
***DOMESTIC WATER SYSTEM
REPORT
FOR
YOUNG NAK CHURCH
CHRISTIAN RETREAT CENTER***

Located in
Lake Hughes, CA

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Prepared By:



Water Resource Engineering Associates
2300 Alessandro Drive, Suite 215, Ventura, California 93001
805.653.7900 • Fax: 805.653.0610 • 1-800-25-WATER
www.wreassoc.net

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BACKGROUND

The Young Nak Church Christian Retreat Center (Center) project will consist of the construction of additional facilities at an already developed site. These facilities will include: a parking area, office building, dormitory, cafeteria, swimming pool, outdoor amphitheater, chapel retreat center, and two meeting rooms. Additional improvements include the paving of several existing dirt roads. Several of these improvements will have a direct impact on the property's private potable water system. In an effort to comply with Los Angeles County Planning and Health Department requirements, a reliable method of supplying and distributing potable water of acceptable quantity and quality to the proposed facilities must be developed.

It is the intent of the Center to permanently develop and operate the Christian retreat center year round. As we know to be true of all retreat center/campground type facilities, it is likely that the population of visitors will vary throughout the year. Population variations will range from the two to three, year round resident staff members, to a maximum 250 people at any one time. Water flow demand and usage will vary accordingly.

WATER SUPPLY

The Center has an existing water system that uses a groundwater well located on the property. This well has been studied and will continue to be used for the existing facilities, as well as the proposed facilities.

Groundwater Well

Investigation was made on the availability of groundwater to supply the facility. Integrated Water Resources (IWR) Groundwater Consultants of Santa Barbara, CA was commissioned to study the feasibility. (Appendix Pages A1 – A18).

Based on their analysis, IWR indicates that the site improvements proposed by the Center would have no significant impacts to groundwater, water quality, or the riparian wetland habitat.

WATER USAGE CATEGORIES, ESTIMATED ANNUAL USAGE

Potable water usage at the Center includes domestic and non-potable uses, which are categorized in the following sub-categories. Water usage estimates were calculated and are shown on Appendix Pages B. They are also listed in the text below.

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Domestic Uses

Individual

Domestic water for such functions as drinking, handwashing, showering, personal food preparation, and toilet flushing will be used by the individual residents and part-time visitors made up of small children, high school/college age kids, small group adults and pastors. Anticipated population figures are used to determine the maximum day demand (MDD) of 22,613 gallons, or 25.3 acre feet per year (AFY)

Non-Domestic Uses

Fire Protection

The Center has a fire protection system that is separate from this domestic system in its entirety. No attempt to quantify usage for the Center's fire protection system was made, as it was not necessary.

Landscape Irrigation

There are no automatic sprinkler systems onsite. Any natural brush that may occasionally require water is attended to manually. Because the impact of this water usage is minute, it is not included in this report.

PERMIT REQUIREMENTS

Definition and Statutory Requirements

A domestic water system such as this is defined as a "Non-Community, Transient, Public Water System" type water purveyor per California Waterworks Standards (CWS), California Administrative Code, Title 22, Division 4, Section 64555-23.

As such, the Center is required to comply with all aspects of the CWS, and that of the local agency and code governing water systems of the Center's size, the Los Angeles County Department of Environmental Health¹, as well as certain functions governed by the California Department of Public Health Services

¹ The Los Angeles County Fire Department imposes the additional requirement of fire flow and fire protection storage. These are not discussed herein as the Center's fire protection system will be a separate standalone system and is covered in a separate report.

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(CDPH). Additionally, the Center will be required to meet water quality requirements set by the California Safe Drinking Water Act as administered by CDPH and EHD.

Permit Requirements

The Center will be required to hold a permit to operate a domestic water system and purvey domestic water from LA County EHD and CDPH, obtained in the following manner:

Within the Permit Application, the Center will be required to submit certain compiled documents to EHD and CDPH as follows: A Technical, Managerial, and Financial (TMF) report outlining a system operation description, managerial and ownership hierarchy (responsible parties) and financial requirements (how the continuous operation, maintenance and replacement functions of the system are to be funded); a Drinking Water Source Assessment and Protection Report (DWSAP) in which contamination hazards and reliability are assessed.

System Construction Permitting

The Center's system is privately owned and entirely on private property, consequently any system improvement construction will require a Los Angeles County Building Department Permit.

Ongoing Operation and Reporting

Once the system is in operation, the California Code of Regulations, Title 17 requires that a State certified water system operator be retained. The water system must be under the operational control of this appropriately certified operator in order to "...assure reliable compliance with drinking water standards" (Title 17).

Testing for specific constituents will be required on a periodic basis, with results reported to the EHD and CDPH. The County and State have the authority to force a public water system to cease operation as a result of non-compliance.

PROJECT SPECIFIC DESIGN REQUIREMENTS

Supply

It is common engineering practice to calculate flow rates for domestic unit usage GPD by multiplying wastewater flows by a factor of 1.25. Wastewater flows for

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this project were calculated based on accepted engineering standards adapted from 2007 California Plumbing Code, Table K-3. It was also necessary to use Metcalf and Eddy's 2003 Wastewater Engineering, Treatment and Re-Use, 4th Edition, Tables 3-2 through 3-4.

Storage

CWS requirements for minimum storage for systems with less than 1,000 service connections to equal or be greater than MDD, unless the system can demonstrate that it has an additional source of supply that can meet the MDD requirement.

System Demand

Since the Center's system is a private system on private property, it is subject to the California Plumbing Code (CPC) which outlines procedures for calculating required instantaneous demand flow rate based on type and quantity of fixtures. A fixture unit analysis was compiled indicating approximately 820 fixture units, equating to a required instantaneous demand rate of 182 GPM (Appendix Page D). Conversely, using CWS standards peak hourly demand (PHD) can be calculated using the hourly average flow during MDD and multiplying by a minimum 1.5 peaking factor. Using this method derives a PHD of 24 GPM. For the purposes of this report, the greater of the two methods will be used.

Distribution

Design of and materials used for domestic water distribution system improvements will be subject to CPC and CWS standards. The distribution system will consist of pipe, valves and appurtenances of sufficient size to provide delivery of adequate flow and pressure to all points on the system.

Water Quality

The Center system will be required to complete periodic testing to show that the supply water meets or exceeds primary and secondary water quality standards pursuant to California Administrative Code Title 22.

Sanitary Requirements – Cross Connection Control

The Center has the responsibility to prevent contamination of the public water system by backflow. This responsibility begins at the source and includes the entire water supply and distribution system.

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The Center must also maintain minimum adequate pressure (20 psi) per Title 22 in the distribution system to minimize the potential for backsiphoning contaminants into the system.

Title 17 of the California Administrative Code requires that all connections to a domestic water system that have a potential to contaminate or backsiphon into the supply be fitted with approved backflow prevention devices to prevent contaminated water from entering the system.

COMPARISON OF REQUIREMENTS VS. PROPOSED SYSTEM CAPACITIES

Supply

A 110' deep groundwater well currently exists at the site. The well is located approximately 560' southerly of the Pine Canyon Road, and 640' east of the west property line.

A constant flow rate of approximately 17 GPM is available. The existing water supply well has been able to provide potable water for the Center without any long-term stress to the aquifer.

Storage

A single 20,000 G storage tank provides storage for the Center's system.

System Demand

System demand is met by the gravity flow system, capable of supplying 182 GPM at a minimum 20 pounds per square inch (psi) delivery pressure. The system will meet or exceed the requirements to deliver PHD.

Distribution

The distribution system is comprised of a combination of 4", 3" and 2" Class 150 AWWA C-900 PVC or Schedule 80 PVC pipe, valves, fittings, thrust blocks, and all other required appurtenances.

Water Quality

Test results have shown that the water meets all Title 22 primary and secondary requirements for supply. The Center will have the number of required sample stations for required system-wide sampling.

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The licensed operator retained by the Center will be responsible for the sampling, testing and reporting required by CDPH and EHD.

SYSTEM OPERATION DESCRIPTION

System Demand

Starting with a full condition, the 20,000-gallon tank supplies system demand through the gravity distribution system. When the tank level falls below a field set pre-determined point, a level control unit sends a signal to the pump switchgear to energize the well pump. The well pump begins discharging first to atmosphere through a pump control valve, which starts in a fully open position, slowly closing, eventually sending all water to the tank. The well pump continues to operate until the tank level reaches a field set pre-determined point at which time the level control sends a signal to the pump switchgear to begin the de-energize sequence. The pump continues operation while the pump control valve slowly opens tripping a microswitch, de-energizing the pump.

SUMMARY

The Center water system as presently proposed and described herein, will meet the requirements of all Local and State involved agencies, and will be designed to meet all Local Codes and Ordinances to provide reliable operation in regards to supply, storage, demand, distribution and water quality.

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APPENDIX

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MAXIMUM DAY WATER USAGE CALCULATIONS

<i>Description</i>	<i>People Quantity/Day²</i>	<i>Unit Usage GPD⁶</i>	<i>Max. Wknd. DayUsage G</i>
Overnight Guest in Dormitory	96	62.5	6000
Overnight Guest in Cottages (Mobile Homes)	120	75	9000
Daytime Attendee	28*	25	700
Caretaker	2	125	250
Daytime Staff (Commuting)	4	25	100
Cafeteria/Dining Hall	750 meals/day	8.75	6562.5

Sub Total Domestic Individual Uses = 22,612.5 22,612.5 MDD

*Population variations will range from the two to three, year round, resident staff members, to maximum 250 total visitors at any one time during the months of July and August.

² Population figures provided by Mr. Jay Kim, email correspondence dated February 6, 2008. Maximum day population is 250 ppl.

⁶ Flow rates for domestic unit usage GPD were calculated by multiplying wastewater flows by a factor of 1.25. The wastewater flows are based on accepted engineering standards adapted from 2007 California Plumbing Code, Table K-3 & Wastewater Engineering, Treatment and Re-Use, 4th Edition, Tables 3-2 through 3-4, Metcalf & Eddy, 2003

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PLUMBING FIXTURE LIST

Description	Appliance	# Of Fixtures	Private FU Weight	Total FU Demand
Chapel Building				
	Water Closet	4	3	12
	Lavatory	4	1	4
Cafeteria				
<i>Kitchen</i>	Utility Sink	3	4	12
	Commercial Dishwasher	1	4	4
<i>Restroom</i>	Water Closet	10	3	30
	Urinals	3	2	6
	Lavatory	6	1	6
Pool area				
<i>Restroom</i>	Water Closet	6	3	18
	Urinals	3	2	6
	Lavatory	4	1	4
	Shower	4	2	8
Dormitory				
	Water Closet	24	3	72
	Shower	24	2	48
	Lavatory	48	1	48
	Kitchen Sink	1	1.5	1.5
	Clothes Washer	2	4	8
Small Meeting				
	Water Closet	2	3	6
	Lavatory	2	1	2
Mobile Dwelling Units				
	Kitchen Sink	11	1.5	16.5
	Lavatory	19	1	19
	Water Closet	19	3	57
	Shower	19	2	38
Caretaker Residence				
	Kitchen Sink	1	1.5	1.5
	Lavatory	2	1	2
Structure Near Caretaker Residence Pending CUP Approval				
	Lavatory	7	1	7
	Water Closet	7	3	21
Rest Rooms Near Outdoor Amphitheatre				
	Lavatory	5	1	5
	Water Closet	8	3	24
	Shower	6	2	12

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PUBLIC USE- FIXUTE UNIT ANALYSIS

FIXTURE TYPE	GENERAL USE ³		HEAVY-USE ASSEMBLY ⁴		TOTAL
	WEIGHT ¹	NO. FIXTURES	WEIGHT ¹	NO. FIXTURES	
Bar Sink	2		-		
Bidet	-		-		
Clinic Sink	8		-		
Clothes Washer	4	2	-		8
Dental Unit, cuspidor	1		-		
Dishwasher	1.5	1	-		1.5
Drinking Fountain	0.5		0.75		
Hose Bibb	2.5		-		
Hose Bibb (each additional)	1		-		
Ice Maker	2		-		
Kitchen Sink	1.5	16	-		24
Laundry Sink	2		-		
Lavatory	1	97	1		97
Lawn Sprinkler	1		-		
Mobile Home, each	-		-		
Shower / Tub	2		-		
Shower, continuous	5	53	-		265
Urinal Flush Tank	3		4		
Urinal, 1.0 GPF	4	6	5		24
Urinal, greater than 1.0 GPF	5		6		
Utility Sink	3		-		
Wash fountain, circular spray	4		-		
Wash-up Sink, each set of faucets	2		-		
Water Closet	5	80	8		400
Water Closet 1.6 GPF Flushometer Tank	2.5		3.5		
Water Closet 1.6 GPF Flushometer Valve	5		8		
Water Closet, 1.6 GPF Gravity Tank	2.5		4		
Water Closet, 3.5 GPF Gravity Tank	5.5		7		
Water Closet, 3.5 GPF Flushometer Valve	8		10		
Whirlpool Bath or Combination Bath/Shower	-		-		
TOTAL FIXTURE UNITS =					819.5

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PUBLIC USE- FIXUTE UNIT ANALYSIS

819.5 F. U. = 182 GPM²
(Flush tank)

1. Demand weight per Uniform Plumbing Code – Table A-2
2. Uniform Plumbing Code – Demand Charts A-2 & A-3
3. “General use” applies to business, commercial, industrial and assembly occupancies other than those defined under “Heavy-use”.
Included are the public and common areas in hotels, motels, and multi-dwelling buildings.
4. “Heavy-use assembly” applies to toilet facilities in occupancies which place a heavy, but intermittent, time-based demand on the water supply system such as schools, auditoriums, stadiums, race courses, transportation terminals, theaters, and similar occupancies where queuing is likely to occur during periods of peak use.

Prepared by:

The logo for Water Resource Engineering Associates (WREA) features the letters 'WREA' in a bold, serif font. A stylized blue water droplet is positioned to the right of the 'A', and a light blue wave-like graphic is behind the letters.

WATER RESOURCE ENGINEERING ASSOCIATES
2300 Alessandro Drive, Suite 215, Ventura, CA 93001
(805) 653-7900 800-25-WATER Fax (805) 653-0610
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