

County Service Area 10A
 Cayucos, CA
 Water System Master Plan 2003
 Storage Needs Calculation Addendum
 April 5, 2007
 Revised May 11, 2009

Build-out demand estimate of 215 acre-feet per year (AFY), or 192,000 gallons per day (gpd), approved by the Board of Supervisors on 10/17/06. Maximum Day Demand = 192,000 gpd * 1.5 = 288,000 gpd or 12,000 gph.

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 * Max Day Demand – Rate of Supply) * 14 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 (38,400 gph) exceeds the maximum daytime demand (12,000 gph) in Cayucos 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 53,974 gallons, or 27% of current maximum day demand (199,500 gpd). Applying this to the maximum day demand at build-out, the equalization storage component is 77,800 gallons.

Fire: Table 2 outlines the critical fire flow requirements for Cayucos based on discussions with Cayucos Fire Chief Bill Radke. The highest fire flow requirement is for the small commercial area on Ocean.

Table 2: Cayucos Fire Flow Requirements

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

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)

The fire storage component for Cayucos is 240,000 gallons (2,000 gpm * 60 min/hr * 2 hrs). It is important to properly protect the existing buildings in Cayucos in order to minimize the potential for the fire to spread to other buildings in the community.

Emergency: Since Cayucos is subject to earthquakes and fires, and relies on the Whale Rock Reservoir and dam, 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 Treatment Plant due to water quality violations or operational problems. The emergency component of storage for Cayucos is 289,000 gallons (1,927 people at build-out * 50 gallons per person for 3 days), which is also 100% of maximum day demand.

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

Table 3: Storage Needed for Cayucos (gallons)

A	Equalization	77,800
B	Fire	240,000
C	Emergency	289,000
D	Total Recommended Storage (A + B + C)	606,800
E	Welded Steel Tank	210,000
H	Additional Storage Needed (D – E)	396,800