

County Service Area 23
Santa Margarita, CA
Water System Master Plan 2003
Storage Needs Calculation Addendum
December 20, 2005

According to American Water Works Association Manual 32, "Distribution Network Analysis for Water Utilities", system storage is made up of three components as shown in Table 1. Upon review of several master plans for water systems throughout the County, it was found that they all include these three components in their calculation of water storage needs.

Table 1: Components of Water System Storage

Component	Description	Typical Calculation ¹
Equalization	Amount to limit pump cycling to off-peak energy periods or to cover demands in excess of pump capacity	$(1.5 * \text{Max Day Demand} - \text{Rate of Supply}) * 14 \text{ hours}$ or 25-50% of Max Day Demand
Fire	Amount needed to suppress the highest fire flow requirement in the system	Largest required flow * length of time
Emergency	Amount to provide water during emergencies such as pipeline failures, equipment failures, power outages, supply contamination or natural disasters	Based on system risk assessment; typically 25% to 100% of Max Day Demand or 50 gpd/capita for three days

Equalization: Since the rate of supply (27,000 gph) exceeds the maximum daytime demand (26,250 gph) in Santa Margarita at build-out, the equalization storage component is used to limit pumping to off-peak hours in order to save energy costs and wear on the pumps. Current equalization storage is about 80,000 gallons, or 21% of maximum day demand. Using the typical calculation of 25% of maximum day demand at build-out, the equalization storage component is 105,250 gallons. This volume may require adjustment if Santa Margarita participates in the State Water Project.

Fire: Table 2 outlines the critical fire flow requirements for Santa Margarita. The highest fire flow requirements are for the Oak Creek Lumber and Ranch Supply facility, and the building occupied by Eagle Energy and Switzer Diesel Repair.

Table 2: Santa Margarita Fire Flow Requirements

Location	Requirement
Commercial (G Street)	2,750 gpm for 2 hours at 20 psi
School (East H Street)	2,000 gpm for 2 hours at 20 psi
Residential	1,000 gpm for 2 hours at 20 psi

The fire storage component for Santa Margarita is 330,000 gallons (2,750 gpm * 60 min/hr * 2 hrs). It is important to properly protect the existing buildings in Santa Margarita in order to minimize the potential for the fire to spread to other buildings in the community.

¹ Typical calculations used in Water System Master Plans for Paso Robles (Boyle Engineering), Atascadero (Boyle Engineering), Arroyo Grande (John Wallace and Assoc.) and CMC (Carollo Engineers)

Emergency: Since Santa Margarita is subject to earthquakes and fires, and the wells are subject to surface water influence, it is important to have an emergency component to the storage system. There is a potential for a fire to break out under emergency conditions such as an earthquake, a regulatory shutdown of the wells due to water quality violations, limited operation of the wells due to drought, power outages, or general breakdown of the wells. The emergency component of storage for Santa Margarita is 210,000 gallons (1,400 people at build-out * 50 gallons per person for 3 days), which is also 50% of maximum day demand.

The storage requirements for Santa Margarita, compared with existing storage, are summarized in Table 3.

Table 3: Storage Needed for Santa Margarita (gallons)

A	Equalization	105,250
B	Fire	330,000
C	Emergency	210,000
D	Total Recommended Storage (A + B + C)	645,250
E	Welded Steel Tank	150,000
F	Bolted Steel Tank	157,500
G	Total Existing Storage (E + F)	307,500
H	Additional Storage Needed (D – G)	337,750