsor, Sonoma County, CA
Attn: Community Development, Planning Division
9291 Old Redwood Hwy
Windsor, CA 95492

RE: Water Demand Study – 8685 Old Redwood Highway, Heritage Park Multi-Family
Residential Development (Project)

Dear Sir or Madam,

Per your request, WREA herein estimates the Water Demand for the above Project as follows:

Per M & E Table 3-2, Apartment, 120 gal/bed/day and County of Sonoma OWTS
Manual, Table 4.5, May 2019 (attached).

Unit Type	#	Demand/Unit	Total (GPD)
1 Bed	2	120	240
2 Bed	17	240	4080
3 Bed	14	360	5040
Totals	33		9360 GPD

Estimates are for interior, residential use only.

Total estimated Water Demand is:

9,360 GPD x 365.25 days/yr = 3,418,740 GPY = 10.5 AFY

Prepared by:

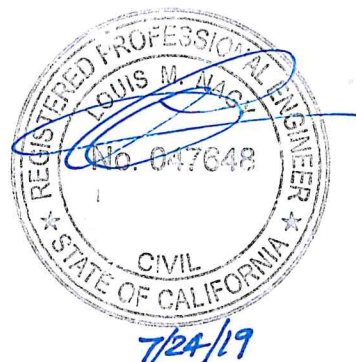
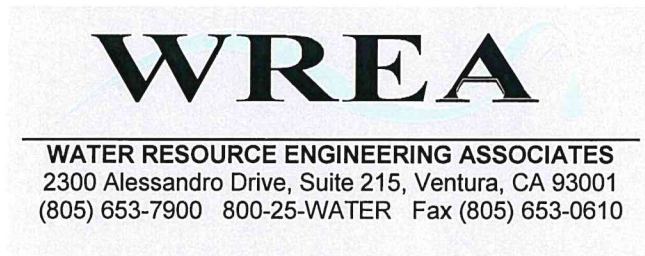


Table 3-2Typical wastewater flowrates from commercial sources in the United States^a

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 Adapted from Metcalf & Eddy (1991), Salvato (1992), and Crites and Tchobanoglous (1998).

**Table 4.5 – Wastewater Design Flows for
Single Family Residences and Second Unit**

Number of Bedrooms	Design Flow (gallons per day)
1	120
2	240
3	360
4	480
5	600
greater than 5	+ 60 per bedroom

C. Wastewater flows used for the design of OWTS for multiunit residences and non-residential projects shall be developed based on full consideration of projected activities, occupancy, and facilities. Table 11.1 provides guidelines for use in estimating design wastewater flows. Wastewater flows shall be determined by:

1. Table 11.1 for those listed facilities; or
2. Appropriate literature references (for example US/EPA) for the type of facility proposed; or
3. Documented wastewater flow monitoring data for a comparable facility. Additionally, the Director of the Permit Authority may consider adjustment to the criteria listed in Table 11.1 for specific facilities based upon documented technical information to support the proposed design flow estimate.

D. Reductions of wastewater design flows up to 20 percent for dwelling units constructed prior to 1998 shall be approved by the Permit Authority Well and Septic Section when each of the following is provided:

1. Low flow devices for toilets, showers and faucets are installed in the structure under permit;
2. The septic tank shall be fitted with a corrosion-resistant effluent filter approved by the Permit Authority;
3. The leachfield shall be either:
 - a. a dual leachfield with each half designed at 75 percent of the reduced design flow (either 50 percent or 150 percent additional reserve replacement area must be provided based upon the date the lot was created); or
 - b. a dispersal field using equal distribution. The dispersal field shall be sized based upon 100 percent of the reduced flow.

4.6 OWTS Locations and Off-Site Easements

A. OWTS shall be constructed, or designed to be placed, on the same legal parcel containing the structure(s) intended to be served by the OWTS.

Table 11.1 – Multiunit and Non-Residential Design Flow Rates

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports	5 per passenger
Campgrounds with central comfort station	35 per person
Campgrounds 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 with Kitchen waste (multi-use utensils)	5 per meal served
Restaurants with 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 waste
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