



March 19, 2012

Donna Leatherman
Calaveras Public Utilities District
P.O. Box 666
506 W. St. Charles Street
San Andreas, CA 95249

RE: CPUD Master Plan Analysis

Dear Ms. Leatherman,

Forsgren Associates, Inc. (Forsgren) has completed its analysis of the Calaveras Public Utility District (District) 2008 Master Plan, in accordance with the scope of services under Task Order 11-01. The purpose of this analysis was to assist the District in developing a “Road Map” that 1) incorporates the elements of the Master Plan, and other District needs and projects; and 2) prioritizes these various needs and projects so that the District can effectively plan and allocate resources.

This Technical Memorandum presents the results of our analysis, and includes the following:

- Master Plan Summary
- Master Plan Analysis
- Recommendations

MASTER PLAN SUMMARY

The Master Plan (MP) evaluates the District’s raw and treated water facilities, current (2008) and future water demands, and water supply. The MP then describes the hydraulic model developed to analyze the system, the analysis of the system under current and future scenarios, and the findings of the analysis. Finally, the MP recommends a Capital Improvement Program (CIP). A brief summary of the MP findings is presented in the sections below.

Facilities

The District’s facilities are briefly described below.

Raw Water

Raw water is pumped from the South Fork of the Mokelumne River to the Jeff Davis reservoir, which provides the raw water supply for the District’s water treatment plant. The District also has rights to the Schaad’s Reservoir, which is located approximately 6.25 miles northeast of the Jeff Davis reservoir. Water from Schaad’s Reservoir currently drains through a hydro via gravity to the Middle Fork of the Mokelumne River where the District pumps raw water to the Jeff Davis Reservoir. According to the MP, the Schaad’s hydro is in need of rehabilitation.

Since the Schaad’s Reservoir has an elevation about 150’ higher than the Jeff Davis Reservoir, gravity flow from Schaad’s Reservoir to the Jeff Davis Reservoir may be economically beneficial. Two alternatives are possible to reduce pumping costs at the Jeff Davis Reservoir.

The first alternative would be to construct a pipeline from Schaad's Reservoir directly to the South Fork Pump Station. This would increase the suction head on the South Fork Pump Station, thus reducing overall pumping costs. A preliminary evaluation of this alternative was done in 2001 by KASL Engineers. The second alternative would be to construct a pipeline directly from Schaad's Reservoir to the Jeff Davis Reservoir. This option would eliminate the need to pump water from the South Fork. The South Fork Pump Station could remain as a backup supply in the event of an emergency. As part of this effort we reviewed a preliminary progress report of this study, which did not provide conclusions or recommendations.

Treatment Plant

The average daily production of the plant in 2007 was 1.33 MGD, with the largest daily demand of 3.07 MGD. Growth projections for 2030 in the MP estimate average daily demand would be 1.95 MGD and maximum daily demand of 4.48 MGD. The current capacity of the plant is 6 MGD, with a potential for expansion to 12 MGD. At this time, it appears the water treatment plant capacity is adequate to meet current and projected demands through 2030.

Distribution System

The MP analyzed pressures in the distribution system for the existing condition and future growth scenarios for the average daily flow (ADF), maximum hourly flow (MHF), and maximum daily flow with fire flow (MDF). Areas identified for future development include the area near Highway 12 & Highway 49, Mountain Ranch, Toyon and Phase II in Saddleback. The MP reviewed pump capacity, treated water storage, and system pressures. According to the MP, the existing pump stations and total water storage is adequate for the foreseeable future. However, the MP also indicated low pressures existed at Saddleback, Golden Hills and Church Hill for the MHF scenario. The District has since raised pressures at the Garamendi hydro by 8 psi, which reportedly has helped, but not fully solved the problem. Additionally, low pressures for the fire flow scenario were observed for Glencoe, Mokelumne Hill and San Andreas.

Distribution System Hydroelectric Pressure Reducing Stations

The District uses hydroelectric pressure reducing stations (hydros) at three locations in the distribution system. Based on the MP, the hydros in the distribution system appear to be undersized for the current maximum hourly demand flow rates. According to the MP, the hydros have a capacity of 1,300 GPM each, and the 2008 maximum hour flows are approximately 1,800 GPM. This means that flow regularly bypasses each hydro during maximum hour flows. This bypass flow represents lost opportunity to generate electricity at a revenue loss of about \$10,000 - \$15,000 per year for the District according to the MP.

Water Supply

According to the MP, the District has a right to natural and stored water from the Mokelumne River of 15 cfs, up to 9,125 acre-feet per year. This right was limited to 6,656 acre-feet by the safe yield established in Water Right Order 16338. The current (2008) estimated water usage is approximately 1,467 acre-feet.

Capital Improvement Program

The CIP recommended in Chapter 9 of the MP is summarized in Table 1 (below). This summary includes the specific categories and improvements identified in the CIP, as well as the rationale for the recommended projects. The CIP does not include project descriptions or rationale, so, for convenience, we have included a “Rationale” column in Table 1 that provides some background for each of the projects (where available). Costs were not included in this summary.

Table 1 - Capital Improvement Program Summary (from 2008 Master Plan)

	Improvement	Rationale
Water Supply		
	Develop water rights and plan to put to beneficial use	Page 14 indicates 6,656 AF is available while the current demand is 2,181 AF, and an ADF of 6,656AF will be reached by 2079.
Raw Water Reservoirs		
	Remove Siltation from Schaads Reservoir	-
	Install Flashboards on River at Schaads Reservoir Diversion	-
	Reconstruct Schaads Hydro	-
	Recapture Jeff Davis Dam Drainage water	-
Raw Water Conveyance		
	Rebuild PS motors, rewind, replace switchgear	Page 8 indicates two 400HP Floway vertical turbine pumps were installed in 1972 capable of producing a combined 3,300gpm. Additionally, page 30 indicates the pump capacity is more than adequate to meet the District’s future needs.
Water Treatment Process		
	Install Baffles in Clearwell to increase CT credit	Page 27 indicates the capacity of the WTP is limited by its ability to provide disinfection. Page 27 indicates installing baffles in the clearwell will increase contact time, which will allow the WTP to increase capacity from 4 MGD to 6 MGD.
	Upgrade Turbidimeters, Install SCADA, Divert Spike Water to waste	-
	Refurbish Plant equipment, including media replacement	Page 32 indicates media needs to be replaced every 10-12 years and was last replaced in 2005.
	Begin Planning for Expanded WTP	Page 31 indicates the 6 MGD capacity of the WTP will be exceeded by 2037.
Treated Water Pumping		
	Select Dedicated Hydropneumatic Systems or Booster pumping systems	Page 22 indicates areas of very low pressure have been identified within the system, and some areas of low pressure coupled with future demands will prevent the water tanks (such as Golden Hills Tank) in the area from becoming completely filled.
	Install Generator at Glencoe PS	Page 24 indicates power losses occur multiple times per year, and that installing a generator is the most economical alternative (\$160k).

Table 1 - Capital Improvement Program Summary (from 2008 Master Plan)

	Improvement	Rationale
Treated Water Pipelines		
	Select PRV Installations	Pages 25 / 26 state that approximately one-third of the current hydrants cannot supply their required fire flow without reducing pressure in the system below 20psi, and that adjusting existing PRV settings will increase available fire flow.
	Annualized Aging Pipeline Replacements (<= 12" dia)	Page 9 states some pipelines are over 50 years old, and page 33 gives estimated cost for regular repair and replacement of the District's distribution pipelines. Specific locations and estimated quantities were identified in Figures C-1 to C-16.
Hydros (Treated Water)		
	Rebuild and increase capacity of hydros 1-3 on transmission main	The hydros have a capacity of 1,300 GPM each, and the 2008 maximum hour flows were 1,800 GPM. This means that flow regularly bypasses each hydro during maximum hour flows. This bypass flow represents lost opportunity to generate electricity at a revenue loss of about \$10,000-\$15,000 per year for the District.

MASTER PLAN ANALYSIS

The MP appears to only provide detailed recommendations for a few specific improvements – PRV adjustments, Clearwell baffle installation, distribution system hydro upgrades, and a generator at the Glencoe Pump Station. Most of these projects have already been addressed by the District. Recommendations for annualized pipeline replacements, Hydropneumatic tanks/booster pumps, and water treatment plant upgrades are included in the CIP, but specific project details are not provided. Finally, recommendations for siltation removal at Schaad’s reservoir, installation of flashboards for the Schaad’s diversion, and the Schaad’s hydro reconstruction were included in the CIP, but not mentioned in the MP. We assume these recommendations precipitated from discussions with District staff.

To facilitate a comprehensive understanding of the District’s needs and recommended projects, we have created a second table (Table 2, attached) that includes the contents of Table 1 for reference, and is expanded to include our analysis. Specifically, columns have been added for “Analysis” and “Next Steps”, and rows have been added for other District needs and contemplated projects identified during this effort.

RECOMMENDATIONS

While the recommendations included within this Technical Memorandum can be addressed individually, they are closely interrelated. Short and long-term capital improvements are critical to the District’s mission to cost effectively provide safe and reliable drinking water for existing and future customers. To fulfill this mission, the District should maintain existing infrastructure, address system deficiencies, implement a sustainable rate structure, and capitalize on unused water rights and put them to beneficial use.

Comprehensive water distribution system maps were apparently not included for District operations staff as part of the MP, although most of the data is available to develop these maps. The MP recommended annual budgets for distribution line replacements, but did not prioritize or include estimated cost for specific projects. These line replacements represent a significant capital investment for the district and it is critical that these projects be well defined, properly prioritized, and efficiently designed to ensure that rate payers are protected. District staff has developed an in-house working model of the CPUD pipe-network system using EPANET software. We recommend

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refining distribution system maps and calibrating/updating the hydraulic model to verify low pressures and operational issues. The model can then be used to optimize the best solutions to address these issues.

We would be pleased to review the final report for pertinent information which may be useful in determining the most appropriate action regarding a new pipeline from Schaad's Reservoir, when available. We recommend a detailed life-cycle economic analysis comparing the costs of replacing the existing hydro at Schaad's reservoir against installing a direct pipeline to the suction side of the Middle Fork Pump Station or installing a gravity line from Schaad's reservoir to the Jeff Davis Reservoir.

Of course, the cost of implementing the previously recommended improvements should be balanced against potential revenues. We recommend a review of the current rate structure to establish an implementation schedule of proposed capital improvements and/or determine if rate increases are necessary to cover the actual cost of producing and distributing water.

Based on our review of the available material, the current and foreseeable District needs have been outlined in the Table included in the Appendix of this report. These improvements will be prioritized upon further analysis and discussion with District staff and will be updated regularly as projects are completed and District needs evolve.

Respectfully Submitted,



Alan Driscoll
Division Manager

Cc: C. Kemp, P.E.

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Water Supply	Develop water rights and Plan to put to beneficial use	--	Page 14 of the Master Plan indicates 6,656 AF is available while the current demand is 2,181 AF. Furthermore, the Master Plan indicates an ADF of 6,656AF will be reached 2079.	\$100,000	While no explicit description for developing water rights was stated in the Master Plan, Forsgren assumes this improvement was listed based on discussions with District staff. In general, water utilities are under increased pressure to "use or lose" water rights.	Develop strategy and specific actions to put unused water rights to beneficial use (Service Expansion, contract sales, groundwater banking credits, etc)
Raw water Reservoirs	Remove Siltation from Schaads Reservoir	--	--	\$500,000	The rationale for these improvements is assumed to be based on discussions with District staff, but was not captured in the Master Plan.	Verify need for, and preferred timing for siltation removal. Prepare Request for Bids.
	Install Flashboards on River at Schaads Reservoir Diversion	--	--	\$500,000	The rationale for these improvements is assumed to be based on discussions with District staff, but was not captured in the Master Plan.	Verify need for, and preferred timing for Flashboard Installation. Evaluate head vs. flow characteristics at Schaad's Diversion. Identify alternatives, if appropriate.
	Reconstruct Schaads Hydro	--	--	\$350,000	The rationale for these improvements is assumed to be based on discussions with District staff, but was not captured in the Master Plan. Also, there are reportedly penstock problems.	Verify condition of Schaads Hydro unit. Conduct life-cycle analysis of reconstruction/ replacement options. Video penstock as/if needed to determine condition.
	Recapture Jeff Davis Dam Drainage water	--	--	\$275,000	The rationale for these improvements is assumed to be based on discussions with District staff, but was not captured in the Master Plan.	Develop specific objectives and evaluate alternative improvement concepts.
Raw Water Conveyance	Rebuild PS motors, rewind, replace switchgear	--	--	\$330,000	Page 8 of the Master Plan indicates two 400HP Floway vertical turbine pumps were installed in 1972 capable of producing a combined 3,300gpm. Additionally, page 30 of the Master Plan indicates the pump capacity is more than adequate to meet the District's future needs. The pumps may require this improvements as part of routine maintenance. The pumps are rotated manually.	Verify need for, and preferred timing of improvements. Automate pump rotation. Prepare Request for Bids.

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Water Treatment Process	Install Baffles in Clearwell to increase CT credit	Install baffles in clearwell at Jeff Davis WTP	Page 27 of the Master Plan indicates the capacity of the WTP is limited to its ability to provide disinfection. Additionally, page 27 of the Master Plan indicates installing baffles in the clearwell will increase contact time, which will allow the WTP to increase capacity from 4 MGD to 6 MGD.	\$175,000	This appears to be necessary for the water treatment plant to reach its current treatment capacity potential.	N/A. Project completed.
	Upgrade Turbidimeters, Install SCADA, Divert Spike Water to waste	--	--	\$330,000	The rationale for these improvements is assumed to be based on discussions between PBI and District staff, which was not captured in the Master Plan.	Field verify needs. Prepare concepts & cost estimates. Design and construct as needed.
	Refurbish Plant equipment, including media replacement	Replace filter media at Jeff Davis WTP	Page 32 indicates media needs to be replaced every 10-12 years and was last replaced in 2005.	\$770,000	The filter media is likely reaching the end of its useful life. Since the District is currently participating in a Watershed Sanitary Survey with CCWD, we recommend reviewing the results of the WSS to see if any treatment deficiencies need to be (or can be) addressed in conjunction with the filter media replacement. It should also be noted that the filters were recently core tested and it is anticipated they will be addressed next year.	Review Watershed Sanitary Survey for additional treatment criteria. Prepare Request for Bids, as appropriate.
	Begin Planning for Expanded WTP	--	Page 31 of the Master Plan indicates the 6 MGD capacity of the WTP will be exceeded by 2037.	\$220,000	This recommendation in our opinion is premature. The treatment plant capacity of 6 MGD appears to be adequate until at least 2037. Expanding the WTP is a low priority until treated water demand increases or treatment standard significantly change.	Monitor water demands and assess the priority of this project every five years.
Treated Water Pumping	Select Dedicated Hydropneumatic Systems or Booster pumping systems	Install hydropneumatic systems or booster pumping systems in specific areas identified as low pressure	Page 22 of the Master Plan indicates areas of very low pressure have been identified within the system. Furthermore, the Master Plan indicates some areas of low pressure coupled with future demands will prevent the water tanks (such as Golden Hills Tank) in the area from becoming completely filled.	\$550,000	These areas of low pressure were based on system demands in 2008. Since then, system demands have changed due to conservation efforts, infrastructure improvements, etc. The hydraulic model should be updated and re-calibrated to assess the low pressures and provide detailed recommendations for specific improvements in these areas. This may be a significant health and safety issue.	Update and re-calibrate the hydraulic model. Exercise the model to identify areas of concern or "need" within the system.

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Treated Water Pumping (Continued)	--	Area on the discharge side of the Railroad Flat tank, including to the east on Ridge Road,	Modeled pressures are less than 20 psi near the tank, and less than 30 psi east on Ridge Road	--	See Above	See Above
	--	Area in the immediate vicinity of the suction side of the Glencoe pump station	Modeled pressures are less than 15 psi	--	See Above	See Above
	--	The transmission pipeline immediately downstream of the Main Control Valve hydro	Modeled pressure is less than 25 psi	--	See Above	See Above
	--	The inlet and outlet pipelines from the Mokelumne Hill tank	Modeled pressures are approximately 15 psi	--	See Above	See Above
	--	The immediate vicinity of the outlet side of the Paloma tank	Modeled pressures are approximately 10 psi.	--	See Above	See Above
	--	The inlet/outlet of the Golden Hills tank	Modeled pressures are approximately 6 psi	--	See Above	See Above
	--	The immediate vicinity of the inlet and outlet side of the San Andreas tank	Modeled pressures are less than 25 psi.	--	See Above	See Above
	--	The area along Sunset Street, Mariposa Street, and Oak Street in the Church Hill pressure zone	Modeled pressures are approximately 30 psi	--	See Above	See Above
	--	The southern end of Saddleback drive	Modeled pressures are less than 25 psi	--	See Above	See Above
		Install Generator at Glencoe Pump Station	Install an electric generator at Glencoe Pump Station	Page 24 of the Master Plan indicates power losses occur multiple times per year. Based on the Master Plan, installing a generator is the most economical alternative (\$160k).	\$160,000	N/A. It is our understanding that this work has been completed.
	Select PRV Installations	Install PRVs at select locations and adjust pressures of existing PRVs	Pages 25 and 26 of the Master Plan indicate that adjusting existing PRV settings will increase available fire flow. According to the Master Plan, approximately one-third of the current hydrants cannot supply their required fire flow without reducing pressure in the system below 20psi.	\$75,000	It appears the modification of these PRV's will greatly increase the available fire flow. Since the system demands have altered since 2008, an updated and calibrated hydraulic model should be prepared to ensure these modifications allow for adequate fire flow pressures based on current system demands.	Update and calibrate the District's hydraulic model, provide specific recommendations and cost estimates for each area.
Treated Water Pipelines (Continued)	--	At Church Hill PRV #1, increase pressure from 19psi to 30psi	To increase available fire flow	--	See Above	See Above
	--	At Angels Road PRV, decrease pressure from 72psi to 60psi	To increase available fire flow	--	See Above	See Above
	--	At Grammar School PRV, increase pressure from 75psi to 95psi	To increase available fire flow	--	See Above	See Above

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Treated Water Pipelines (Continued)	--	At Ken James PRV, reverse direction to deliver water north and east, set pressure at 75psi	To increase available fire flow	--	See Above	See Above
	--	At Gold Strike Rd, replace closed valve with PRV flowing towards San Andreas Tank Pressure Zone, set pressure at 165psi	To increase available fire flow	--	See Above	See Above
	--	At Hwy 49 and Fahily Cir, replace closed valve with PRV flowing towards Angels Rd Pressure Zone, set pressure at 80psi	To increase available fire flow	--	See Above	See Above
	Annualized Aging Pipeline Replacements (<= 12" dia)	Replace system distribution pipes at various locations in San Andreas, CA and Mokelumne Hill, CA	Page 9 of the Master Plan indicates some pipelines are over 50 years old, and page 33 describes an estimated cost for regular repair and replacement of the District's distribution pipelines. Specific locations and estimated quantities have been identified in Figures C-1 to C-16 of the Master Plan.	\$17,500,000	The Master Plan recommends an average annual pipeline replacement budget of \$750,000 to ensure that pipelines are replaced prior to the end of their useful life. Aging infrastructure replacements should be coordinated with pipeline replacements for increased fire flows, as well as with other infrastructure improvements.	Prioritize pipeline replacements based on maintenance history, hydraulic model results, and other infrastructure projects (e.g street paving).
	--	Replace 1950 LF of existing 2"-4" pipe with 6" pipe at W St Charles St between Pool Station Rd and Russell Rd in San Andreas, CA	To increase fire flow from 151gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 560 LF of existing 4" pipe with 6" pipe at Pool Station Rd and Industrial Way in San Andreas, CA	To increase fire flow from 286gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 1500 LF of existing 2"-4" pipe with 6" pipe at Russell Rd between Hwy 49 and Oak St in San Andreas, CA	To increase fire flow from 433gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 1400 LF of existing 4" pipe with 6" pipe at Sunset St between Russell Rd. and Mariposa St in San Andreas, CA	To increase fire flow from 233gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 920 LF of existing 3"-4" pipe with 6" pipe at Mariposa St between Pine St. and Sunset St. in San Andreas, CA	To increase fire flow from 165gpm to 500-1000gpm	Included above	See Above	See Above

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Treated Water Pipelines (Continued)	--	Replace 1,311 LF of existing 2"-4" pipe with 6" pipe at Two sections at Oak St, between Oak Pl and Broadway St in San Andreas, CA	To increase fire flow from 99gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 672 LF of existing 2" pipe with 6" pipe at Broadway St between Market Street and Sunset St. in San Andreas, Ca	To increase fire flow from 591gpm to 1000-1500gpm	Included above	See Above	See Above
	--	Replace 380 LF of existing 4" pipe with 6" pipe at Market St between Adams Ave and Church Hill Rd in San Andreas, CA.	To increase fire flow from 1560gpm to >1500gpm	Included above	See Above	See Above
	--	Replace 800 LF of existing 4" pipe with 6" pipe at Pope St between California St. and Roberts Ave in San Andreas, CA.	To increase fire flow from 437gpm to 1000-1500gpm	Included above	See Above	See Above
	--	Replace 1,164 LF of existing 4" pipe with 8" and 12" pipe at Marshall Ave and Mountain Ranch Rd. towards Pope St. in San Andreas, CA.	To increase fire flow from 359gpm to >1500gpm	Included above	See Above	See Above
	--	Replace 2,724 LF of existing 4" pipe with 6" pipe at along Hwy 26, until approximately 600ft west of Howard Ln in Mokelumne Hill, CA.	To increase fire flow from 588 gpm to 1000-1500gpm	Included above	See Above	See Above
	--	Replace 700 LF of existing 4" pipe with 6" pipe west of Hwy 26 between Andrew Ln and Main St in Mokelumne Hill, CA.	To increase fire flow from 421 gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 456 LF of existing 2" pipe with 6" pipe at Main St S between Corral Flat Rd and Hwy 49 in Mokelumne Hill, CA.	To increase fire flow from 227gpm to 1000-1500gpm	Included above	See Above	See Above
	--	Replace 271 LF of existing 4" pipe with 6" pipe at Peek Cir, between Center St. and Hoerchner Pl. in Mokelumne Hill, CA.	To increase fire flow from 496gpm to 500-1000gpm	Included above	See Above	See Above

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Treated Water Pipelines (Continued)	--	Replace 1200 LF of existing 4" pipe with 6" pipe at Approx. 245ft along Center St going east near Hwy 26 and continuing north of Center along Hwy 26 for about 953ft in Mokelumne Hill, CA.	To increase fire flow from 397gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 4,670 LF of existing 4"-6" pipe with 8" pipe at Approx. 2780ft south of Brian Road along Pergrine Rd and approx. 1880 ft heading northeast toward Jojoba Ln. Mokelumne Hill, CA.	To increase fire flow from 413gpm to 500-1000gpm	Included above	See Above	See Above
	--	Replace 1,850 LF of existing 4" pipe with 6" pipe at Along Hwy 26 heading east of Jojoba Ln, Mokelumne Hill, Ca.	To increase fire flow from 301gpm to 1000-1500gpm	Included above	See Above	See Above
	--	Replace 670 LF of existing 2" pipe with 6" pipe at Northern tai- end of Miwok Trail (Approx. 670 Ft), Mokelumne Hill, CA.	To increase fire flow from 144gpm to 500-1000gpm	Included above	See Above	See Above

Table 2 - Calaveras Public Utility District "Road Map"

Category	Information derived from 2008 Master Plan				Analysis	Next Steps
	Project	Project Description	Project Rationale	Estimated Cost		
Hydros (Treated Water)	Rebuild and increase capacity of hydros 1-3 on transmission main	Rebuild and increase capacity of the following hydros:	According to the Master Plan, the hydros have a capacity of 1,300 GPM each, and the 2008 maximum hour flows stated in the Master Plan are approximately 1,800 GPM. This means that flow regularly bypasses each hydro during maximum hour flows. This bypass flow represents lost opportunity to generate electricity at a revenue loss of about \$10,000-\$15,000 per year for the District according to the Master Plan.	\$550,000	According to the Master Plan, the bypass flows represents lost opportunity to generate electricity at a revenue loss of about \$10,000-\$15,000 per year. This loss may be different based on current demands. Additionally, if these hydros are nearing the end of their useful life, it may be economical to replace these hydros with larger units. We recommend an assessment of the condition of the existing hydros and an updated economic analysis to determine the return on investment for these hydro replacments.	Perform a life-cycle economic analysis for hydro units re-build vs. upgrade.
	--	Ponderosa Hydro (#1)	Upgrade each hydro to convert max hour flows for the useful life of the hydro.	--	See Above	See Above
	--	Main Control Valve (#2)	Upgrade each hydro to convert max hour flows for the useful life of the hydro.	--	See Above	See Above
	--	Garamendi's Hydro (#3)	Upgrade each hydro to convert max hour flows for the useful life of the hydro.	--	See Above	See Above
Miscellaneous					District facilities may be vulnerable to vandalism or contamination without necessary fencing and/or security measures. It may be possible to partially fund these improvemets with grant funds.	Construct fencing as needed.
					With the anticipated improvements over the next several years, we recommend a preliminary assessment of the current rate structure to determine if revenues will be sufficient to cover necessary expenditures	Perform a preliminary rate analysis for operating costs, capital expenditures, water use, projected revenue streams, and possible infrastructure improvements related to beneficial use of water rights. This may lead to a full (Prop 218) Rate Study.