Oceano Community Services District

Prepared by

WALLACE GROUP®

July 2009
Water Master Plan Update

Updated December 2019
by Cannon Corp.

CHAPTER 1

INTRODUCTION

This report is an update to the Oceano Community Services District (District) 2004 Water Master Plan (WMP) prepared by Garing, Taylor, and Associates (GTA). As this is an update to the 2004 WMP, the 2004 report is included on CD-ROM as Appendix A.

ACKNOWLEDGEMENTS

Wallace Group thanks and gratefully acknowledges the following District staff for their efforts, involvement, input, and assistance in preparing this water master plan update:

Kevin Walsh, General Manager
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The following Wallace Group key team members were involved in the preparation of this WMP update:

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CHAPTER 2

STUDY AREA CHARACTERISTICS

This chapter describes the study area characteristics and the basis of evaluation relevant to this water master plan update, including the District's boundary, existing and future population estimates, and a summary of the anticipated growth within the District service area.

BACKGROUND

The District is located immediately to the south of Grover Beach and Arroyo Grande with the Pacific Ocean to the West in the County of San Luis Obispo. Formed in November 1980, the District took over several responsibilities of the County and now provides water, street lighting, sewage collection, garbage collection, fire protection and basic life support services, and parks and recreation services. The County is responsible for roads, drainage, land use planning, and general services. The service area (illustrated in Figure 2.1) has not changed since 1980 and borders directly with the Arroyo Grande CSD and the City of Grover Beach to the north. The District encompasses approximately 1150 acres with elevations ranging from sea level to approximately100ft.

Figure 2.1 District Service Area and Adjacent Areas

LAND USE

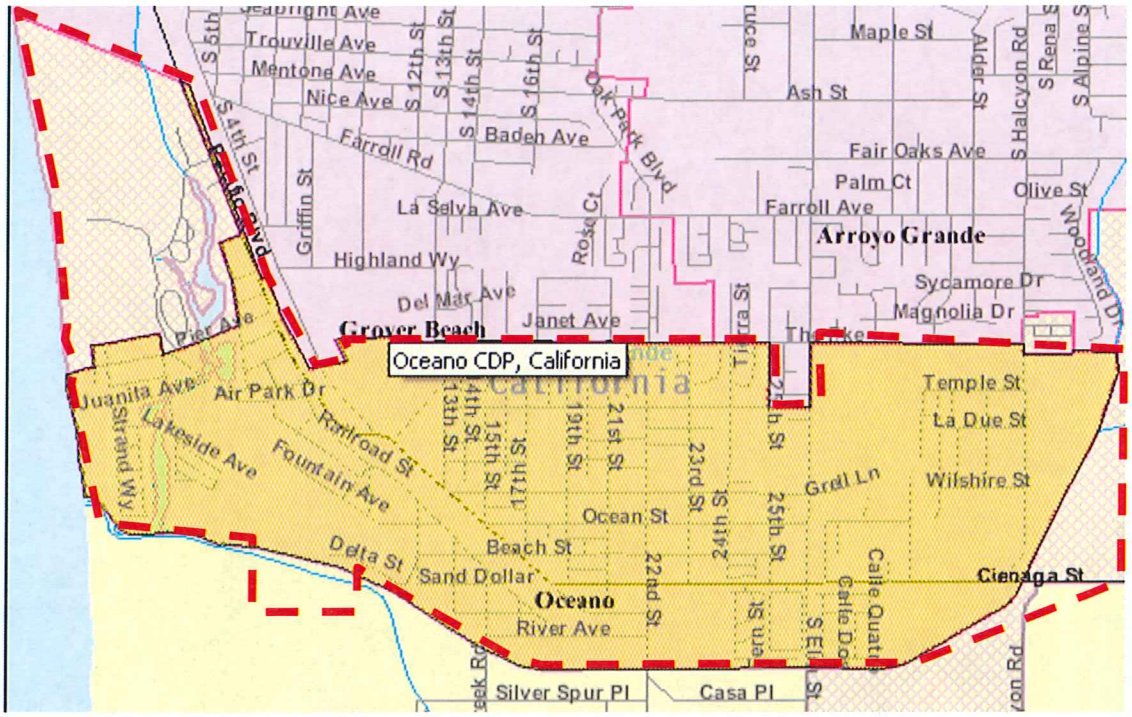
The current District land uses are accurately summarized in the G&T 2004 WMP.

EXISTING POPULATION

The population of the District service area for water and wastewater services has a large impact on the use of and demand for those services. Determining the service population is not always a simple process and estimates are key components to forecasting system and community needs. Population can be estimated with several different approaches. Consideration must also be given to those provided water and sewer service living outside the official District boundary.

Figure 2.2 shows the Census Designated Place (CDP) in orange and the District's service area shown by the dashed red line. While they are not an exact match, most of the additional area included by the CDP is undeveloped. Also, there are other areas the District provides water and/or sewer service which are outside the District Boundary and the CDP. While the service population and the CDP are not the same, the 2000 census still provides a reasonable estimate of the typical household size and a population of 7260 within the service area can still be used as a base point for population estimates.

Figure 2.2 Oceano Service Area Compared to Census Designated Place



Currently the district provides water service to Crest Canyon (54 units), the Christie Family property (4 units), other parts of Arroyo Grande (137 units) for a total 577 people. Sewer service is also provided to customers outside the District. The district provides sewer collection for Paul Place and Russ Court (39 units) which contains approximately 115 people. The current population can be estimated several ways, detailed as follows:

1. 2005-2006 County General Plan: Appendix A of the 2005-2006 County General Plan (General Plan) estimated the population of Oceano at 7,446 in 2005 and projected it to be 7,826 in 2010. From this, it is reasonable to interpolate a population of 7,750 in 2009 within the District. By adding the population outside the District boundary we can estimate the total water service population to be 8,327.

2. 2004 Draft Water Master Plan: The 2004 Draft Water Master Plan uses the 2000 Census population of 7,260 as a basis of calculation. With the county projected growth rate of 1.69%, the draft plan estimates the 2005 population to be 7,877. A reasonable approach would be to extrapolate this projection to estimate the 2009 population to be 8,442. While this is the population used in the previous WMP it does not account for the service provided to Crest Canyon and Christie Family outside the District. After adding the 172 people receiving service outside the service area the resulting population estimate would be 8,614.

3. Water Billing Information: The previous two estimates are based on projected estimates rather than current information. The most up-to-date information the District has concerning its customers is billing information. Billing information can be used to estimate population by multiplying the household size of 2.96 by the 2,944 residential units with water service to obtain a total population served of 8,714 people. The internal District population can be back calculated by subtracting out the 577 customers outside the District to arrive at a population of 8,137.

Of the three population estimating methods described above and summarized in Table 2.1, the water service based approach uses information that is both current and produces the most conservative estimate so will be used as the basis of analysis throughout the remainder of the report.

Table 2.1 Current District Population

Estimation Method	District	Water Customers
General Plan	7,750	8,327
2004 WMP	7,865	8,614
Water Billing	8,137	8,714

While the preceding approach works well to estimate current population, the District's population in 20 years and at build-out will also impact water system planning.

FUTURE POPULATION

Though the G&T 2004 WMP estimates future population, the update population information warrants an updated approach and estimates. It is worth noting that population projections can be developed in a number of different ways, and thus discrepancies between County and District population estimates will exist.

The 2002 Oceano specific plan estimates the build-out population under the existing County General Plan to be 9,601 (considerably less than the 12,184 referenced in the 2004 WMP).

Although the Oceano specific plan recognizes that the build-out population is often never reached because it represents a maximum, the population provided water service can be larger than the build-out population because land use within the District can be rezoned, the service area of the District can expand, and the District can provide service to people outside its service area. Current water service agreements already add 577 users not included in the Oceano Specific Plan. The combination of rezoning and expanded service area (Ellsworth Annexation) will add another 3,131 users (2004 WMP). Further, agreements beginning January 2010 with the Grand Mobile Manor (34 units using approximately 4.0 AFY) and Halcyon Estates (25 units using approximately 5.0 AFY) will raise the effective population (assuming 1.6 people per unit) by 94 users. Since the District creation it has been providing water to users outside the District. Beyond the current agreements and ones beginning in 2010 there are no others planned.

The General Plan contains population projections to 2030. From this data we can back calculate an average population growth rate of 0.67% that can be applied to the District's current population. By this method the current population of 8,714 (plus the additional 94 customers outside the service boundary) will increase to 10,134 in 2030.

Since population projections by year are difficult, a build-out population estimate provides additional perspective of potential future demands. Further, these populations correlate to the construction of new units within the District service area. Even if the year's population is no longer representative of the District projected population, the number of new units since 2009 can be used to project water demand. The build-out population for the District may be affected heavily by the rezoning of agricultural land for residential housing. Build-out population of the existing service area was calculated to be as much as 12,184.[1] If the zoning changes, the District expands service area, and/or outside District agreements are carried out the effective build-out population served could be as much as 15,986.[1] Several key populations and their corresponding unit equivalent are summarized in Table 2.2 and all other populations required for this report will be calculated from this data. This master plan update is based on a build-out population of 12,855.

Table 2.2 Calculated Populations

Year	Population	Additional Units
2000	7,260	-
2009	8,714	-
2010	8,863	50
2015	9,141	144
2030	10,033	446
Build-out same zoning	12,855	1,399
Build-out rezoning	15,986	2,457

CHAPTER 3

WATER DEMAND

The 2004 WMP utilizes historical and projected per capita demand to project current and future demand types. The availability of up to date population and water demand warrants an updated analysis.

HISTORICAL DEMAND

Table 3.1 updates the District's water demand and per capita use from 2003 to 2008. While total production is rising over time as would be expected with population growth the per capita demand continues to fall. This can be seen more clearly when compared to Table 4 of the G&T WMP.

Table 3.1 Water Demand

Year	Population	Demand	Demand
-	-	gpcd	AFY
2003	8,117	100	910
2004	8,215	103	953
2005	8,324	100	933
2006	8,422	94	885
2007	8,519	97	925
2008	8,617	97	934
Average	8,369	98	923

HYDRAULIC DEMAND PARAMETERS

Water system demands are important characteristics of water systems, as these parameters are used to size pumping, storage, and distribution facilities. Each community's water system exhibits unique characteristics that must be calculated and identified in order to better evaluate existing and future water distribution system requirements. Hydraulic demand parameters are defined as follows:

Average Day Demand (ADD): The ADD is the average water demand calculated over the year. This demand is generally determined by production records. The ADD is used also to determine the average per capita demand, which in turn is used to project future water system demands based on anticipated population growth. Based on an average of the production records from 2007 to 2008, the ADD is 802,000 gpd (0.8 MGD) for the District.

Maximum Day Demand (MDD): The MDD is the maximum daily production of water needed to meet the peak day demand of the year. This is generally occurs during the summer as a result of increased irrigation, seasonal occupancy, and construction water demand. The MDD occurred on July 6, 2008. The MDD was 1,331,000 gpd (1.3 MGD), which results in a peaking factor of 1.7 (1.7 times ADD).

Peak Hour Demand (PHD): The PHD of the system is critical in sizing water mains and pumping facilities. During peak hour demand, customers will generally experience low service pressures in areas with undersized mains and/or lack of looped distribution pipelines. The PHD can be determined by calculating the specific demand within the day while monitoring tank levels and pumping records. In many municipal systems the calculation of this parameter is difficult to ascertain. This is the case with the District. Therefore, based on engineering judgment, a PHD factor of 3.5 (3.5 times ADD), was assigned to the entire distribution system for a total of 2.8 MGD (1,950 gpm).

Table 3.2 summarizes the hydraulic demand parameters and their respective peaking factors that will be used as the basis for evaluation of the District's distribution system.

Table 3.2 Hydraulic Demand Parameters

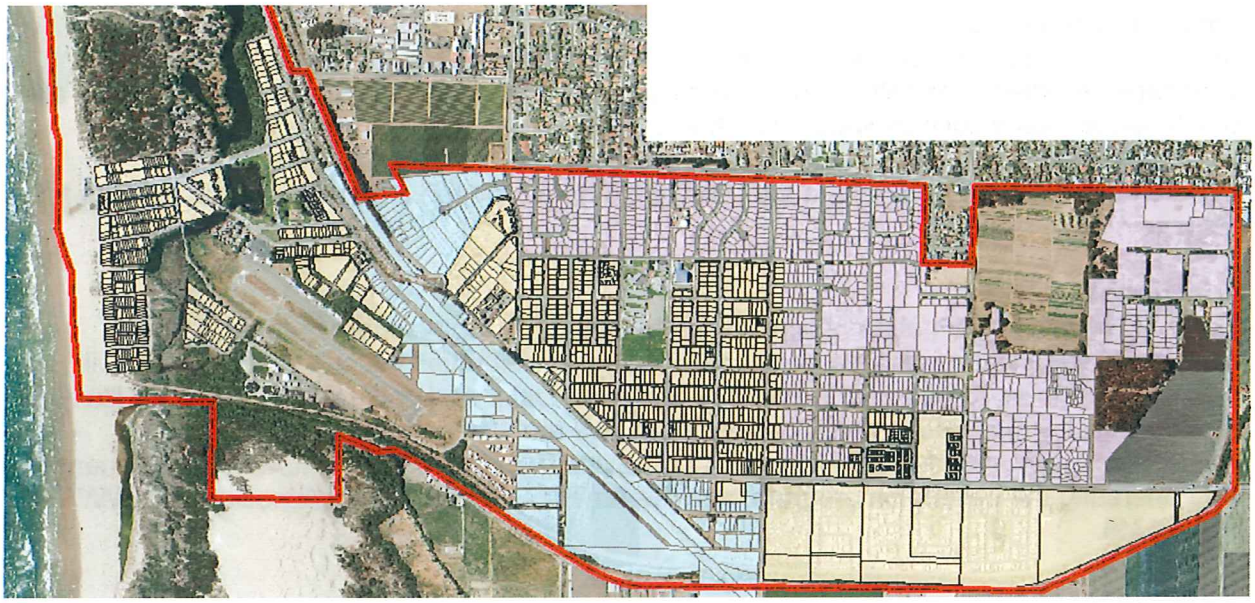
Demand Condition	Peaking Factor	Existing Demand (mgd)
Average Day Demand (ADD)	-	0.8
Maximum Day Demand (MDD)	1.7	1.3
Peak Hour Demand (PHD)	3.5	2.8

Fire Flow Demand (FF): FF requirements of the system change throughout the District's service area, depending on the nature of the buildings in the vicinity. For the purpose of this analysis, the land use designations will be used to determine FF requirements. The flow rate and duration requirements by Land Use Zone are summarized in Table 3.3 as determined by the California Fire Code and depicted in Figure 3.1.

Table 3.3 Fire Flow Requirements by Land Use

Land Use	Fire Flow, gpm	Duration, hrs	Fig 3.1 Shading
RSF	1,000	2	Pink
RMF	2,500	2	Tan
Commercial Retail	2,500	3	Tan
Commercial Service	3,500	3	Blue
Industrial	3,500	4	Blue

Figure 3.1 Fire Flow Requirements



UNACCOUNTED FOR WATER USE

Not all water that enters the distribution system is metered out to customers. Unaccounted for water (UAW) is the difference between the metered water production and the metered water deliveries. Table 3.4 updates produced, metered, and UAW data for the District since 2003.

Table 3.4 Unaccounted for Water (UAW)

Year	Produced	Metered	UAW	
-	AFY	AFY	AFY	%
2003	910	840	69.9	7.7%
2004	953	867	86.1	9.0%
2005	933	843	89.8	9.6%
2006	885	821	63.3	7.2%
2007	925	850	74.5	8.1%
2008	934	815	119.1	12.8%

The AWWA Manual 32 states that municipal water system ranges for UAW are typically between 10 and 15 percent. The District compares well to these typical values averaging about 9% UAW over the last 6 years. By definition it is difficult to determine where UAW is going but it is typically comprised of several factors including leaking pipes, unmetered services, inaccurate meters, illegal connections, and normal operation and maintenance activities (such as line flushing).

Leaking Pipes

Capital improvement programs based on good records on the age and condition of the water system, along with scheduled replacements, are some of the best means of preventing leaking

pipes. Alternatively, real time remote data collectors for all meters can used to find leaks, but would require significant investment in new meters, infrastructure, and software.

Unmetered Services
This is the most easily prevented cause UAW and include, but are not limited to, parks or landscaped medians, miscellaneous construction use, water used for fire events, operation and maintenance needs such as water main flushing. Wherever possible these uses should be metered (except fire flows), or at least estimated and documented. If there are known unmetered facilities or practices, a method should be developed for metering and charging for this use.

Inaccurate Meters
Faulty or un-calibrated meters can be limited by running a replacement and recalibration program based on good records about meter age and calibration history. Water meters will typically need to be replaced at least every 15 years. Older and undersized meters are likely to underestimate consumption resulting in higher UAW and lost revenue. The repair and replacement program should be based on the advice from the meter manufacture, experience from operating the calibration program, and the American Water Works Association (AWWA) Manual M6.

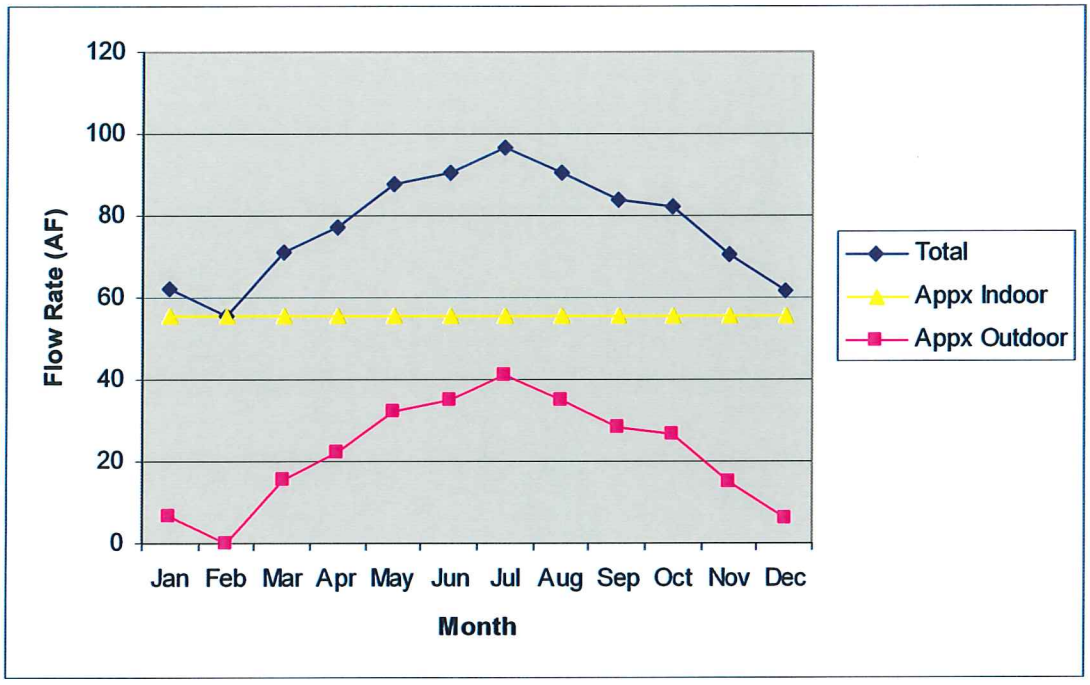
Illegal Connections
Illegal connections are uncommon and difficult to spot but operator awareness of unusual pavement cuts or sudden changes in water use on an existing account with a large demand can send up a red flag.

Operations
Some of the UAW is required to conduct normal operations and maintenance of a functioning water system. Such uses should be documented when possible.

OUTDOOR WATER USE AND SEASONAL DEMAND

Understanding the relationship between indoor and outdoor water use can be helpful in improving the operation of the District's water system. If it is assumed that the population in Oceano does not change significantly throughout the year and that the majority of water demand in the winter months is for indoor use we can calculate approximate outdoor and indoor water use over the duration of the year. Data from 2007 and 2008 were averaged to create Figure 3.2.

Figure 3.2 Seasonal Cycle of Water Demand



FUTURE WATER DEMAND

Future water demand is determined by changes in population, customer habits, land use, District service area, and climate. The coastal Mediterranean climate is unlikely to change anytime in the near future. The relatively low per capita water demand of the customers is unlikely to change without a significant demographic shift. Therefore, changes in the districts service area, population of customers, and land use will primarily drive the change in demand. All of these changes result in an effectively larger customer base.

As discussed in Chapter 2 the population will increase to approximately 8,863 in 2010 because of these changes. Assuming no new water service agreements outside the District the population and Demand will increase as summarized in Table 3.5.

Table 3.5 Projected Populations and Water Production

Year	Population	Demand AFY	Development, Post 2009 Units
2010	8,863	978	50
2015	9,141	1,009	144
2030	10,033	1,107	446
Build-out same zoning	12,855	1,419	1,399
Build-out rezoning	15,986	1,764	2,457

CHAPTER 4

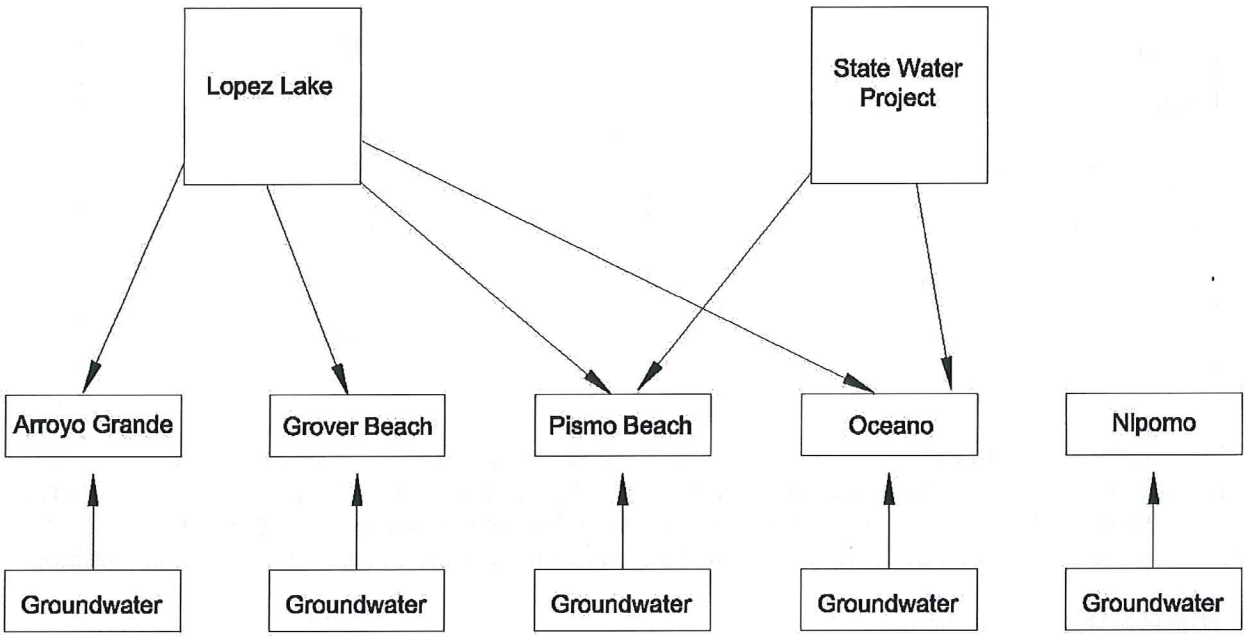
WATER SUPPLY CHARACTERISTICS

This chapter presents an overview of the District's water sources, allocations, review of reliability of water supplies relative to projected future needs, and recommendations for meeting future water supply needs for the District. This chapter updates the 2004 WMP.

WHOLESALE WATER SUPPLIERS

As part of the review of the District's water supply, a brief review of regional water supplies is warranted. The water supply system in the Five Cities area is varied and unique. It utilizes surface, ground and imported water from outside the area. Communities in this area have their own mix of supplies from which they draw (see source/user diagram below). All of the communities produce some portion of their water from their own wells. Some also purchase water from one or more large wholesalers operating in the region. The following is a brief description of the large wholesale water purveyors.

Water Suppliers in the Five Cities Area



Surface Water – Lopez Lake

Lopez Lake is a reservoir managed by the County of San Luis Obispo Flood Control District (Zone 3). The reservoir receives runoff from the Arroyo Grande Creek Watershed. The capacity of the reservoir is 51,990 AF at full capacity. This capacity was reduced to 43,150 AF due to the need to strengthen the dam, however full capacity was restored in June 2002 as part of the seismic retrofit of the dam. In a year of average precipitation, the "normal" inflow into the

reservoir is 10,730 AF. Evaporation is estimated at 2,000 AFY leaving 8,730 AFY available for various uses. Of that amount, a maximum of 4,200 AFY of untreated surface water is required to be released to the Arroyo Grande Creek for downstream users and environmental enhancement. However, based on discussions with the County staff, in recent years, the minimum release from the Dam has been 4.0 million gallons per day, which amounts to 4,480 AFY. The County is in the process of developing a Habitat Conservation Plan that may allow for reduced minimum releases in the future. However, the outcome of such flow reductions is uncertain at this time. The remaining 4,530 AF is available for distribution to water retailers.

A safe yield study conducted in 1984 concluded that the Lopez Lake entitlements, which are summarized in Table 4.1 below, are within the safe yield of the reservoir. Even during the most recent prolonged drought, 1986 to 1992, all communities within Zone 3 received full Lopez Reservoir Entitlement.[xx]

Table 4.1. Lopez Lake Allocations

Water Contractor	Annual Entitlement (AFY)
Arroyo Grande	2,290
Oceano CSD	303
Grover Beach	800
Pismo Beach	896
Avila Valley MWC	12
Avila Beach CSD	68
Port San Luis	100
Other CSA 12 Customers	61
Total	**4,530**

The County is also in the process of evaluating the viability of raising the spillway at Lopez Dam. This study is in the preliminary stages, and the County currently is in the process of confirming which water purveyors may be interested in participating and sharing the cost of such a study. As of the date of this Report, no further update on future viability of raising the dam is available.

Groundwater Extractions

The Santa Maria Groundwater Basin is approximately 250 square miles and extends from the southwest corner of San Luis Obispo County into the northwestern corner of Santa Barbara County. About one third of the basin (50,000 acres) is located in San Luis Obispo County.

The subareas primarily influencing the study area include the Pismo, Oceano and Nipomo Mesa Hydrologic subareas (HSAs) within these HSAs the Tri-Cities Mesa - Arroyo Grande Plain and the Nipomo Mesa watershed areas are of particular relevance. Specific yield of the groundwater basin ranges from 5 to 21 percent with an average of 12%. The Nipomo Mesa has the largest

variation in specific yield values.

In January 1983, four of the local water agencies (Arroyo Grande, Grover Beach, Pismo Beach, Oceano) entered into an agreement outlining pumping rights to the Tri-Cities Mesa Arroyo Grande Groundwater Basin. This agreement is known as the Groundwater Management Agreement (formerly the "Gentlemen's" Agreement). According to the Groundwater Management Agreement, the safe yield of the groundwater basin is 9,500 AFY. A breakdown of the groundwater allocations from the Groundwater Management Agreement is shown in Table 4.2.

Table 4.2. Arroyo Grande Groundwater Basin Allocations

	Acre-Feet
Applied Irrigation	5,300
Subsurface flow to ocean	200
Urban Use:	
City of Arroyo Grande	1,202
City of Grover Beach	1,198
City of Pismo Beach	700
Oceano CSD	900
Total Safe Yield	**9,500**

Arroyo Grande Creek recharges the Tri-Cities Mesa - Arroyo Grande Plain with releases from the Lopez Lake Reservoir. Recharge for the Nipomo Mesa occurs through deep percolation of precipitation and sub-surface inflows.

Groundwater storage above mean sea level has remained constant in the Tri-Cities Mesa - Arroyo Grande Plain over the period between 1975 and 1995, while levels in the Nipomo Mesa have dropped approximately 12% between 1985 and 1995. The declines were not Mesa wide, but were related directly to pumping depressions in those areas.

The California Department of Water Resources (DWR) Water Plan Update 2005 indicates that water budget projections for the Central Coast region show a deficit in overall water storage. Because the majority of potable water on the Central Coast is provided by groundwater, overpumping of the groundwater basins is creating seawater intrusion problems region-wide. Table 4-1 in the DWR Report shows the quantity of water entering the region (by groundwater pumping, surface water extractions, or imported water supply) is less than the water leaving the region, on the order of 1,500 thousand acre feet (TAF) for 2001. It is stated in the 2005 Report that local water agencies must plan for, and maintain, strict water management and conservation strategies in order to continue providing water to their customers. In addition to conservation, the report recommends that local agencies consider supplemental water

supply sources including recycling, groundwater recovery, water marketing and desalination to help meet future water demands.

Local hydrogeologists familiar with the groundwater basins in the study area, indicate that there has been no indication of seawater intrusion from samples taken in the study area. It should be noted that high TDS has been discovered in upper aquifers, but that groundwater seems to be of good quality below 50 feet. As stated earlier, strict management of the groundwater basins will help prevent seawater intrusion problems. Since the South San Luis Obispo County Agencies already operate under an existing Groundwater Management Agreement that ensures pumping allocations are within the safe yield of the groundwater basin, problems with seawater intrusion should not be an issue in the future. Substituting recycled water for agricultural and municipal demands can help ensure that seawater intrusion will be minimized or avoided in future years.

The quality of the water from wells through-out the area is generally considered acceptable for domestic and agricultural uses. The quality of the Nipomo Mesa HSA is generally of a better quality than that found in the other areas and HSAs. There are some exceptions in the Pismo and Oceano Hydrological Subarea, where Total Dissolved Solids (TDS), sulfate, and chloride have been found exceeded drinking water limits in some sampled wells. It is believed that these wells are impaired by irrigation return waters. Water taken from these wells requires additional treatment, and has therefore a greater cost for delivery. Costs associated with the production of groundwater includes: pump and control maintenance and replacement, electrical loading, personnel time and treatment operations.

Imported Water - State Water Project

The California State Water Project (SWP) is operated by the California State Department of Water Resources. Treated water from the SWP is delivered to the region through the Coastal Branch of the aqueduct at the Lopez turn-out. The Central Coast Water Authority (CCWA) treats and distributes the water directly to retailers who have contracts for service. The San Luis Obispo County Engineering Department manages these contracts. Since 1997, the State Water Project Coastal Branch Phase II has delivered water to Central Coast water purveyors in San Luis Obispo and Santa Barbara counties. The central coast system was sized to convey 42,986 AFY, based on 39,078 AFY of contract allocations and 3,908 AFY of "drought buffer" allocations.

Oceano CSD is one of two communities in this area that purchase wholesale water from the SWP. The City of Pismo Beach is the other customer in this area. The City of Pismo Beach is the larger customer of the two, having purchased 1,100 AFY of State Water. Oceano CSD purchased 750 AFY, and in 2008 took a delivery of 377 AF. Compared to 2004, Oceano in recent years has depended more heavily on well water, thus decreasing recent State Water demands.

Typically, freshwater from the SWP is considered a reliable source, however in September 2007, a federal judge ordered protective measures for the endangered Delta Smelt fish in the Sacramento-San Joaquin River Delta, a mandate that could reduce water exports to Southern California. The protective measures ordered by the federal judge included reducing pumping from the delta during the fish spawning season, typically from the end of December through June. Reduced pumping from the delta will result in reduced water supply to many Southern California agencies who currently rely on water from the SWP.

In light of the environmental issues with the Sacramento-San Joaquin Delta, Gov. Arnold Schwarzenegger proposed a new delta restoration project that would divert water around the delta in order to maintain water supply to Southern California via the SWP. Current status of this Plan is not known; however implementation of the restoration project isn't expected to be completed for 10 to 20 years. In addition to the proposed project, Governor Schwarzenegger has also declared California to be in drought conditions, further limiting delivery of water through the SWP. With the 2008/2009 rainy season again showing water shortfalls, coupled with Bay Delta environmental issues, the anticipated deliveries to Central and Southern California customers saw wide fluctuation from zero allocation to farmers in the Central Valley, to only 15% to 30% of M&I users. Based on the recent May 20, 2009 update from the Department of Water Resources, the Central Coast can expect to see 40% deliveries this year.

Based on these significant environmental and political issues, along with the existing drought conditions, water supply via the SWP is considered far less reliable than it has been in the past. Water agencies dependent on the SWP are being urged to consider alternative, drought-proof water supplies in order to meet water demands across the state.

Drought Buffer

The following is an excerpt, and summary of water reliability options for San Luis Obispo County State Water Project Subcontractors in 2009, as provided by the County of San Luis Obispo.

Drought Buffer Program

The drought buffer program was developed as a means for local agencies to firm up their State Water Project deliveries. The Drought Buffer program is the only permanent reliability option available to subcontractors. Drought buffer is established by contracts and thus not available for sale or lease by the District, i.e. it is essentially irrevocable. This provides subcontractors with the highest level of protection against delivery shortages.

Drought buffer increases subcontractor's total allocation so that when project delivery is cut, the percentage available for delivery is calculated on a larger number. For instance, if a subcontractor has 100% drought buffer when delivery is cut to 50%, the subcontractor will still receive full deliveries. See example below:

County Operations Center		*If delivery is 50%*	
Water Service Amount	*425 AF*	*Water Service Amount x 50%*	*213 AF*
Drought Buffer Amount	*425 AF*	*Drought Buffer Amount x 50%*	*213 AF*
Total Allocation	*850 AF*	*Available Allocation*	*425 AF*

The cost associated with the drought buffer program is defined by the drought buffer contracts. The District's cost of that entitlement is passed on to subcontractors – i.e. 100% cost recovery. To ensure the full quantity of drought buffer is available for your agency, please submit a request to enter into a drought buffer agreement by October 1st of the preceding year.

Central Coast Water Reliability Program Subcontractor Participation Contract

When the State Water allocation is at 40% or less, if a subcontractor has executed a Subcontractor Participation Contract, the District's and participating subcontractors' excess allocation will be used to deliver 100% of a subcontractor's delivery request. The cost of the water to make a subcontractors delivery request whole will be a market price negotiated between the District and CCWA. This is the opportunity cost described below.

Article 10(b) Option (For State Water allocations above 40%)

The Article 10(b) Option is temporary while the District's excess is still available. This article provides the ability to utilize the District's excess entitlement to fulfill subcontractors delivery requests during shortages up to their defined Water Service Amounts, so long as there is sufficient supply to do so. Under this option, the District's excess is allocated proportionally by each subcontractors defined Water Service Amount. Like drought buffer, this option increases subcontractors' total allocation using the District's excess to do so. Unlike the drought buffer program, utilization of this option is not guaranteed, i.e. it is revocable. This option is revocable because the District's excess is currently "up for sale/lease". If the District's excess is sold or leased, the excess will not be available for local subcontractors to use to improve their delivery reliability.

The cost of implementing Article 10(b) for a subcontractor is equal to either the District's cost for the entitlement (like the drought buffer agreements) or the opportunity cost of not participating in the state-wide turnback pool if Article 10(b) water is not needed, but originally held in case it was needed. Turnback pool prices are usually around $12/acre-foot for the first pool and $6/acre-foot for the second pool.

* * *

The following table shows the minimum SWP delivery required to fulfill subcontractors' Water Service Amount under this option with the current agreements when everyone is requesting full deliveries:

Contractor	***Minimum SWP Delivery Required to Meet Full Requests***
City of Morro Bay	*16.20%*
Ca Mens Colony	*18.43%*
Co Operations Center	*18.43%*
Cuesta College	*18.43%*
City of Pismo Beach	*22.59%*
Oceano CSD	***22.59%***
San Miguelito MWC	*18.43%*
Avila Beach CSD	*22.59%*
Avila Valley MWC	*18.43%*
San Luis Coastal USD	*18.43%*
Shandon (CSA No. 16)	*22.59%*

Oceano CSD Summary of Existing Water Supplies
The Oceano CSD utilizes water from three sources, including groundwater, the State Water Project and Lake Lopez water. A breakdown of the District's allocations is as follows:

- 900 AF groundwater allocation
- 303 AF allocation from Lake Lopez
- 750 AF from the State Water Project
- **1,953 AF Total**

In 2008, the District used a total of 934 AFY, a 9% increase over Year 1998, a decade ago. As noted earlier, the per capita water demand has declined over the past several years due to increased water conservation efforts and increasing water rates.

According to the 2004 draft Water Master Plan, the current population of the District was 7,488 in 2003/2004, and is projected to reach 12,855 at build-out. There are 2,077 active connections in the system, 86 of which are commercial and 39 are agricultural (irrigation). The irrigation connections are for both landscaping and farming activities.

The District currently has sufficient water supply to meet their demands, however as discussed earlier in this Chapter, allocations from the SWP should not be considered a guarantee in the future. Without the 750 AFY from the SWP, the District's supply would drop to 1,203 AFY.

Reliability of Water Supplies
Wallace Group concurs with the 2004 WMP findings that the 303 AFY allocation of Lopez Lake water is considered reliable. Recent history during prolonged drought conditions indicates full entitlement delivery to all local water purveyors.

SWP water, even with the drought buffer, can be considered fairly unreliable. To exactly what extent year to year water deliveries may be curtailed, is difficult to ascertain. It would be reasonable to expect that 15% to 20% minimum deliveries could be delivered, with the Drought Buffer, based on historical drought periods. However, uncertainties with the Bay-Delta smelt/environmental issues remain. Furthermore, the District must keep in mind that each Fall (October/November time frame), State Water shuts down for a 30-day maintenance period. This year, State Water customers on the Central Coast will see a 40% delivery of allocation (without drought buffer program).

The local groundwater supply is considered relatively reliable, so long as area purveyors continue with cooperative means of managing the groundwater basin, to prevent overdraft and advancement of seawater intrusion.

Inter-Agency Agreements. It is possible that neighboring water purveyors can provide temporary water surplus supplies to one another during shortfalls. However, it is noted that both the Cities of Arroyo Grande and Grover Beach are currently utilizing over 90% of their current water supply allocations. Currently, the District has a single intertie with the City of Grover Beach. It is a 6-inch connection located on The Pike between 16th and 17th St.

CONCLUSION

Oceano CSD's reliable water supply is summarized as follows:

- 900 AF groundwater allocation
- 303 AF allocation from Lake Lopez
- 300 AF from the State Water Project (40% of allocation)

1,503 AF Total

Based on future population projections of 12,855, which is based on current zoning within the CSD service area, a total demand of 1,418 AFY will be realized in the future. If certain re-zoning with the CSD service area occurs, and build-out population increases to nearly 16,000 people, projected future water demand is anticipated to reach 1,764 AFY.

At this time, it is difficult to ascertain to what degree re-zoning or densification may occur. This projection of future water demand will need to be continually re-assessed in future years. Based on current zoning/land use in the CSD service area, it is reasonable to expect that the District has sufficient water supply for future years, even during drought years when State Water supplies may be reduced to 40% of entitlement.

The District should continue to assess the potential need for additional water supplies, depending on potential zoning changes in the future. It is recommended that the District participate in the drought buffer program to further enhance the reliability of State Water deliveries to the community.

CHAPTER 5

WATER STORAGE

This chapter describes the existing and projected water storage requirements for the District, and updates Chapter 5 of the G&T WMP Report.

EXISTING WATER STORAGE FACILITIES

As mentioned in the G&T WMP report, the District's water supplies include a number of wells, and State Water. Aside from the annual entitlement variations from year to year, from a delivery and reliability standpoint when water is being delivered to Central Coast customers, the reliability of such deliveries is high given that the State Water system includes a number of safeguards against power failures and other emergencies. However, it must be kept in mind that State Water deliveries do shut down routinely for approximately one month each year, around October/November for annual maintenance. Thus, during this critical month when State Water is shut down, storage facilities and existing wells must be able to deliver demands adequately during this time.

The District currently operates two water storage tanks, both located at the District's water yard. The two storage tanks are summarized as follows:

- Tank 01, 0.3 MG capacity, Installed 1991
- Tank 02, 1.0 MG capacity, installed 1982

STORAGE ANALYSIS

Groundwater is considered a form of storage for the District. However, in the event of a system emergency, and particularly when the largest well may be out of service (and State Water is unavailable), the District's combined storage capabilities must be capable of supplying water during these conditions. The storage analysis will be conducted with the largest well (Well 8) out of service.

There are three types of storage commonly evaluated in a storage analysis: emergency, fire, and operational. The sum of these three components is recommended to be the total storage volume needed for the system.

Emergency Storage

Emergency storage is intended to provide for conditions such as extended power outages, pump failures, and similar problems. Most water planners accept that during emergencies, supply per capita may be reduced to minimum levels. Typically, on that basis, an emergency storage volume of 50 gpcd for three days is accepted as a reasonable value. Table 5.1 provides a summary of the emergency storage recommendations for existing and build-out for the District.

Table 5.1 Recommended Emergency Storage Volume

	Estimated Population	Storage Recommendation (MG)
Existing	8,137	1.22
Future	12,855	1.93

Fire Storage

Fire storage is the volume of water needed to control an anticipated fire in a building or group of buildings. The determination of this storage is based upon a recommended flow rate, its duration, and a minimum residual pressure as established by the agency of interest. The agencies which establish the relationships between land use and fire requirements include the Uniform Fire Code (UFC) and the Insurance Services Office (ISO). The services of ISO are advisory only and are used to establish insurance ratings for cities and communities across the nation. The flow rate and duration of fire flow varies greatly with the type of development, with UFC values ranging from 1,500 to 15,000 gpm for different building types and sizes. To serve the maximum fire flow requirements of the community, the fire flow requirement is set at 3,500 gpm for a four-hour duration. This results in the need for 840,000 gallons in emergency fire storage.

Operational Storage

Operational storage is the amount of water needed to equalize the daily supply and demand. Without this storage, water production facilities large enough to meet the instantaneous peak demands of the system would be required. With adequate operational storage, well pumps can operate at the daily average rate, while storage facilities meet the hourly peaks. This operating method also prevents the unnecessary use of additional well pumps at times when electrical rates are the highest. AWWA M-32 recommends operational storage of 20 to 25 percent of build-out average day demand, or up to 15 percent of the ultimate maximum day demand. Based on the more stringent criteria of 15 percent of ultimate maximum day demand, the recommended operational demand for existing and future conditions is as follows:

- 0.85 mgd x 1.6=1.36 mgd max day (existing); 15% of 1.36=0.20 MG
- 1.27 mgd x 1.6=2.03 mgd max day (future); 15% of 2.03=0.30 MG

Storage Recommendation Overview

Table 5.2 reviews the existing and future overall storage recommendations for the District. As discussed in the G&T report, there are additional means of backup water storage that are not considered reliable. However, the District should keep in mind that these resources are still available. Such resources include other water supply wells, and the Grover inter-tie. However , the District should also keep in mind that in the event of a regional emergency such as an earthquake, the City of Grover Beach may not be able to provide water through this inter-tie during that time.

Table 5.2 Water Storage Recommendations

	Storage Component, MG			Total Storage Recommended	Storage Available	Storage Surplus/ (Deficit)
	Emergency	Fire	Operational			
Existing	1.22	0.84	0.20	2.26	---	0.93
				Tanks	1.30	
				Well 7[1]	1.08	
				Lopez[2]	0.81	
				State Water[3]	0.00	
				Total	**3.19**	
Future	1.93	0.84	0.30	3.07	---	0.12
				Tanks	1.30	
				Well 7[1]	1.08	
				Lopez[2]	0.81	
				State Water[3]	0.00	
				Total	**3.19**	

[1]Well 8, the largest well, considered to be out of service during an emergency.
[2]Lopez water delivery, 303 AFY allocation, delivered for 3 days during emergency.
[3]State water shut down for annual maintenance.

Based on a review of available reliable storage, it is not recommended that additional storage be provided for existing or future conditions. However, should land use re-zoning or densification of development occur over time, or should the District's service area boundary expand, the District must continue to evaluate their storage requirements in light of potential future unanticipated demands.

Other Considerations

The District's two water storage reservoirs must continue to be maintained and serviced over the years. The District must anticipate and budget for, periodic dive inspections, scheduled maintenance and cleaning, and tank re-coating and re-lining. In particular, the 0.3 MG water tank likely needs to be re-lined and re-coated. It is noted that the 1.0 MG water tank was re-lined in 2001. Both tanks however need "touch-up" coating on the exterior and roofs, and ladders.

In addition, the large 1.0 MG water tank rests on a gravel ring, not anchored down to a concrete ring foundation. Although apparently this tank fared well during the 2003 San Simeon earthquake, other tanks in the Central Coast area of similar construction, received considerable damage. The District should consider a seismic retrofit to this tank to provide an anchored system. The 0.3 MG water tank has been equipped with flexible joints/connections to allow for additional flexibility and movement during seismic events.

The ladders on both tanks include a steel post mounted to the ladder with metal bolts. The specific regulations for ladder safety are not readily known; however, the tanks are 32 feet tall, and these safety posts are likely required. The District should pay special attention to the maintenance of the ladders, safety post and attachments that secure the post to the ladder, to ensure attachments are always secure.

CHAPTER 6

WATER QUALITY

This chapter describes the water quality parameters associated with the District, and updates the Water Quality Chapter (Chapter 8) prepared by G&T in the 2004 WMP Report. As described in Chapter 4 of this Report, the District receives State Water/Lopez Water, and groundwater to fulfill the District's water supply needs.

DRINKING WATER STANDARDS

Drinking water standards are established by the United States Environmental Protection Agency (EPA) and by the California Department of Public Health (CDPH). These federal and state agencies are responsible for ensuring that all public water systems are in compliance with the Safe Drinking Water Act (SDWA). The State of California has been consistent in applying drinking water standards as they are adopted by the EPA. Moreover, California has established action levels for contaminants not on the federal list. Future water quality regulations germane to the District are discussed later in this chapter.

Water Quality Parameters

State and Federal water standards fall into two categories:

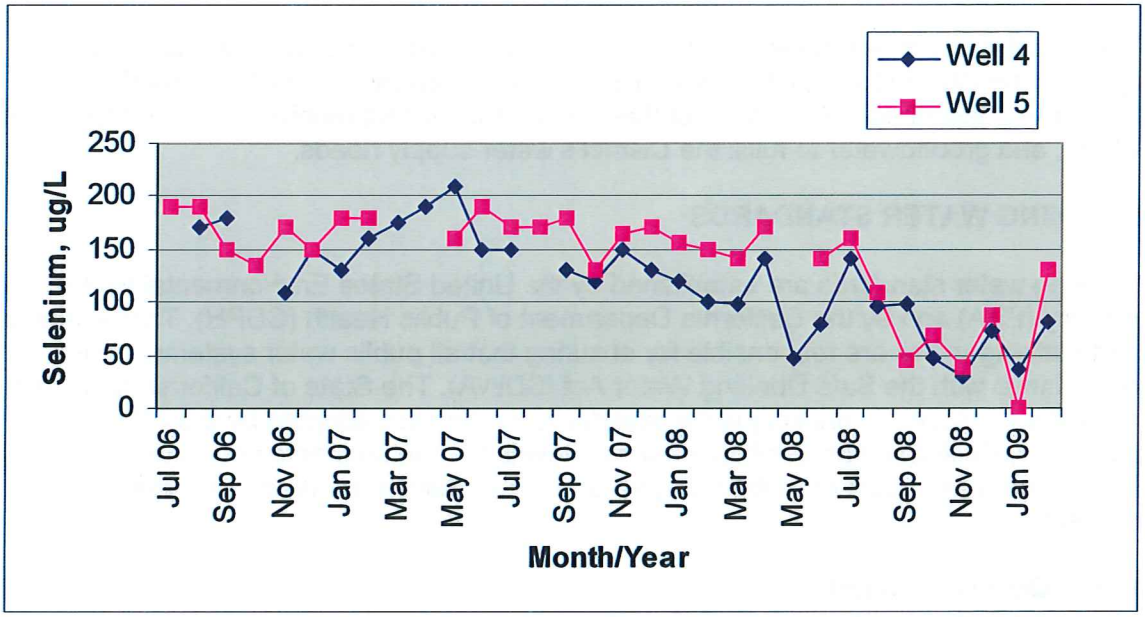
- Primary Standards relate specifically to the health of the community as it might be affected by the water supply. Mandatory maximum contaminant levels (MCLs) are established for specific constituents.

- State Secondary Standards relate to aesthetic qualities of the water including taste, odor, color, and some minerals. In California, maximum contaminant levels (MCLs) are also established for these secondary constituents.

The latest (2008) Consumer Confidence Report (CCR) prepared by the District is included as Appendix B. In reviewing the CCR for 2008, the District continues to meet all Federal and State Drinking Water Standards. Selenium levels continue to be high, from Wells 4 and 5; however, with blending of the various other water sources, the drinking water standard continues to be met. Figure 6.1 provides a summary of selenium concentrations for Wells 4 and 5 for the past three years.

The selenium concentrations in Wells 4 and 5 have appeared to increase since the 2004 G&T WMP Report. However, interestingly, the recent results also show a fairly clear trend of diminishing selenium concentrations over the past year. It is uncertain what may be the reason for the decline this past year; possibly the current drought conditions may have some effect on the selenium concentrations in the groundwater. Regardless, the concentrations of selenium remain above the MCL of 50 ug/L, and must continue to be monitored and blended with other water supplies to achieve the MCL requirements.

Figure 6.1. Selenium Concentrations in Wells 4 and 5



Lead and Copper

Based on the 20 samples collected for lead and copper, as reported in the 2008 CCR, the 90th percentile copper and lead concentrations meet the action levels and goals for lead and copper. As referenced in the G&T WMP, the District's water supply in recent years has been adjusted to reduce corrosivity, and this appears to have reduced the lead and copper concentrations over recent years.

Iron and Manganese

As indicated in the 2004 WMP, iron and manganese concentrations in the water supply wells occasionally exceed the MCLs of 300 ug/L and 50 ug/L respectively. The District reports annually to CDPH, any incidences of taste and odor complaints. In 2008, the District received three complaints on taste and odor. In 2002, it was referenced that three complaints were also received. There appears to be no trend or increase in the number of taste and odor complaints received over the years, and the actual number of complaints received remains relatively low.

Radioactivity

The radionuclide concentrations in OCSD wells ranged from ND to 10 pCi/L in 2008, with an average of 5.0 pCi/L. These concentrations continue to remain below the MCL of 15 pCi/L.

CALIFORNIA WATER WORKS STANDARDS

In January 2009, the new Title 17 and Title 22 Code of Regulations for Drinking Water Standards were adopted. According to these Standards, new water systems must be designed to provide a minimum pressure of 40 psi throughout the distribution system and at all times (except under fire flow conditions). Although this is a requirement for

new water systems, it is also prudent to meet these standards for existing water system customers.

Other updated and new standards were also adopted for new potable water tanks, wells, and other system improvements. These CDPH regulations will need to be consulted with if and when the District provides new water related facilities to its overall water system.

FUTURE REGULATIONS

Future water regulations will continue to evolve and change, and therefore should be considered (and periodically updated) in OCSD's overall water master planning effort.

Disinfectant/Disinfection Byproduct Rule

The purpose of the Rule is monitoring and reduction, as necessary, of potentially carcinogenic disinfection byproducts. According to the Rule, water systems with groundwater as their sole source were to begin sampling for trihalomethanes (TTHMs) and five specific haloacetic acids (HAA5) in their distribution system in January, 2004. Small groundwater systems (less than 10,000 people served) would collect a sample for measurement of total trihalomethanes (TTHMs) and HAA5 at the point in their distribution system with the longest residence time. If that sample exceeds the MCL (maximum contaminant limit) established in the California Code, samples must be repeated quarterly and a running yearly average computed. If this value exceeds the MCL, the Code will require notification of a violation to the Department of Environmental Management and to the public.

The 2008 CCR indicates recent samples for the District's water system are in compliance with this Rule, and that TTHMs and HAA5s are within these set MCLs.

Groundwater Rule

EPA published the Ground Water Rule in the Federal Register on November 08, 2006. The purpose of the rule is to provide for increased protection against microbial pathogens in public water systems that use ground water sources. EPA is particularly concerned about ground water systems that are susceptible to fecal contamination since disease-causing pathogens may be found in fecal contamination.
The GWR will apply to public water systems that serve ground water. The rule also applies to any system that mixes surface and ground water (such as OCSD) if the ground water is added directly to the distribution system and provided to consumers without treatment.

The Final Ground Water Rule was published in the Federal Register, November 8, 2006. Requirements of this Rule are summarized as follows:

- Periodic sanitary surveys of groundwater systems are required, for eight critical elements. The surveys also include review and identification of significant deficiencies and threats, such as a well located near a leaking septic tank system. Initial surveys must be completed by December 31, 2012 for most public water systems.
- Source water monitoring to test for the presence of E. coli, interococci, or coliphage in the sample, is required. Two provisions are as follows:
    - Source water monitoring is triggered for systems that do not already provide treatment that achieves 4-log inactivation or removal of viruses,

and that have a total coliform-positive routine sample under the Total Coliform Rule.
    - States have the option to require assessment monitoring as a complement to triggered monitoring, at any time, to help identify high risk water systems.
- Corrective Actions are required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options:
    - Correct all significant deficiencies,
    - Eliminate the source of contamination,
    - Provide an alternate source of water, or
    - Provide treatment to reliably remove 99.99% (4-log) inactivation or removal of viruses.
- Compliance monitoring is required ensure that treatment technology installed to treat drinking water reliably achieves the 4-log inactivation or removal of viruses.

Impacts to the District: The Groundwater Rule will require the District conduct an initial sanitary survey by December 31, 2012.

Proposed Radon Rule

There is no significant change to this proposed Rule since the 2004 G&T WMP Report. The rule is still in the proposed stages. EPA outlines two options for reducing exposure to radon, and encourages States to consider implementation of what are known as Multimedia Mitigation Measures (MMMs) to address exposure to radon in indoor air, as an effective means of complying with this proposed Rule. If such a program is implemented, then individual water systems need also to reduce radon levels in drinking water to 4,000 pCi/L or lower.

If a State does not choose to develop an MMM program, water systems in that State would be required to reduce radon in drinking water to 300 pCi/L or develop individual local MMM programs and reduce levels in drinking water to 4,000 pCi/L or lower.

The future impact to OCSD, should this Rule be adopted, is unclear. At this time, the District's water supply meets drinking water standards for radionuclides. It is possible that if the District's water supply does not meet the 4,000 pCi/L proposed limitation for radon, that future treatment of the District's well water supplies would be required.

CHAPTER 7

WATER DISTRIBUTION SYSTEM

This chapter presents the analysis of the water distribution system, including water modeling, updates to design criteria, and water distribution system analysis. This chapter updates the G&T Report, Chapters 6, 7 and 8.

COMPUTER MODELING

The computer model used to run the hydraulic analysis was created by importing the water model created by G&T in EPA Net, into Water CAD. After being imported the model was updated to reflect the current atlas map pipe sizes, pipe materials, and installation date; new components of the system; and available multi point pump curves. Field flow tests were not used to calibrate the water model prior to running the scenarios. The design standards and criteria outlined in Chapter 7 were applied to this water model to determine deficiencies.

The hydraulic demands for current and projected conditions outlined in Chapter 3 (ADD, MDD, and PHD) were distributed and applied to the updated water model. Under all of these conditions pressure was maintained above 40 psi as required by the California Department of Public Health (CDPH).

Fire flow on the other hand has a significantly larger demand determined by building type and zoning summarized in Chapter 3. Under fire flow conditions, CDPH requires residual pressure to be maintained above 20 psi during fire flow conditions. In order to meet both this standard, Capital Improvement Projects (CIPs) are recommended and discussed in Chapter 9 in greater detail.

While there are several locations in the system where line velocities are excessively high these problem areas are addressed by the fire flow CIP list so require no further improvements.

DESIGN STANDARDS AND CRITERIA

The design requirements for the water distribution system relate primarily to the flow and pressure delivered by the system to the residences. The CDPH regulates the system pressures within a water distribution system under different demand conditions. Pressures below 20 psi, at any time, including fire flow, are not acceptable in a municipal water system. Under the existing Waterworks Standards (adopted March 2008) issued by the CDPH, the average day, maximum day, and peak hour demand pressure should be no less than 40 psi.

Ideally, normal operating (static) pressures should be within the range of 40 to 80 psi. This is the range that most people find comfortable and will serve most fire sprinkler systems. Pressures higher than 80 psi are acceptable within the distribution system, but should be reduced to 80 psi at the service connection to prevent water hammer effects or leakage through rapidly weakening washers and seats within a home. Pressures above 100 psi begin to cause system damage and should be avoided. For the District, the design requirements were based on the DHS standards mentioned above.

The flow requirements examined in the network model include fire flow, maximum day demand, peak hour demand, and average daily demand. The various flow scenarios are summarized in Table 7.1.

Table 7.1 Summary of Hydraulic Parameters and Design Criteria

Hydraulic Parameters and Design Criteria	Value		
Fire Flow Requirements	Residential Single Family	1,000 gpm	2 hrs
	Residential Multi-Family	2,500 gpm	2 hrs
	Commercial Retail	2,500 gpm	3 hrs
	Commercial Service	3,500 gpm	3 hrs
	Industrial	3,500 gpm	4 hrs
Peak Hour Demand Factor	3.5 times ADD		
Maximum Day Demand Factor	1.7 times ADD (Based on historical data)		
Minimum System Pressure at ADD	40 psi		
Minimum System Pressure at MDD	40 psi		
Minimum System Pressure at PHD	40 psi		
Minimum System Pressure at FF	20 psi		
Maximum Pipeline Velocity at ADD	<5 fps		
Maximum Pipeline Velocity at FF	< 10 fps (<15 fps near source of fire)		
Fire Hydrant Spacing	At every intersection, at intervals not more than 250 feet in commercial zones, and not more than 300 feet in residential zones.		
Pipe Diameter	All new water mains must be 8 inch or greater.		
Valving	No shut down of greater than 500 feet in commercial/residential areas.		

DISTRIBUTION SYSTEM ANALYSIS

The District's water system is comprised of pipelines, booster pumps, valves, hydrants, services, tanks, and wells. Tanks and wells are addressed in detail in Chapter 5.

The system is comprised of approximately 22.4 miles of pipeline (not including the Lopez Line 3000ft of 8 in) summarized in Tables 7.2 and 7.3 below. Table 7.4 summarizes the water service laterals. Operator records and recent CIPs approximate 206 public hydrants and 8 private hydrants throughout the system. According to the District's 2008 Annual Report filed with CDPH, the District has 410 valves throughout the system. Currently water valve information is not tracked. Water meter type and number are summarized in Table 7.4.

Table 7.2 Length of Pipe by Size

Size (in)	Length (ft)	Length (mi)
2	4201	0.8
3	404	0.1
4	7686	1.5
6	44331	8.4
8	40431	7.7
10	4698	0.9
12	16407	3.1
16	136	0.0
Total	118294	22.4

Table 7.3 Length of Pipe by Material

Material	Length (ft)	Length (mi)
Unknown	10242	1.9
Steel	3947	0.7
PVC	30745	5.8
Ductile Iron	1492	0.3
Asbestos Cement	71873	13.6
Total	118300	22.4

Table 7.4 Meter Type and Number

Type	Connections	Units
Residential	1949	2944
Commercial	92	473
Industrial	7	7
Public Agency	19	18
Fire	1	
Irrigation	48	46
Total	2099	

RECOMMENDATION

As part of system operations the system atlas maps should be continually updated with pipeline, hydrant, valve, and lateral information. The more update information will allow for more informed operation, design, and rate studies.

CHAPTER 8

SYSTEM MAINTENANCE

This chapter briefly discusses water system maintenance, and updates that system maintenance information presented in Chapter 10 of the 2004 WMP.

CURRENT STAFFING LEVEL

The District employs three full-time operations staff that services the water service and wastewater collection systems for OCSD. Mr. Phil Davis, the Utilities Supervisor for the District, is a licensed operator with a D2/T4 grade. Similarly, Mr. Maximiano Torres is also a D2/T4 grade operator. Based on the comparison conducted by G&T of similar special districts in the central coast area, District's staffing appears to be on the low range as compared to other districts. If the District finds that current staff cannot adequately maintain both water and sewer systems, consideration of budgeting for an additional staff may be warranted. Wallace Group believes this should be decided upon by the District based on their assessment of how well maintenance and upkeep is being conducted. The District should consider this carefully at this time, given that a parallel water rate study is being conducted at this time.

CURRENT MAINTENANCE LEVEL

The G&T WMP report indicated in the past, that District staff had not been able to respectably keep up with needed water system maintenance. Wallace Group did not review operations in detail with District staff; however, in reviewing the latest 2008 annual report to CDPH, the District is providing maintenance including:

- Annual flushing of dead-end mains (15 currently exist)
- Biannual exercising of water valves (410 total valves in system)

In addition, in February 2009, the District inspected and cleaned both potable water storage tanks.

RECOMMENDATIONS

It is recommended that the District consider now, as part of acceptance and adoption of this Water Master Plan, the need for an additional staffing position for utilities operations. This is an opportune time to consider staffing needs, prior to, and in conjunction with, the parallel water and sewer rate study being conducted for the District.

CHAPTER 9 (Updated December 2019)

CAPITAL IMPROVEMENT PROGRAM

This chapter summarizes the District's recommended Capital Improvement Program (CIP) to meet existing and future needs, and to assist the District in the financial planning aspects of implementing the recommended improvements. The improvements are described as first, second, and third priorities. The costs for these improvements are summarized in Table 9.1 and illustrated in Figure 9.1. The 5-year Capital Improvement Program is comprised of all First priority projects, and subsequent projects can be addressed in future CIP planning.

BASIS OF CAPITAL IMPROVEMENT PROJECT COSTS

The CIP costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. Hard construction costs are multiplied by a factor of 1.4 to budget and allow for preliminary engineering, engineering, administration, construction management, construction contingency, and inspection costs. **All CIP costs are expressed in Year 2019 (October) dollars, using an ENR Construction Cost Index of 11,326, and will need to be escalated to the year during which the midpoint of construction occurs.**

SUMMARY OF RECOMMENDATIONS AND CAPITAL IMPROVEMENT PROJECTS

The projects are listed in order of necessity.

First priority projects are those considered necessary for correcting existing health and safety deficiencies, such as fire flow and low water service pressures, and are generally recommended to be completed within five years. As part of this Report and recommendations, first priority projects were listed for areas that are significantly deficient in fire flow requirements at the minimum residual pressure of 20 psi.

Second priority projects are those needed to correct lower priority system deficiencies, and anticipated future deficiencies (depending on growth and development) within 1 to 10 years. Given the number of fire flow deficiencies, and understanding the limitations of completing all fire flow related improvements within 5 years, second priority projects also included those areas that have deficient fire flow requirements at the minimum residual pressure of 20 psi, but are operating closer to the required minimums. These projects may also include undersized mains that are nearing the end of their useful life. These older, smaller diameter pipe sizes are more apt to leak or break, which could cause serious consequences if not replaced in a timely manner.

Third priority projects are generally those that that do not present immediate deficiencies, but should be corrected in the future as budgets allow, such as looping dead-end mains, increasing water main sizes when a pipeline's useful life is nearing the end, increasing undersized pipelines to the District’s 8-inch minimum, valve replacements or additions, and other such improvements. The costs of these improvements were estimated as described in the above section, Basis of Capital Improvement Project Costs. While the following proposed projects address system deficiencies, each project and comparable alternatives should be considered prior to design.

In addition to the operational deficiencies noted above, ranking of projects also considered

future County of San Luis Obispo and Caltrans street improvement projects. Higher priority projects that are in areas where development or street improvements projects are planned have been elevated on the priority list in order to minimize excavation in recently repaved streets, or provide service to new developments.

RECOMMENDATIONS

The following is a list of general recommendations to the District:

Un-accounted for Water

The District's un-accounted for water is considered within industry standards, and acceptable. It is recommended, however, that the District document incidental uses such as water used for line flushing, metered construction water, fire flow events, fire department training, and other incidences. This will help further refine the estimates of unaccounted for water that may be the result of inaccurate meters or unauthorized use.

To help reduce un-accounted for water, the District has implemented a meter replacement program to replace all the meters in the system. To this date, over half of the meters have been replaced, and the District is on track to complete the replacements in the next few years. It is recommended that this program continue until all meters have been replaced.

Water Conservation Programs

The District does an excellent job in conserving water, as is portrayed by the relatively low per capita water demands. The District is encouraged to continue promoting water conservation through education and outreach programs, and tiered water rates.

Water Supply

The District previously participated in the State Water Drought Buffer Program to enhance water supply reliability. Reliable delivery of State Water Project water varies from year to year, and the State is currently evaluating options to make delivery more reliable in future years. One such proposal is the Delta Conveyance Project. It is recommended that the District participate in the in the preliminary efforts in support of this project to ensure future reliability and delivery.

Tank Lining and Coating

Over time the linings and coatings on steel tanks breaks down and needs replacement. Regular inspections of the tank and its coatings should be performed by a qualified coating specialist either by diving, or at the next scheduled tank cleaning, to assess the condition of both tanks. The 0.3 MG water storage tank is likely in need of re-coating and re-lining. The Division of Drinking Water (DDW) performed an inspection of both tanks in 2017 for their Sanitary Survey Report, and noted both tanks needed spot-repairs to address external corrosion, particularly on the tank roofs. This should be completed soon to avoid holes forming in the tank due to lack of maintenance.

Tank coatings last 15-20 years or more, and the life can be extended by performing spot-repair work on the tank periodically. Budgeting for tank lining and coating of the 0.3 MG water tank should be anticipated for some time within the next 5-10 years. This therefore has been included as a Priority 1 CIP. Tank lining and coating of the 1.0 MG tank can be deferred with minor spot repairs now, but should be budgeted for in the next 10-15 years or so.

Capital Improvement Projects

This section presents a brief description of recommended first priority capital improvements. The G&T 2004 WMP and the Wallace 2009 WMP Update provided an extensive list of CIPs to address many conditions. Some of these projects have been completed and others were beyond the needs of the District. Table 9.1 summarizes the projects required to meet pressure and fire flow requirements throughout the system, as well as improve the functionality of the operation of the overall system.

Priority 1 Improvements (Orange Figure 9.1)

First priority projects are those considered necessary for correcting existing health and safety deficiencies, such as fire flow and low water service pressures, and are generally recommended to be completed within five years. As part of this Report and recommendations, first priority projects were listed for areas that are deficient in fire flow capacity at the minimum residual pressure of 20 psi. These projects are summarized in Table 9.1 and illustrated in Figure 9.1. The Priority 1 projects listed in table 9.1 are also considered to be the 5-year CIP.

1-1 Cabrillo Hwy (Hwy 1 at 21st St.)
Cabrillo Highway between 19th and 21st St is served by a 2-inch line. This is one of several undersized and dead-end lines that result in fire flows as low as 120 gpm (3,500 gpm required). To provide sufficient fire flow to this area, an 8-inch water line will be required. It will connect to the new water line in 21st Street and extend west to Front Street. This line should be upgraded to the district 8-inch minimum, and connect to the existing fire hydrant near 19th St that is currently fed from the alleyway to the north.

1-2 Cabrillo Hwy and Front Street
A fire hydrant on Front St between Cabrillo Hwy and Nipomo Street is fed by a dead-end line and has low fire flow capacity. To increase the fire flow to this hydrant, the existing dead-end water main in Front street should be extended to the northwest and connect to the proposed Cabrillo Hwy water main described in Project 1-1. An 8-inch looping water main would increase fire flow and eliminate the dead end main in this location.

1-3 22nd Street at Paso Robles Street
There is a gap in the piping network in 22nd Street between Warner St. and Paso Robles St. Approximately 225 feet should be installed in this location to loop the system to allow the District the flexibility to isolate the system more effectively in the event of an outage. An 8-inch looping water main would increase fire flow and eliminate the dead end main in this location. Timing is of the essence since the County of SLO has planned to do a street overlay in the next fiscal year, and installation of the main prior to this project would maintain the integrity of the freshly paved roadway. If this project is not completed in a timely manner, it may need to be re-prioritized to a later date to avoid trenching in a freshly paved street.

1-4 Truman Drive
Fire flows in this area are as low as 500 gpm (2,500 gpm required). Replacing the existing 4-in ACP line in Truman Drive between Norswing Dr and Railroad St will increase the fire flow in this area. There is also a slow leak at the intersection of Truman Drive and Norswing Drive that needs to be addressed along with this project. This is another project that needs to be addressed soon so that it can be completed before the County of SLO street overlay project passes through this area.

1-5 Railroad Street Alley (Truman to Airpark)

Fire flows to The Strand (beach area) were as low as 1,150 gpm at one point (2,500 gpm required), but improvements to the water mains in Air Park Drive and the new 10-inch lagoon crossing at Maui Circle have helped increase these flows. There are still undersized water mains that need to be replaced to allow The Strand area to achieve the full fire flows required. To help remedy these deficiencies, the existing 4-inch and 6-inch lines in the Railroad Street Alley should be upgraded to a 10-inch pipe from Air Park Drive to Truman Street. The portion between Truman Dr. and Pier Ave has already been upgraded to a 10-inch pipe, and upsizing the pipe in this area will allow additional flow to reach Pier Ave, and ultimately increase the fire flow to The Strand area.

1-6 Norswing Drive and Pershing Drive

Fire flows in this area are as low as 500 gpm (2,500 gpm required). Replacing the existing 2-in steel lines in Norswing Drive from Pier Ave to Pershing Drive, and in Pershing Drive from Norswing Drive to Railroad St. will increase the fire flow in this area. This is another project that needs to be addressed soon so that it can be completed before the County of SLO street overlay project passes through this area.

1-7 Strand Way (South of Utah)

South of Utah Avenue the fire flow is as low as 1,600 gpm (2,500 gpm required). Replacing the existing 4-inch lines south of Utah Ave with 8-inch mains will provide sufficient fire flow to this area of the system.

1-8 Laguna Dr Alley (South of Utah)

South of Utah Avenue the fire flow is as low as 1,600 gpm (2,500 gpm required). Replacing the existing 4-inch lines south of Utah Ave with 8-inch mains will provide sufficient fire flow to this area of the system.

1-9 Cabrillo Hwy Alley (at 19th Street)

In this area there are several undersized and dead-end lines that result in fire flows as low as 120 gpm (3,500 gpm required). To provide sufficient fire flow to these areas an 8-inch and 12-inch water main will be required. It will connect the Front St Alley water main to the existing 12-inch main between 19th St and 21st St.

1-10 Utah Ave Alley (between Strand Way and Utah)

The alley between Strand Way and Laguna Drive Alley connects the two water mains with a 3-inch AC pipe. The fire flow in this area is as low as 1,600 gpm (2,500 gpm required). To increase the fire hydrant's capacity and loop the system this main should be upgraded to the district 8-inch minimum along with Projects 1-7 and 1-8.

1-11 Pershing Drive across Hwy 1

From Pershing Dr South 700 feet along Cabrillo Hwy the existing 6-inch dead end line provides only 1100 gpm fire flow (2,500 gpm required) and is a long dead end main. Both of these deficiencies can be solved by connecting the dead-end line to the proposed 10-inch main (Project 1-5) at intersection of Railroad St Alley and Pershing Dr. This will require crossing Caltrans right of way with a steel casing pipe.

1-12 Tank Inspection

The storage capacity at the District's Corp Yard includes a 0.3 MG and a 1.0 MG water storage tank. The District should provide coatings inspection by a qualified diver/coatings inspector, either while tanks are in service, or at the next scheduled

cleaning. The inspection of both tanks should be conducted to assess the need for re-lining and re-coating of the tanks, and recommendations for rust/corrosion repairs to the tank exteriors. This assessment should be done at the following intervals after re-coating and re-lining is completed:

- Year 5: First inspection
- Years 5-15: Every 2-3 years
- Years 15+: Annually

1-13 Tank Re-line and Re-coat

The recommendations from the tank inspection reports should be followed. If spot repairs are needed to extend the life of the tank, those should be addressed immediately. If deferred maintenance is noted, or corrosion is too severe and the tanks need to be re-lined and re-coated, they should be done at separate intervals so both tanks are not out of service at the same time. Spot repairs on both tanks should be done right away, and relining and recoating of the tanks should be completed as funding becomes available.

Priority 2 Projects (Green Figure 9.1)

Second priority projects are those needed to correct lower priority system deficiencies, and anticipated future deficiencies (depending on growth and development) within 1 to 10 years. Given the number of fire flow deficiencies, and understanding the limitations of completing all fire flow related improvements within 5 years, some fire flow improvement projects are included as Priority 2 projects instead of Priority 1 projects. Completion of these projects should take place as soon as funding becomes available. These projects are summarized in Table 9.1 and illustrated in Figure 9.1.

2-1 Pier Avenue

Fire flows to The Strand (beach area) were as low as 1,150 gpm at one point (2,500 gpm required), but improvements to the water mains in Air Park Drive and the new 10-inch lagoon crossing at Maui Circle have helped increase these flows. There are still undersized 6-inch water mains in Pier Avenue that need to be replaced to allow The Strand area to achieve the fire flows required. To help remedy these deficiencies, the existing 6-inch lines in Pier Avenue from Air Park Dr to Railroad Street Alley should be upgraded to a 10-inch pipe. The portion in the existing 80-foot bridge crossing has already been upgraded to a 10-inch pipe.

2-2 Norswing Drive Loop (North of Pier)

The Norswing alley main that provides service to the area north of Pier Ave is a 1,050-foot long dead-end main. Fire flow at the north end of the Norswing Drive Alley is approximately 740 gpm (2,500 gpm required). Replacing the existing 4-inch line from Coolidge Dr to Harding Dr with an 8-inch main will provide sufficient fire flow, while water quality and reliability of service to this area can be improved by installing a new 8-inch line looping the main back to Pier Ave in Norswing Dr.

2-3 Railroad Street (Creek Rd. to 17th St.)

Fire flow provided by the existing waterline at Sand Dollar Ave and Creek Rd is 2,200 gpm (3,500 gpm required) and it is a dead-end line. To increase the fire flow in this area, the only way to address the issue is to connect the system on the west side of the railroad tracks to the system on the east side of the tracks. Currently the only connections across the railroad tracks are at Air Park Drive. If the crossings in this location were ever compromised, there would be no way to get water to the western

portions of the distribution system. Installing another water main across the railroad tracks on the southern end of the system would provide an added measure of security to the operational functionality of the system. To address this deficiency, a new 8-inch water main should be installed in a new steel casing pipe under the UPRR right of way in Railroad Street.

2-4 Creek Road (Sand Dollar to Railroad St)
Fire flow provided by the existing waterline at Sand Dollar Ave and Creek Rd is 2,200 gpm (3,500 gpm required) and it is a dead-end line. To increase the fire flow in this area, the only way to address the issue is to connect the system on the west side of the railroad tracks to the system on the east side of the tracks. Once the connection in Railroad St is completed (Project 2-3), a new water main can be installed in Creek Rd from Sand Dollar to Railroad St to address the fire flow deficiencies and provide a benefit to the entire system by looping the piping network.

2-5 16th Street and Warner Street
Existing fire flows in this area are as low as 1000 gpm (2,500 gpm required). Replacing the existing 2-inch, 4-inch, and 6-inch lines in the area with 8-inch mains will provide sufficient fire flow to the area.

2-6 14th Street at Wilmar Ave
The existing waterline between Wilmar Ave and Rice St is only a 2-inch line limiting the fire flow to 1650 gpm (2,500 gpm required). Upgrading the existing 2-inch line to an 8-inch main will provide sufficient fire flow to the area.

2-7 Vista Street (19th St to 21st St)
Vista St is provided service by a 2-inch line between 19th St. and 21st St. This line should be upgraded to the district 8-inch minimum to provide additional fire flow.

2-8 Warner Street (19th to 21st)
Warner St is provided service by a 2-inch line between 19th St. and 21st St. This line should be upgraded to the district 8-inch minimum to provide additional fire flow.

2-9 South 4th Street Upgrade
There is a 200-foot 2-inch dead end line located in S 4th St, just past the UPPR and Highway 1 crossing at Air Park Drive. This line should be upgraded to the district 8-inch minimum to eliminate the old undersized steel main, and prevent a future leak or break in the main.

2-10 Temple St and Halcyon Rd
There is currently a 2,300 lf long dead-end reach of pipe on the eastern end of the District's system that serves several homes near Halcyon Rd. The pipe is sized properly for fire flow, but it is a dead end main in the system. Extending this pipe to the intersection of Halcyon Rd and The Pike would allow the District to serve new and existing developments along Halcyon Rd, and could also provide an interconnect with the City of Arroyo Grande for emergency conditions if ever needed. Although there is not an immediate need for this main, the long term returns for the District are beneficial.

2-11 Jetty Ave Alley (Palace Ave. to Fountain Ave.)
Currently there are dead end mains at both these streets and both have fire flow deficiencies. Connecting the two with an 8-inch line will provide a loop, allow sufficient fire flow, and greatly reduce the length of dead-end mains.

Priority 3 Projects (Blue Figure 9.1)

Priority 3 projects are generally those that do not pose any immediate concern to the operation of the system, but would benefit the longevity and life expectancy of the system as a whole. There are several un-looped water mains and dead ends in the system. If these lines can be looped it would benefit water quality and reliability of service. Also, replacing any existing 2-inch, 3-inch, and 4-inch lines with 8-inch mains would be beneficial to the fire flow capabilities of the system. Some of these projects will rely on outside parties to complete, and therefore have been placed as a lower priority on the overall list. These projects are summarized in Table 9.1 and illustrated in Figure 9.1.

3-1 La Verne Ave. (Between 22nd St. and 23rd St.)
La Verne Ave. service is provided by a 4-inch main. The 4-inch line should be upgraded to the District 8-inch minimum.

3-2 23rd Street (Between Wilmar Ave. and Tamera Dr.)
There is a short reach of 4-inch water line in 23rd St, just north of Wilmar Ave. that should be upgraded to the District 8-inch minimum size pipe.

3-3 18th Street at Wilmar Ave.
The water main in 18th Street is a dead-end main right near the intersection of Wilmar Avenue. The existing 4-inch piping was never connected to the water main in Wilmar Avenue. Connecting these water mains would provide a looping system in this area, providing increased pressure and fire flows to this area. Upsizing the water main from 4-inches to the District's 8-inch minimum would also provide a benefit to the system.

3-4 Laguna Drive Alley (from Utah Ave. to Juanita Ave.)
The Strand is fed by an 8-inch water main, with a 4-inch loop around the alley that connects back to Juanita Ave. Existing fire flows on Laguna Alley are as low as 2,200 gpm (2,500 gpm required). To provide better fire flow, looping capabilities, and to meet the District's pipe sizing minimum; an 8-inch water main should be installed to replace the old main in this location. In conjunction with Projects 1-7, 1-8, 1-10, and 3-5, this will provide a more robust system that gives operational flexibility to the District in this area.

3-5 Utah Ave Alley (Between York and Utah)
The alley between York Ave and Utah Ave is provided service by a 3-inch main. This pipeline should be upgraded to the District 8-inch minimum.

3-6 Rochelle Way Loop
Rochelle Way is provided service by a 370-foot dead-end 6-inch main. To improve water quality this main should be connected to the nearby 8-inch main if it is possible to obtain an easement.

3-7 Security Ct at Sunset Lane
Security Ct service is provided by a 2-inch dead end line. The 2-inch line should be upgraded to the district 8-inch minimum.

3-8 21st Street at River Ave
The dead-end waterline on River Ave provides fire flows of 2,680 gpm (3,500 gpm required). By looping the system with an 8-inch line running north along 21st St to Nipomo St, sufficient fire flow will be provided and the dead-end line will be eliminated.

3-9 La Vista Ct at The Pike

Existing fire flows are approximately 490 gpm (1,000 gpm required). To provide sufficient fire flow the existing 4-inch dead-end line should be upgraded to an 8-inch main. Although this area is served by the District, the homes on this street are actually in the City of Arroyo Grande. Funding for upgrading these mains may need to come from the City.

3-10 Lancaster Drive at The Pike

Existing fire flows on Lancaster Dr are as low as 750 gpm (1000 gpm required). To provide sufficient fire flow the existing 4-inch main should be upgraded to an 8-inch. Although this area is served by the District, the homes on this street are actually in the City of Arroyo Grande. Funding for upgrading these mains may need to come from the City.

3-11 Trinidad Drive at Martinique

Existing fire flows are approximately 1,700 gpm (2,500 gpm required). To provide sufficient fire flow the existing 4-inch line along Trinidad Dr should be upgraded to an 8-inch main. This main, along with others on Antigua Drive, Barbados Street, and Tobago Street are all undersized per District standards, but are actually owned by the Cienega Seabreeze development so minimum District sizing does not necessarily apply. As a good rule of practice though, these 4-inch and 6-inch ACP water mains should be upsized in the future when their service life has been reached.

Other Projects

While it is not hydraulically necessary to upgrade all of the distribution system's 4-inch lines to the District's new 8-inch standard, it is recommended that they be replaced if the budget is available, or at least upsized in the future when they reach the end of their serviceable life. Replacement of these 4-inch lines offers the further benefit of replacing old piping, improving looping, and providing better water quality and reliability.

Table 9.1 – Capital Improvement Projects List

Project No.	Description	Priority	Existing (in.)	Proposed (in.)	Length (lf)	Unit Cost	Construction Cost	Soft Cost	Total Cost
1-1	Cabrillo Hwy (Hwy 1 at 21st St.)	1	2	8	650	$150	$97,500	$39,000	$136,500
1-2	Cabrillo Hwy and Front St	1	-	8	400	$150	$60,000	$24,000	$84,000
1-3	22nd Street at Paso Robles St	1	-	8	225	$150	$33,750	$13,500	$47,250
1-4	Truman Dr	1	4	8	250	$140	$35,000	$14,000	$49,000
1-5	Railroad St Alley (Truman to Air Park)	1	4,6	10	1000	$140	$140,000	$56,000	$196,000
1-6	Norswing Dr & Pershing	1	1,2	8	900	$140	$126,000	$50,400	$176,400
1-7	Strand Way (South of Utah)	1	4	8	235	$150	$35,250	$14,100	$49,350
1-8	Laguna Dr Alley (South of Utah)	1	4	8	130	$150	$19,500	$7,800	$27,300
1-9	Cabrillo Hwy Alley (at 19th St)	1	2,4	8	700	$140	$98,000	$39,200	$137,200
1-10	Utah Ave Alley (Strand Way to Utah)	1	3	8	195	$140	$27,300	$10,920	$38,220
1-11	Pershing Dr across Hwy 1	1	-	8	200	$150	$30,000	$12,000	$42,000
1-12	Tank Inspections	1	-	-	-	-	$6,500	$2,600	$9,100
1-13	Tank Re-lining and Re-coating	1	-	-	-	-	$180,000	$72,000	$252,000
2-1	Pier Ave (Lakeside to Hwy 1)	2	6	10	1140	$140	$159,600	$63,840	$223,440
2-2	Norswing Dr Loop (North of Pier)	2	4,-	8	1750	$140	$245,000	$98,000	$343,000
2-3	Railroad Street (Creek to 17th)	2	-	8	650	$250	$162,500	$65,000	$227,500
2-4	Creek Road (Sand Dollar to Railroad)	2	-	8	480	$140	$67,200	$26,880	$94,080
2-5	16th St at Warner St.	2	2,4,6	8	940	$140	$131,600	$52,640	$184,240
2-6	14th St at Wilmar Ave.	2	2	8	380	$140	$53,200	$21,280	$74,480
2-7	Vista St (19th to 21st)	2	2	8	480	$140	$67,200	$26,880	$94,080
2-8	Warner St (19th to 21st)	2	2	8	480	$140	$67,200	$26,880	$94,080
2-9	South 4th St Upgrade	2	2	8	200	$150	$30,000	$12,000	$42,000
2-10	Temple St and Halcyon Rd	2	-	12	1075	$175	$188,125	$75,250	$263,375
2-11	Jetty Ave Alley (Palace to Fountain)	2	-	8	650	$150	$97,500	$39,000	$136,500
3-1	La Verne Avenue (22nd to 23rd)	3	4	8	500	$140	$70,000	$28,000	$98,000
3-2	23rd Street at Wilmar Ave.	3	4	8	300	$150	$45,000	$18,000	$63,000
3-3	18th St at Wilmar Ave.	3	4	8	40	$250	$10,000	$4,000	$14,000
3-4	Laguna Dr Alley (Utah to Juanita)	3	4	8	1195	$150	$179,250	$71,700	$250,950
3-5	Utah Ave Alley (York to Utah)	3	3	8	195	$140	$27,300	$10,920	$38,220
3-6	Rochelle Way Loop	3	-	8	200	$200	$40,000	$16,000	$56,000
3-7	Security Ct at Sunset Ln	3	2	8	280	$140	$39,200	$15,680	$54,880
3-8	21st St at River Ave.	3	-	8	690	$130	$89,700	$35,880	$125,580
3-9	La Vista Ct at The Pike	3	4	8	425	$140	$59,500	$23,800	$83,300
3-10	Lancaster Dr at The Pike	3	4	8	1150	$140	$161,000	$64,400	$225,400
3-11	Trinidad Dr at Martinique	3	4	8	300	$130	$39,000	$15,600	$54,600
Subtotal	Priority 1 (Orange)	1	-	-	4885	-	$888,800	$355,520	$1,244,320
Subtotal	Priority 2 (Green)	2	-	-	8225	-	$1,269,125	$507,650	$1,776,775
Subtotal	Priority 3 (Blue)	3	-	-	5275	-	$759,950	$303,980	$1,063,930
Total		**-**	**-**	**-**	**18385**	**-**	**$2,917,875**	**$1,167,150**	**$4,085,025**

CAPITAL IMPROVEMENT PROJECTS LIST

Project Number	Description	Priority	Existing (in)	Proposed (in)	Length (ft)
1-1	Cabrillo Hwy (Hwy 1 at 21st St.)	1	2	8	650
1-2	Cabrillo Hwy and Front St	1	-	8	400
1-3	22nd Street at Paso Robles St	1	-	8	225
1-4	Truman Dr	1	4	8	250
1-5	Railroad St Alley (Truman to Air Park)	1	4,6	10	1000
1-6	Norswing Dr & Pershing	1	1,2	8	900
1-7	Strand Way (South of Utah)	1	4	8	235
1-8	Laguna Dr Alley (South of Utah)	1	4	8	130
1-9	Cabrillo Hwy Alley (at 19th St)	1	2,4	8	700
1-10	Utah Ave Alleys (Strand Way to Laguna Alley)	1	3	8	195
1-11	Pershing across Hwy 1	1	-	8	200
1-12	Tank Inspections	1			-
1-13	Tank Re-linging and Re-coating	1	-	-	-
2-1	Pier Ave (Lakeside to Hwy 1)	2	6	10	1140
2-2	Norswing Dr Loop (North of Pier)	2	4,-	8	1750
2-3	Railroad Street (Creek to 17th)	2	-	8	650
2-4	Creek Road (Sand Dollar to Railroad)	2	-	8	480
2-5	16th St at Warner St.	2	2,4,6	8	940

Project Number	Description	Priority	Existing (in)	Proposed (in)	Length (ft)
2-6	14th Street at Wilmar Ave	2	2	8	380
2-7	Vista St (19th to 21st)	2	2	8	480
2-8	Warner St (19th to 21st)	2	2	8	480
2-9	South 4th St Upgrade	2	2	8	200
2-10	Temple St and Halcyon Rd	2	-	12	1075
2-11	Jetty Ave Alley (Palace to Fountain)	2	-	8	650
3-1	La Verne Avenue (22nd to 23rd)	3	4	8	500
3-2	23rd Street at Wilmar Ave.	3	4	8	300
3-3	18th Street at Wilmar Ave.	3	4	8	40
3-4	Laguna Dr Alley (Utah to Juanita)	3	4	8	1195
3-5	Utah Ave Alleys (Strand Way to Laguna Alley)	3	3	8	195
3-6	Rochelle Way Loop	3	-	8	200
3-7	Security Ct at Sunset Ln	3	2	8	280
3-8	21st St at River Ave.	3	-	8	690
3-9	La Vista Ct at The Pike	3	4	8	425
3-10	Lancaster Dr at The Pike	3	4	8	1150
3-11	Trinidad Dr at Martinique	3	4	8	300

LEGEND

- 2"
- 3"
- 4"
- 6"
- 8"
- 10"
- 12"
- PRIORITY 1
- PRIORITY 2
- PRIORITY 3
- PRESSURE VESSEL
- WATER WELL
- WATER TANK
- WHARF HYDRANT

1 INCH = 400 FEET

REV. NO	DATE	REVISED	CKD./APRD BY
		DESTROY ALL PRINTS BEARING EARLIER DATE	

Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.1407 F 805.544.3863

DATE 11/06/2019
SCALE 1" = 400'
CA JOB NO. 171019
DRAWN BY AJS
CHECKED BY

OCEANO COMMUNITY SERVICES DISTRICT
WATER DISTRIBUTION SYSTEM
CAPITAL IMPROVEMENT
PROJECT LOCATIONS
OCEANO, CALIFORNIA

FIGURE
9.1

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