Section 5

Results of Water System Analyses

Section 5: Results of Water System Analyses

FIGURES 5-1, 5-2, 5-3 DELETED FOR WEB SECURITY ISSUES.

This section presents the criteria used to evaluate the adequacy of CCSD's water system and the results of the hydraulic analyses using the water system model described in the previous section. All future scenarios were analyzed to generate ultimate system improvements to satisfy the criteria described below.

As explained in Section 2.1.4, the 4th future scenario option was selected to develop cost estimates for necessary improvements and develop the phased improvement schedule discussed in Sections 6 and 7. Unless a different scenario is mentioned in this section, results for scenario option 4 are explained in detail below.

Scenario	Dw. Units	Year	Basis/Rationale
4	4,650*	2011	Adding 3,812 existing units (estimated as of the end of 2002) plus 165 connections in process, plus 670 remaining CCSD wait listed customers. This approximates the number of dwelling units served by a proposed desalination project that was subject of an August 2000 advisory ballot and also follows a July, 2003 Board recommendation for ultimate number of units.

*Note: a dwelling unit density of 1.66 was used, consistent with the 2000 Census study.

5.1 Evaluation Criteria

A discussion of the evaluation criteria used to determine the water system improvements for CCSD's pipelines, reservoirs and pump stations is given below.

5.1.1 Pipelines

Evaluation criteria include system pressure, velocity and flow requirements for distribution system pipelines. These criteria are established to evaluate potential customer service issues such as low pressures, poor odor or taste, and excess wear and pumping due to high headlosses or lost energy in the system. At higher pressures, potential customer problems include plumbing leaks or appliance failures. At higher flow rates, velocities can approach levels that are physically destructive to pipelines and valves. Evaluation criteria were developed through discussions with CCSD staff and review of industry standards.

The water service pressure criteria used for these analyses are:

Desired minimum pressure at peak hour demand:	50 pounds per square inch (psi)
Desired minimum pressure at maximum day with fire flow:	24 psi

(This allows for a 4 psi drop from the main to the hydrant outlet so that fire flow can be delivered at 20 psi.)

Desired maximum service pressure: (Residences exceeding desired pressure can use pressure reducing valves at the service connection)	120 psi

The velocity requirements used for these analyses are as follows:

Desired maximum velocity at maximum day with fire flow:	15 feet per second (ft/s)

The fire flow criteria used for these analyses are as follows:

- 3,500 gpm for 3 hours at no less than 24 psi during Summer maximum day conditions (current and future) for Zones 3, 4, 5, 6, 7, and 8. These flows are specified for residential structure fires that are located in hazardous vegetation zones.

- 2,500 gpm for 2 hours at no less than 24 psi during Summer maximum day conditions (current and future) for Zones 3, 4, 5, 6, 7, and 8.

- 4,500 gpm at no less than 24 psi for 4 hours during Summer maximum day conditions for Zone 1 and 2. This reflects flow for a commercial structure fire or school fire in the East or West Village commercial area.

- 750 gpm sprinkler flow requirement at no less than 50 psi for all zones (to ensure 40 psi minimum at top floor of 2 story building).

- For storage, one commercial and one residential fire requiring 4,500 gpm for 4 hours and 3,500 gpm for 3 hours, simultaneously.

- For storage, one commercial and one residential fire requiring 4,500 gpm for 4 hours and 2,500 gpm for 2 hours, simultaneously.

Because Cambria has many homes that are in close proximity to one another and interface with a wildfire susceptible area, high flows to support firefighting is critical. The CCSD has addressed this issue by developing different fire flow scenarios to be modeled to see which one would be the most cost effective and beneficial.

According to the 2000 UFC Table A-III-A-1, a residential fire for a building 0-3,600 ft^2 requires 1,500 gpm of fire flow for 2 hours. If there are two homes in close proximity to one another, flow requirements can be taken from this table based upon the area of the two structures combined. For example, two 3,500 ft^2 residential structure fires in close proximity would be the same as one 7,000 ft^2 residential structure fire. From the Table A-III-A-1 the required fire flow for 7,000 ft^2 would be 2,250 gpm for 2 hours.

On September 26, 2002 the CCSD Board approved the 2000 and 2001 editions of the Uniform Fire Code. Ordinance No. 03-2002 is provided as Appendix D. This approval provides amendments requiring residential sprinklers on new construction and remodels that add

25 percent more area to an existing residence. Because of this resolution a fire sprinkler scenario was added to the modeling project.

Fire flow requirements and nodal (hydrants) assignments per the descriptions above are shown as Figure 5-1.

TABLE 5-1
TABLE A-III-A-I OF THE 2000 UNIFORM FIRE CODE

TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

FIRE AREA (square feet)					FIRE FLOW (gallons per minute)[2]	FLOW DURATION (hours)
× 0.0929 for m²				Residential Units		
Type I-F.R. II-F.R.[1]	Type II One-HR. III One-HR.[1]	Type IV-H.T. V-One-HR.[1]	Type II-N III-N[1]	Type V-N[1]	× 3.785 for L/min.	
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	2
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	3
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	4
"	"	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
"	"	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
"	"	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
"	"	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
"	"	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
"	"	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
"	"	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
"	"	191,401-Greater	128,301-Greater	85,101-Greater	8,000	

[1]Types of construction are based upon the Building Code.
[2]Measured at 20 psi (137.9 kPa). See Appendix III-A, Section 2.

5.1.2 Water Storage Reservoirs

Water Storage for residential and commercial land uses considers 3 main components in storage volume:

- Operational Storage
- Fire storage
- Emergency storage

5.1.2.1 Operational Storage

Operational Storage should account for the volume of water needed to meet the fluctuations in hourly demand within the maximum day of a target year for each pressure zone. On the basis of daily hydrographs of water consumption for similar communities, this fluctuation of hourly demand varies from 25 to 30 percent of the maximum day use. For CCSD, an operational storage criteria of 25 percent of the maximum day use is recommended.

5.1.2.2 Fire Storage

Storage for firefighting purposes should be sufficient to provide supply without the need for intra-zone transfers (i.e. pumping from a lower zone to a higher zone). Therefore, fire storage criteria is established to hold each pressure zone as self-sustaining in the event of power outages, main breaks, or other consequential events of a fire. The amount of storage desired by CCSD was developed in consultation with the recommendations of CCSD's Fire Chief and the 2000 Uniform Fire Code (UFC).

5.1.2.3 Emergency Storage

Emergency storage criteria are developed using three primary considerations.

- Temporary Service Interruptions: The general concept is to select an emergency storage volume that will be sufficient to supply the service area in times of planned or unplanned equipment outage, such as pump failure, power failure, pipeline breakage, etc.

- Disaster: Emergency storage is also needed as protection in case of major disasters such as earthquakes or other catastrophic events. Storage should be adequate to provide uninterrupted service during such circumstances.

- Reliability and Diversity of Supply Sources: Another basis for sizing of emergency storage is the reliability and diversity of the supply sources. Greater reliability and diversity of water supply sources allows smaller emergency storage requirements. Availability of standby power for water supplies improves reliability.

In recognizing the purposes of emergency storage requirements and in consultation with CCSD staff as well as generally recognized industry practices, an emergency reserve of one-half of maximum day use is recommended.

5.1.3 Pump Stations

Interzone pump stations are necessary to convey water from lower pressure zones to higher pressure zones. If gravity storage is not available in a higher pressure zone, pump stations need to be capable of providing the zone's peak hour demand, or maximum day demand plus fire flow. If adequate storage is available but the higher zone is served by a single reservoir, pump stations should be capable of providing the zone's peak hour demand so that the reservoir can be periodically removed from service. If the higher zone is served by multiple reservoirs, pump stations should be capable of providing the zone's maximum day demand as fire flow and peak hour flow are provided by the reservoirs.

5.2 Critical Conditions for Modeling

The water system model was run under a variety of normal and emergency operating conditions. Normal condition analyses include average day, maximum day, and peak hour demands for both existing and future conditions. Emergency condition model simulations include several fire flow scenarios for existing and future maximum day demands, with varying levels of planned housing units and dwelling unit densities. Fire flow scenarios were developed with CCSD input using guideline set forth by the 2000 UFC. Of these modeled operating conditions, the following were identified as critical conditions for the purpose of evaluating water system improvements:

- Peak hour demand for future conditions (normal operations).
- Simultaneous commercial (4,500 gpm for four hours) and residential (3,500 gpm for three hours) fires during future maximum day.
- Simultaneous commercial (4,500 gpm for four hours) and residential (2,500 gpm for 2 hours) fires during future maximum day demand.
- Fire sprinkler activation (750 gpm at 50 psi) during future maximum day demand.
- Wildfire support (4,500 gpm until emergency storage capacity is exhausted) during future maximum day demand at designated "safe havens" where firefighting vehicles can be safety and rapidly refilled. Designated "safe havens" were identified by CCSD staff.

5.3 Results of Hydraulic Analyses

Hydraulic analyses of CCSD's existing water system were performed using the model development, refinement, and calibration process explained in Section 4. In the model, pressure reducing stations were set at operator verified pressures. (Note: because the model utilizes topographic contours from CCSD's GIS system, small pressure variations between those resulting from the model and those resulting from field measurements should be expected). Results from the hydraulic analyses for critical conditions are discussed in the following subsections.

5.3.1 Future, Peak Hour Demand

A Peak Hour Demand scenario was evaluated for future conditions, using 4,650 dwelling units with a density of 1.66 persons/dwelling unit. At this demand condition, there exist areas with system pressures below the desired minimum of 50 psi. (The regulatory requirement for minimum pressure is 20 psi)[8], or above the desired maximum pressure of 120 psi. Generally, the areas of low pressure are located in higher elevation portions of Zones 1, 2, 3, and 4. The lowest system pressure (excluding transmission mains where static pressures are low due to nearness to a tank or prv) is approximately 33 psi located in Zones 1, 2, & 3 at junctions 274, 648, & 976 respectively (refer to Figure 4-2 for node location). The areas of high pressure are primarily located in Zones 1 and 2 and smaller portions of Zones 3, 5, and 7. The highest

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[8] State of California, Waterworks Standards (Proposed). Article 1, Section 64602 (a). Dated August 16, 2002.

25 percent more area to an existing residence. Because of this resolution a fire sprinkler scenario was added to the modeling project.

5.1.2 Water Storage Reservoirs

Water Storage for residential and commercial land uses considers 3 main components in storage volume:

%œ Operational Storage
%œ Fire storage
%œ Emergency storage

5.3.2 Future, Maximum Day Demand: Simultaneous Residential and Commercial Fire Flows

A Maximum Day Demand scenario was evaluated for future conditions, using all scenarios outlined in Section 2.1.4. CCSD's objective was to meet the hydraulic criteria outlined in Section 5.1.1 to serve a potential event of simultaneous commercial and residential fires. For example, if zone 1 (on the north side of Highway 1), which is primarily commercial and zone 3 (on the south side of Highway 1), which is primarily residential experience fires at the same time, District pipelines will be improved to serve occupants from both land uses and system-wide.

This analysis selected 10 critical commercial nodes to assign the point-load, commercial fire flow of 3,500 gpm. Each simulation was then run to include the combination of 1 commercial and 1 residential fire flow. This evaluation was performed for the all residential nodes, combining each of the 10 critical commercial locations to identify locations of high headloss, high velocities, and low residual pressures.

A sample of the most critical nodes per zone among all analysis run for future maximum day demand, simultaneous commercial and residential fire flows are summarized in Tables 5-3 and 5-4.

TABLE 5-3
CRITICAL NODES FOR SIMULTANEOUS COMMERCIAL AND RESIDENTIAL (4,500 GPM) FIRES

Pressure Zone	Junction Node Number	Description
1	338	Windsor Blvd. terminus
1	350	Huntington Rd./ Worchester Dr.
2	886	Arliss Dr./ Pickwick Ln.
3	944	Stuart St./ Holden Pl.
4	1006	Stuart St./ Lyle Ave.
6	116	Charing Ln.
7	402	Sunbury Ave./Weymouth St.
8	96	Exeter Ln.

TABLE 5-4
CRITICAL NODES FOR SIMULTANEOUS COMMERCIAL AND RESIDENTIAL (2,500 GPM) FIRES

Pressure Zone	Junction Node Number	Description
1	338	Windsor Blvd. terminus
1	386	Huntington Rd./ Pembrook Dr.
2	622	Randal Rd. terminus zone 2
3	1004	Berwick Dr. zone 3 terminus
4	1156	Lyle Ave.
5	510	Windsor Dr. terminus
7	1120	Coventry Lane terminus
8	96	Exeter Ln.

The results of the hydraulic analyses indicate that with CCSD's existing distribution system, there exist several locations which do not meet the desired minimum pressure of 24 psi with the projected future demand and simultaneous commercial and residential fire flows. Residual pressures for the 4th scenario option (4,650 dwelling units, with 1.66 persons/dwelling) are provided in Table 5-5 and illustrated in Figures 5-3 and 5-4. The node identification, location, pressure zone, and residual pressure for low-pressure nodes are summarized in Appendix E.

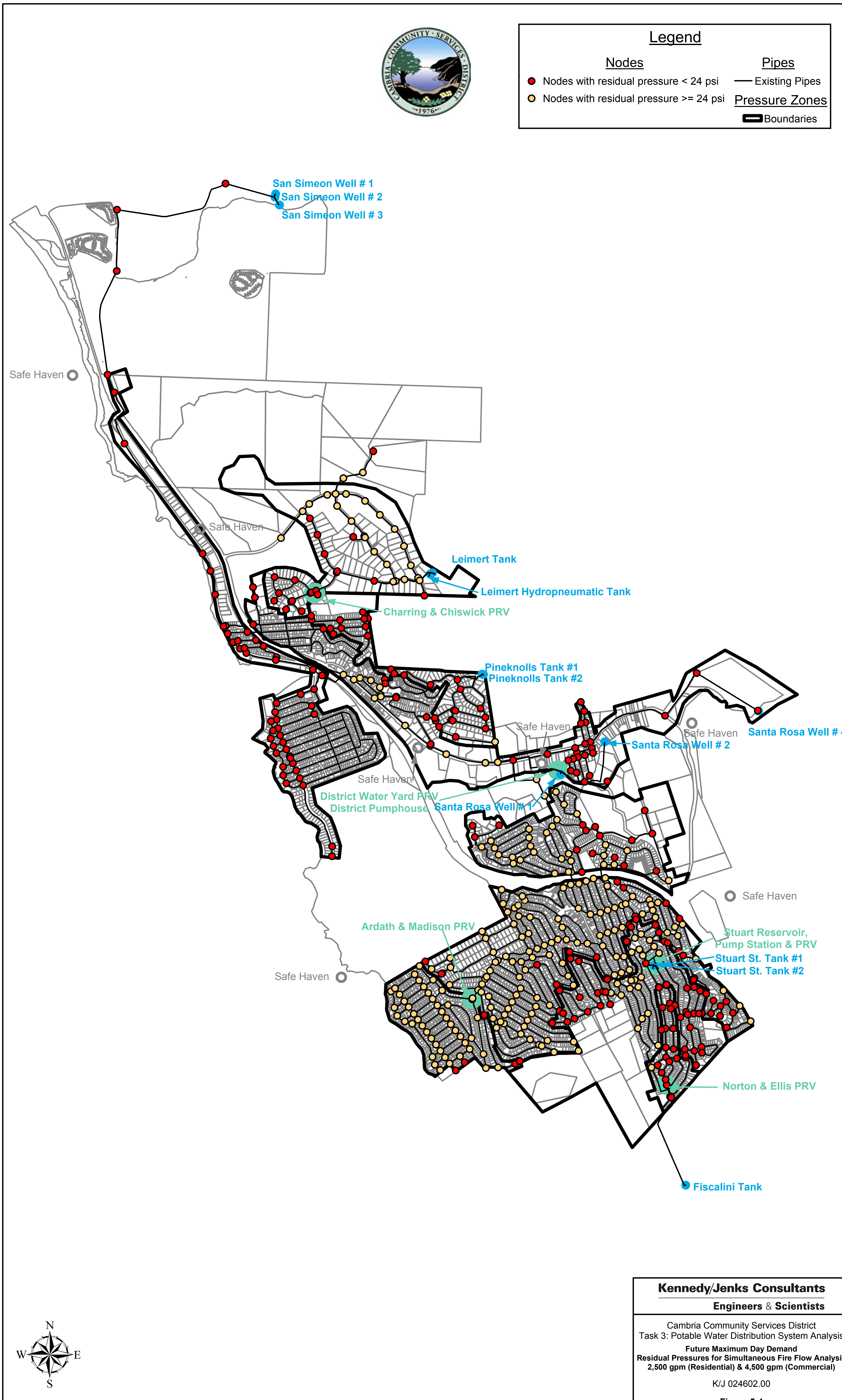
TABLE 5-5
SUMMARY OF WATER SYSTEM NODES RESIDUAL PRESSURES DURING SIMULTANEOUS COMMERCIAL (4,500 GPM) AND RESIDENTIAL (3,500 GPM OR 2,500 GPM) FIRES

Simultaneous Commercial (4,500 gpm in Zone 1) and Residential (3,500 gpm in Zone 3) Fires

	Nodes with Pressures <24 psi	Nodes with Pressures >24 psi
Zone 1	24	130
Zone 2	0	186
Zone 3	64	5
Zone 4	27	2
Zone 5	0	50
Zone 6	0	36
Zone 7	1	33
Zone 8	0	11

Simultaneous Commercial (4,500 gpm in Zone 1) and Residential (2,500 gpm in Zone 2) Fires

	Nodes with Pressures <24 psi	Nodes with Pressures >24 psi
Zone 1	32	122
Zone 2	0	186
Zone 3	3	66
Zone 4	0	29
Zone 5	0	50
Zone 6	0	36
Zone 7	2	32
Zone 8	1	10



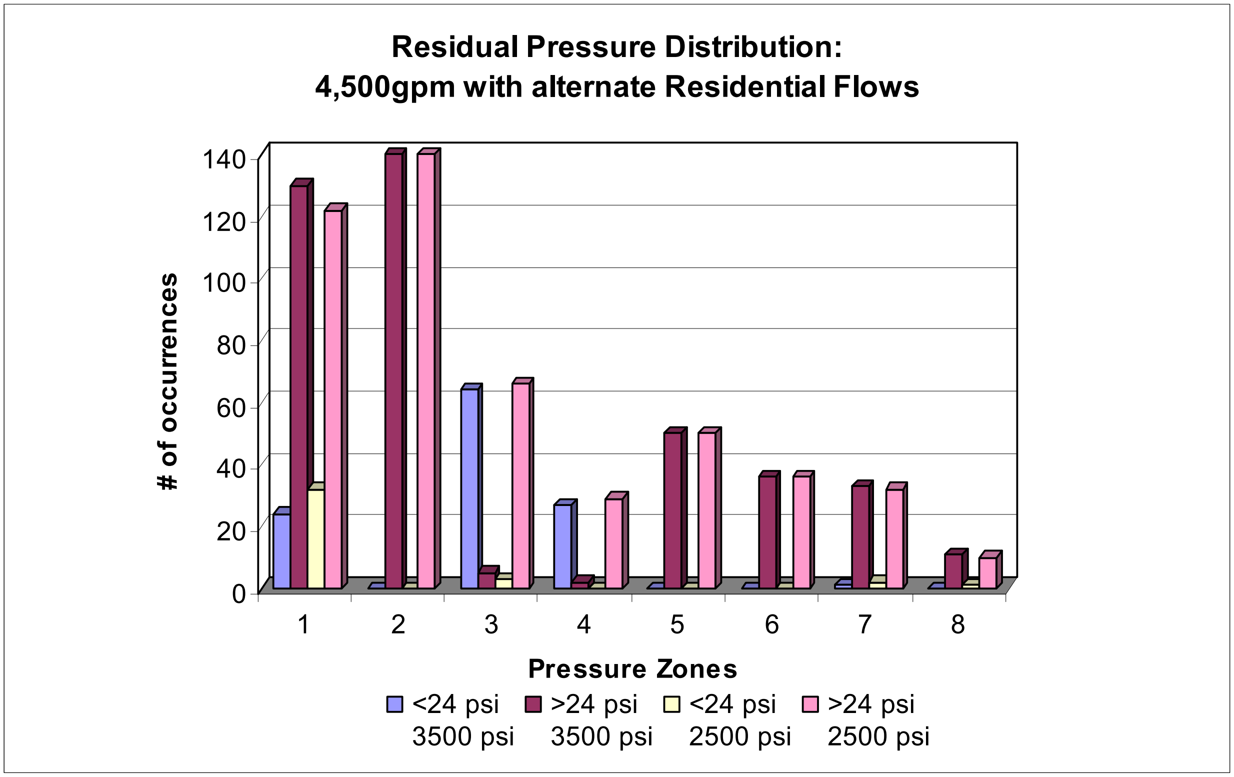
Kennedy/Jenks Consultants
Engineers & Scientists

Cambria Community Services District
Task 3: Potable Water Distribution System Analysis

Future Maximum Day Demand
Residual Pressures for Simultaneous Fire Flow Analysis
2,500 gpm (Residential) & 4,500 gpm (Commercial)

K/J 024602.00

Figure 5-4



5.3.3 Fire Sprinkler Activation During Future Maximum Day Demand

Similar to the simultaneous fire evaluation, a global flow analysis was used to determine the critical nodes at which the analysis would be performed. Hydraulic analyses was performed by applying a fire sprinkler demand of 750 gpm at the identified node and evaluating the residual pressure. A minimum residual pressure of 50 psi is desired. These nodes and the resulting residual pressure are summarized in Table 5-6. The lowest residual pressure is 37 psi located in Zone 1. Generally, areas with low residual pressures are located in Zones 1, 2, 4, and 7 and near pressure reducing valves or in the upper elevations of a pressure zone. The nodes at which the residual pressure does not meet the minimum desired pressure for fire sprinkler operations should be evaluated on a case by case basis as to whether alternative connection routes or boosting pressure would be necessary.

TABLE 5-6
SUMMARY OF WATER SYSTEM NODES WITH LOW RESIDUAL PRESSURE DURING SPRINKLER ACTIVATION (750 GPM AT 50 PSI)

	Nodes With Pressure <50 psi	Nodes With Pressure >50 psi	Node Totals
Zone 1	10	144	154
Zone 2	8	178	186
Zone 3		69	69
Zone 4	11	18	29
Zone 5		50	50

Zone 6	1	35	36
Zone 7	5	29	34
Zone 8		11	11
Total	35	534	569

5.3.4 Wildfire Support During Maximum Day Demand

Potential "Safe Havens" were identified by the CCSD Fire Chief as strategic locations where fire fighting personnel could go to refill firefighting vehicles when fighting major wildfire. Seven identified locations were modeled to deliver the desired flow of 4,500 gpm at a minimum residual pressure of 24 psi. Table 5-7 summarizes the locations of the potential Safe Havens as well as the residual pressures at these locations. The locations of potential Safe Havens are shown on Figure 4-1. Of the identified potential Safe Havens, only one location can maintain the desired minimum residual pressure of 24 psi without improvements.

TABLE 5-7
RESIDUAL PRESSURES AT POTENTIAL SAFE HAVENS

Safe Haven	Zone	Fire Flow Demand (gpm)	Residual Pressure (psi) Before Improvements
Pine Knolls Drive/ Main Street	1	4500	50.3
Main Street Between Tamson and Wall	1	4500	-62.8
Main Street/ Santa Rosa Creek Road	1	4500	-200
Eton Rd/ State HWY. 1	2	4500	-23
East West Ranch Zone 1 & 5 Connector	Between 1 & 5	4500	Future Location
Moonstone Beach Drive Across from Cambria Pines Drive	1	4500	56.4
Moonstone Beach Drive/ State HWY. 1	1	4500	-30

5.4 Reservoirs

Based on the established evaluation criteria for the reservoirs and discussion with CCSD staff regarding storage distribution, the capacities of the existing reservoirs were evaluated. Results of this evaluation are presented in Table 5-8. Significant deficiencies have been identified for each future scenario analyzed. Costs proposed in Section 6 are based on fire storage required to serve the 4th scenario option of 4,650 dwelling units with 1.66 persons per dwelling unit.

5.5 Pump Stations

Based on the established evaluation criteria for pump stations, the capacities of the existing pump stations were evaluated. The results of this evaluation are presented in Table 5-9. This evaluation indicates that the existing pump stations have sufficient capacity if the reservoir capacities are increased to the established criteria.

TABLE 5-8
EVALUATION OF EXISTING RESERVOIRS

Reservoir	Year/ # of Residential Units	Fire Flow Scenario (gpm)	Zones Served	Average Daily Demand (MGD)	Maximum Daily Demand (MGD)	Storage Requirements (MG) Operational	Fire	Emergency	Total Required Storage (MG)	Total Existing Storage (MG)	Total Storage Deficit (MG)
Pine Knolls											
	Current	2500	1	0.270	0.405	0.101	0.630	0.202	0.934	0.206	0.728
		3500	1	0.270	0.405	0.101	0.630	0.202	0.934	0.206	0.728
	Future - 6700	2500	1	0.519	0.779	0.195	0.630	0.390	1.214	0.206	1.008
		3500	1	0.519	0.779	0.195	0.630	0.390	1.214	0.206	1.008
	Future - 5700	2500	1	0.482	0.723	0.181	0.630	0.362	1.172	0.206	0.966
		3500	1	0.482	0.723	0.181	0.630	0.362	1.172	0.206	0.966
	Future - 5250	2500	1	0.465	0.698	0.175	0.630	0.349	1.154	0.206	0.948
		3500	1	0.465	0.698	0.175	0.630	0.349	1.154	0.206	0.948
	Future - 4650	2500	1	0.443	0.665	0.166	0.630	0.332	1.128	0.206	0.922
		3500	1	0.443	0.665	0.166	0.630	0.332	1.128	0.206	0.922
Stuart Street											
	Current	2500	2,5,7	0.356	0.534	0.134	0.300	0.267	0.701	0.337	0.364
		3500	2,5,7	0.356	0.534	0.134	0.300	0.267	0.701	0.337	0.364
	Future - 6700	2500	2,5,7	1.097	1.646	0.411	0.300	0.823	1.534	0.337	1.197
		3500	2,5,7	1.097	1.646	0.411	0.300	0.823	1.534	0.337	1.197
	Future - 5700	2500	2,5,7	0.987	1.480	0.370	0.300	0.740	1.410	0.337	1.073
		3500	2,5,7	0.987	1.480	0.370	0.300	0.740	1.410	0.337	1.073
	Future - 5250	2500	2,5,7	0.937	1.405	0.351	0.300	0.703	1.354	0.337	1.017
		3500	2,5,7	0.937	1.405	0.351	0.300	0.703	1.354	0.337	1.017
	Future - 4650	2500	2,5,7	0.870	1.306	0.326	0.300	0.653	1.279	0.337	0.942
		3500	2,5,7	0.870	1.306	0.326	0.300	0.653	1.279	0.337	0.942

Reservoir	Year/ # of Residential Units	Fire Flow Scenario (gpm)	Zones Served	Average Daily Demand (MGD)	Maximum Daily Demand (MGD)	Storage Requirements (MG) Operational	Fire	Emergency	Total Required Storage (MG)	Total Existing Storage (MG)	Total Storage Deficit (MG)
Fiscalini											
	Current	2500	3,4	0.067	0.101	0.025	0.300	0.051	0.376	0.320	0.056
		3500	3,4	0.067	0.101	0.025	0.630	0.051	0.706	0.320	0.386
	Future - 6700	2500	3,4	0.333	0.499	0.125	0.300	0.250	0.675	0.320	0.355
		3500	3,4	0.333	0.499	0.125	0.630	0.250	1.005	0.320	0.685
	Future - 5700	2500	3,4	0.293	0.440	0.110	0.300	0.220	0.630	0.320	0.310
		3500	3,4	0.293	0.440	0.110	0.630	0.220	0.960	0.320	0.640
	Future - 5250	2500	3,4	0.276	0.413	0.103	0.300	0.207	0.610	0.320	0.290
		3500	3,4	0.276	0.413	0.103	0.630	0.207	0.940	0.320	0.620
	Future - 4650	2500	3,4	0.252	0.378	0.094	0.300	0.189	0.583	0.320	0.263
		3500	3,4	0.252	0.378	0.094	0.630	0.189	0.913	0.320	0.593
Leimert											
	Current	2500	6,8	0.034	0.051	0.013	0.300	0.025	0.338	0.120	0.218
		3500	6,8	0.034	0.051	0.013	0.300	0.025	0.668	0.120	0.218
	Future - 6700	2500	6,8	0.065	0.098	0.024	0.300	0.049	0.373	0.120	0.253
		3500	6,8	0.065	0.098	0.024	0.300	0.049	0.703	0.120	0.253
	Future - 5700	2500	6,8	0.060	0.091	0.023	0.300	0.045	0.368	0.120	0.248
		3500	6,8	0.060	0.091	0.023	0.300	0.045	0.698	0.120	0.248
	Future - 5250	2500	6,8	0.058	0.088	0.022	0.300	0.044	0.366	0.120	0.246
		3500	6,8	0.058	0.088	0.022	0.300	0.044	0.696	0.120	0.246
	Future - 4650	2500	6,8	0.056	0.083	0.021	0.300	0.042	0.363	0.120	0.243
		3500	6,8	0.056	0.083	0.021	0.300	0.042	0.693	0.120	0.243

TABLE 5-9
EVALUATION OF EXISTING PUMP STATIONS

Pump Station	Zones Served	Reservoirs Serving Zones (Number of Reservoirs)	Future Peak Hour (gpm)	Future Max Day (gpm)	Fire Flow* (If Pressure Zones are not Served by Gravity Storage) (gpm)	Current Pumping Capacity (gpm)	Required Pumping Capacity (gpm)	Additional Pumping Capacity Required (gpm)
Leimert	6,8	Leimert (1)	116	58	2500	1500	2,558	1,058
Stuart St.	3,4	Fiscalini (1)	525	263	0	910	526	0
Yard	2,7,5	Stuart St. (2),	1812	906	0	1400	906	0
Wells	1	Pine Knolls (2)	924	462	0	1800	464	0

*CCSD has identified critical fireflow and storage needs for zones 6 & 8.
As such, pumping from zone 1 is anticipated to augment the single Leimert tank, which currently shows deficient..