Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form

1. Applying for (select one):	[X] (a) Prop 13 Urban Water Conservation Capital Outlay Grant [ ] (b) Prop 13 Agricultural Water Conservation Capital Outlay Feasibility Study Grant [ ] (c) DWR Water Use Efficiency Project	
2. Principal applicant (Organization or affiliation):	Calaveras County Water District	
3. Project Title:	West Point Urban Water Conservation Capital Outlay Grant Project, Phase I	
4. Person authorized to sign and submit proposal:	Name, title	Larry Diamond, Interim General Manager
	Mailing address	PO Box 846 San Andreas, CA 95249-0846
	Telephone	(209) 754-3543
	Fax.	(209) 754-9620
	E-mail	Larryd@ccwd.org
5. Contact person (if different):	Name, title.	James Cornelius Director of Regulatory Affairs
	Mailing address	PO Box 846 San Andreas, CA 95249-0846
	Telephone	(209) 754-3543
	Fax	(209) 754-9620
	E-mail	Kristinc@ccwd.org
6. Funds requested (dollar amount):		$ 3,282,000
7. Applicant funds pledged (dollar amount):		$ 0
8. Total project costs (dollar amount):		$ 3,282,000
9. Estimated total quantifiable project benefits (dollar amount): Percentage of benefit to be accrued by applicant: Percentage of benefit to be accrued by CALFED or others:		Per Marsha Prillwitz, 2/26/02, this section is non-applicable to the Urban Water Conservation Capital Outlay Grant

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form (continued)

10. Estimated annual amount of water to be saved (acre-feet):	1,210
Estimated total amount of water to be saved (acre-feet):	60,450
Over 50 years	50 years
Estimated benefits to be realized in terms of water quality, instream flow, other:	Significant improvement in source water protection, drinking water supply
11. Duration of project (month/year to month/year): *See figure 2-11 (Page 27), Project Work Schedule*	Two years: → Begin Construction: 6 months after execution of DWR/CCWD contract → Construction: 1 year → Project Finalization: 6 months
12. State Assembly District where the project is to be conducted:	4th District
13. State Senate District where the project is to be conducted:	1st District
14. Congressional district(s) where the project is to be conducted:	4th District
15. County where the project is to be conducted:	Calaveras
16. Date most recent Urban Water Management Plan submitted to the Department of Water Resources:	Service area has only 530 connections, therefore is not subject to Urban Water Management Plan Act

17. Type of applicant (select one):
Prop 13 Urban Grants and Prop 13 Agricultural Feasibility Study Grants:

- ☐ (a) city
- ☐ (b) county
- ☐ (c) city and county
- ☐ (d) joint power authority
- ☒ (e) other political subdivision of the State, including public water district
- ☐ (f) incorporated mutual water company

DWR WUE Projects: the above entities (a) through (f) or:

- ☐ (g) investor-owned utility
- ☐ (h) non-profit organization
- ☐ (i) tribe
- ☐ (j) university
- ☐ (k) state agency
- ☐ (l) federal agency

18. Project focus:

- ☐ (a) agricultural
- ☒ (b) urban

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form (continued)

19. Project type (select one):
Prop 13 Urban Grant or Prop 13 Agricultural Feasibility Study Grant capital outlay project related to:

- ☐ (a) implementation of Urban Best Management Practices
- ☐ (b) implementation of Agricultural Efficient Water Management Practices
- ☐ (c) implementation of Quantifiable Objectives (include QO number(s)
- ☒ (d) other (specify) Urban Water Conservation Capital Outlay Grant Project

DWR WUE Project related to:

- ☐ (e) implementation of Urban Best Management Practices
- ☐ (f) implementation of Agricultural Efficient Water Management Practices
- ☐ (g) implementation of Quantifiable Objectives (include QO number(s))
- ☐ (h) innovative projects (initial investigation of new technologies, methodologies, approaches, or institutional frameworks)
- ☐ (i) research or pilot projects
- ☐ (j) education or public information programs
- ☐ (k) other (specify)

20. Do the actions in this proposal involve physical changes in land use, or potential future changes in land use?

- ☐ (a) yes
- ☒ (b) no

If yes, the applicant must complete the CALFED PSP Land Use Checklist found at http://calfed.water.ca.gov/environmental_docs.html and submit it with the proposal.

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One
B. Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form is authorized to submit the proposal on behalf of the applicant; and

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant.

___________________	Larry Diamond, Interim General Manager	_________
Signature	Name and title	Date

Proposition 13 Urban Water Conservation Capital Outlay Proposal Part 2

Project Summary

The Calaveras County Water District (CCWD) is located on the east side of the Central Valley of California and encompasses approximately 1,028 square miles of valleys, foothills, and mountain peaks. The communities of West Point, Wilseyville and Bummerville are located in the northeastern portion of the County in the sparsely populated higher foothills. Figure 2-1 is a general vicinity map showing the location of the study area. Detailed project component descriptions and maps are presented in Section A of this proposal package.

The objective of this project is to rehabilitate portions of the existing water system facilities serving the communities of West Point, Wilseyville and Bummerville.

The projects consists of replacement of existing distribution and raw water conveyance facilities that are quite old, have severe leakage problems and are unable to reliably meet fire protection and potable water needs of the communities. The project goals are to reduce lost water by significantly reducing the leakage problems, and to increase efficiency and reliability of the system to meet fire protection and potable water demands. To accomplish these goal the following project features have been analyzed for feasibility and cost effectiveness.

Bear Creek Raw Water Pipeline - This project component consists of replacing the existing 10-inch raw water pipeline, which has continuing leakage problems and can only deliver approximately ¼ of the allotted diversion flow from Bear Creek.

Bummerville Storage Tank - The proposed Bummerville storage tank is sized at 50,000 gallons to replace the 50,000 gallon capacity of the existing tanks. The new tank is sited at the location of the existing two wooden tanks to be replaced. These tanks are quite old and leak continuously.

Bummerville Distribution Systems - The Bummerville distribution grid consists of mainly 4-inch lines with some 2-inch, and only two sections of 6-inch lines. Based on a network computer model, the entire Bummerville distribution system must be replaced in order to adequately deliver fire flow demands. In addition, due to the age of the system, water loss has been a significant problem resulting from pipeline deterioration and extensive leakage.

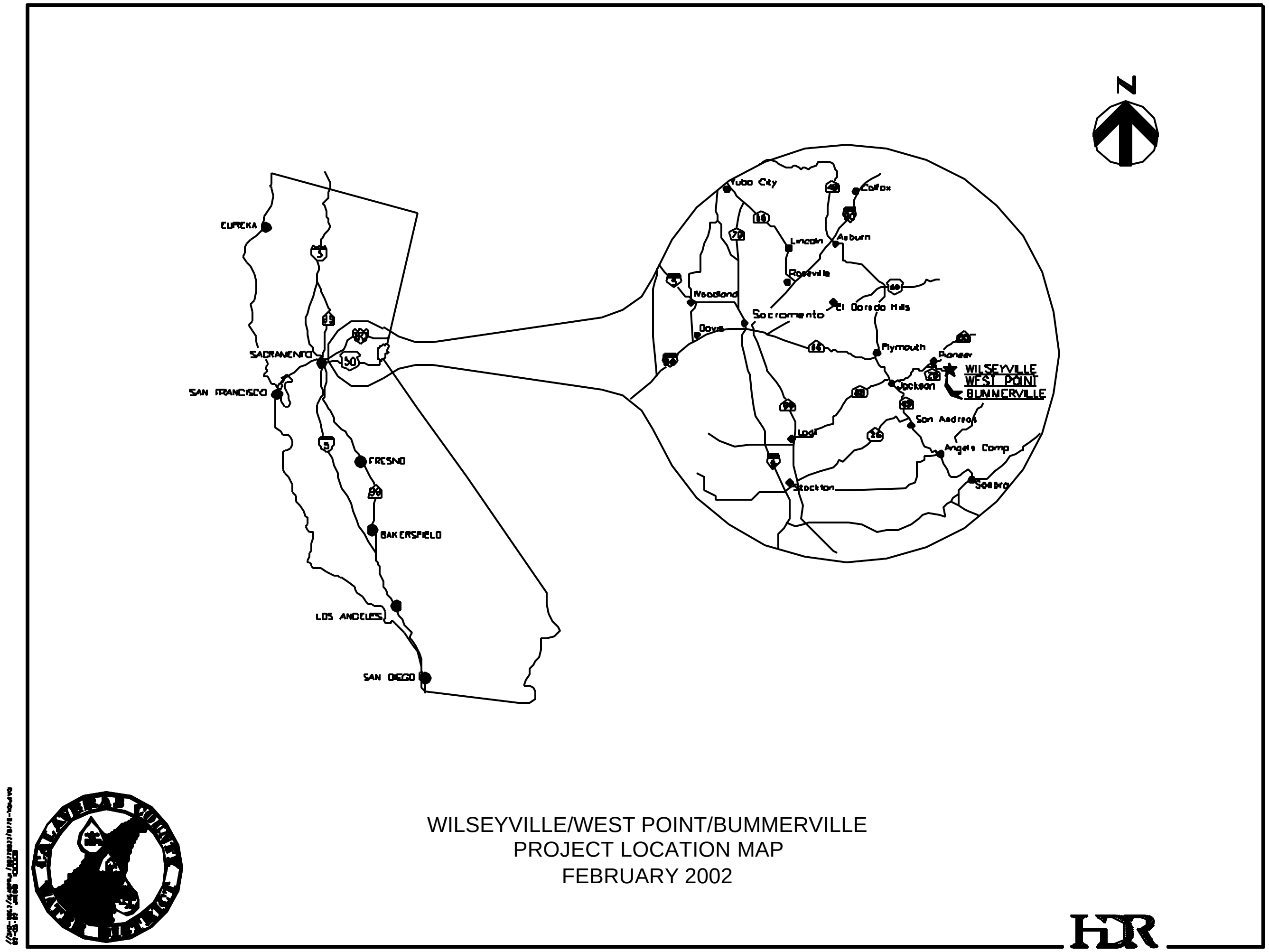

Figure 2-1. Location Map for Proposed Project

To determine the project components required and their specific design features, the project team started with information provided in previous master plans and District records. The team refined the project components through hydraulic modeling of the distribution system and the raw water conveyance pipeline to determine pipeline sizes.

By replacing the deficient pipelines and tanks, the design team has estimated that approximately 1200 acre- feet of water will be saved annually. In addition, reliability to deliver adequate raw water and fire flows will be greatly increased.

A cost-benefit analysis for the project revealed that the project is locally cost effective, having a benefit –cost ratio greater than one.

A. Scope of Work: Relevance and Importance

A1. Nature, scope, objectives of Project

The purpose of this project is to rehabilitate the existing water system facilities serving the communities of West Point, Wilseyville and Bummerville. This water system is currently deficient due to failing and leaking components, and components that are unable to meet fire flow requirements and the design capacity of the current water treatment plant facilities.

In the fall of 1946 Calaveras County Water District (CCWD) was organized under the laws of the State of California as a public agency for the purpose of developing and administering the water resources in the County. CCWD filed for the development of the water resources within the County on March 24, 1947. This filing was for the use of the Middle and South Forks of the Mokelumne River, the Calaveras River, and the North Fork of the Stanislaus River. The filing initiated the preserving of the water rights and resources of Calaveras County being a "County of Origin". Calaveras County, being a "County of Origin" with respect to water rights in California, enjoys certain protections regarding the use of water originating in the County (Borcalli & Assoc., 1996).

CCWD owns and operates the domestic water system in West Point, Wilseyville, Bummerville and part of Sandy Gulch. Population growth in the service area has generally averaged less than one percent annually over the last 15 years (CMA, 1996).

The existing water system serves approximately 520 customers with a population of 1,298. The current facilities include two raw water reservoirs (Wilson Lake and the Regulating Reservoir); two raw water diversion facilities, (Bear Creek gravity supply and Middle Fork Mokelumne pumped supply); one water treatment plant (West Point); two treated water pump stations (Bummerville and Upper Wilseyville); and the associated distribution and storage systems. Figure 2-2 provides an illustration of the water system and the interconnection of the water supply and distribution between the three communities. Also shown in bold are the three components of the proposed replacement project; Bear Creek Raw Water Pipeline, Bummerville Tank, and the Bummerville Distribution Systems.

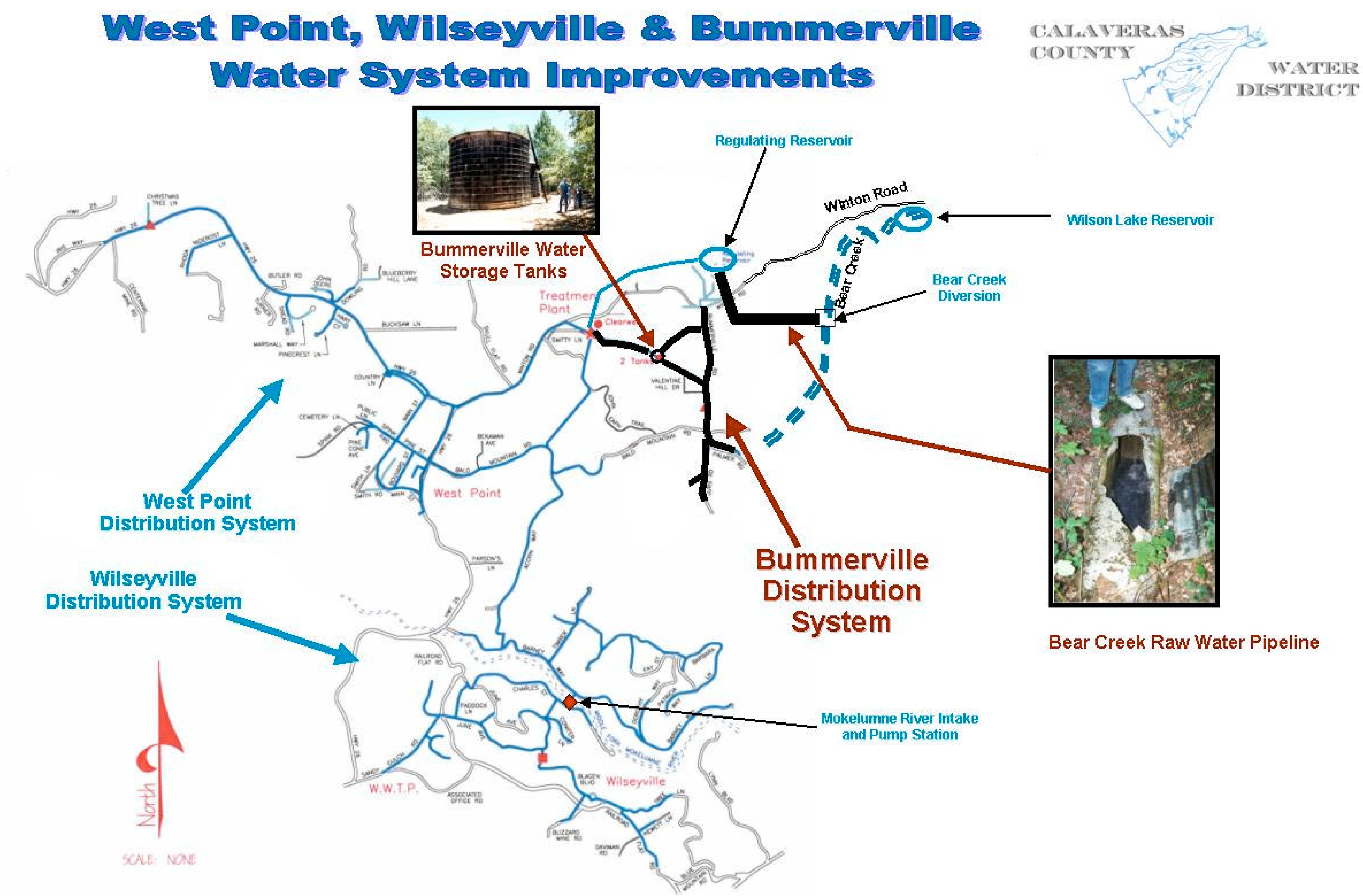

Figure 2-2. West Point, Wilseyville and Bummerville water supply system

CCWD receives its water entitlement from two main sources of water (1) the Bear Creek diversion and (2) pumped water from the Mokelumne River. Both sources are generally of good quality and are easily treated to potable standards. Water rights are derived from agreements for diversion of flow from Bear Creek and from the Middle Fork of the Mokelumne River for diversion of up to 1,930 acre feet annually. Water rights for Bear Creek are described in Permit Number 15452, issued September 7, 1967. Mokelumne River water rights are provided under a purchase agreement (CCWD Resolution 91-17) between CCWD and Calaveras Public Utilities District (CPUD). At full build-out of the service area, the water use would not reach half of this total entitlement (1,930 acre-feet). Conveyance, storage and distribution of the water continue to be greater issues than the entitlements to the water.

CCWD's West Point Water Treatment Plant (WTP) was recently upgraded to a capacity of one million gallons per day (mgd). This capacity is close to the projected average daily demands through the year 2020, given the current modest growth rate of approximately 1% annually. Currently, neither of the raw water conveyance facilities from Bear Creek or the Mokelumne River can reliably deliver the necessary water supply for the WTP. This is due to severely leaking pipes and sections of undersized pumps and pipe.

The diminishing reliability of the raw water conveyance due to deteriorating pipe is of significant concern due to the potential for loss of the primary supply from Bear Creek. In addition, the portions of the raw water conveyance systems where the pipe are undersized make it impossible to deliver the design capacity to the WTP, and reduces the ability to replenish the existing raw water storage system quickly and efficiently. Raw water storage is essential to maintain adequate supply during drought conditions when flows in the streams are running low.

In addition to the raw water conveyance and storage deficiencies, treated water storage and distribution are also inadequate in this system. Treated storage is currently provided by a 500,000 gallon clear well at the WTP which serves West Point and Wilseyville and 50,000 gallons of storage from two wooden tanks which serve Bummerville. The Bummerville storage quantity is grossly inadequate to meet fire flow demands, and each tank has leaking and structural integrity problems and is in need of replacement. The proposed project will replace the leaking tanks, but will not increase storage volume. Fire flow will be enhanced by replacement booster pumps capable of delivering greater fire flow from the treatment plant.

The treated water distribution pipelines are deficient due to age and inadequate fire flow capacity throughout Bummerville and West Point. Most of Wilseyville has a newer distribution network which is adequately sized to deliver fire flow, and therefore will not need to be replaced.

Project Objectives

The objectives of this project are to:

1. Provide a reliable delivery of currently entitled water to meet drinking water and fire flow demands;

2. Replace failing or leaking water system components in order to conserve water and increase the overall reliability and efficiency of the system;

3. Site, replace and construct the proposed facilities so that environmental impacts are minimized to the extent feasible.

Summary of Project Features

Table 2-1 provides summaries of project features for the various water system components.

Table 2-1. Project Features Summary

Project Component	Features	Detailed Description
Bear Creek Raw Water Pipeline	Replace existing pipeline, modify diversion, add SCADA control features	• 9,980 Linear feet of 16-inch pipeline • New valves and meters • SCADA controls and power supply
Bummerville Storage Tanks Replacement	Replace deteriorating storage tanks to eliminate water loss	• 50,000 gal tank at Bummerville, with 3,150 feet of 6-inch fill line and booster pump
Bummerville Distribution System	Replace undersized and deteriorating pipelines to current fire protection standards	• 3,450 feet - 6-inch pipe • 7,100 ft –8-inch

A2. Statement of Critical Water Issues

Critical local water issues include adequate supply of water for fire protection and a continuous reliable potable water supply. Local fires have caused significant damage within the local communities due to inadequate distribution facilities. The project features will enhance the fire protection for the area. Conservation of water is an important local, regional, Bay-Delta, state and federal issue addressed by this project. Replacement of old, leaking raw water conveyance and distribution facilities will significantly improve the efficiency and level of conservation within the project area.

The goals of this project are consistent with local water management plans (West Point/Wilseyville Domestic Water Master Plan, *Charpier, Martin and Associates* 1996 and Calaveras County Water Master Plan, *Borcalli and Associates* 1996) calling for infrastructure rehabilitation and increased fire protection. The conservation aspects of this project will meet the goals of local, regional, Bay-Delta, state and federal management plans.

B. Scope of Work: Technical/Scientific Merit, Feasibility, Monitoring and Assessment

B1. Methods, Procedures and Facilities

In 1996, a District-wide water supply master plan was completed to address system deficiencies (CMA, 1996). In 1998, a master plan supplement provided additional analysis for improvements to the West Point, Wilseyville, and Bummerville systems. The following is a list of a few of the recommended improvements from the master plan documents, with modifications identified in the November 2001, CCWD, West Point, Wilseyville/Bummerville System Improvements, Draft Feasibility Report. The technical sections provided below were taken from this feasibility study.

B1a. Bear Creek Raw Water Pipeline

Introduction

This portion of the project consists of replacing the existing 10-inch raw water pipeline with a 16-inch diameter line. The existing 10-inch pipeline has continuing leakage problems and can only deliver approximately ¼ of the allotted diversion flow from Bear Creek. This project feature also includes modifications to provide a Supervisory Control And Data Acquisition (SCADA) system.

The existing Bear Creek raw water pipeline conveys water diverted from Bear Creek to CCWD's Regulating Reservoir. CCWD has a water right to divert four cubic feet per second (cfs) from Bear Creek. However, the existing 10-inch pipeline is significantly deteriorated and needs to be replaced. A new 16-inch diameter pipe with the capacity to deliver the allotted 4cfs would provide water to the treatment plant, while more efficiently keeping the regulating storage reservoir full.

It is proposed that the existing pipeline be replaced with a 16-inch diameter high-density polyethylene (HDPE) raw water pipeline that will follow along the same route as the existing pipe. The new pipeline will be extended beyond the current terminus of the existing pipeline and continue to the northern end of the Regulating Reservoir to allow for greater water circulation within the reservoir and reduce water stagnation. The proposed design incorporates a flow measuring system and implements a SCADA system that will allow for remote regulation of the diversion. Figure 2-3 shows the approximate alignment of the pipeline.

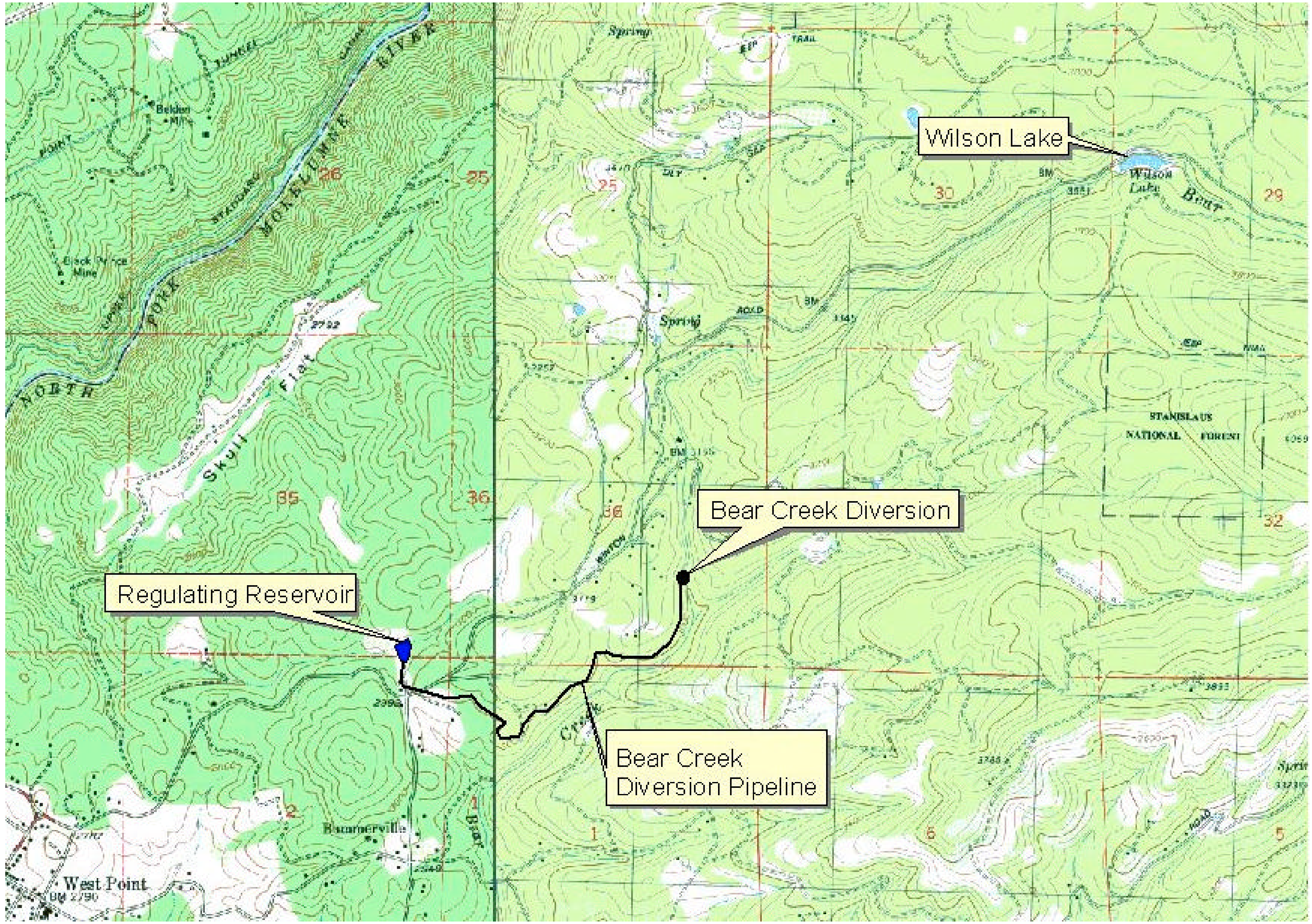

Figure 2-3. Approximate alignment of Bear Creek Pipeline

The following section discusses the criteria used in the design of the proposed 16-inch HDPE pipeline.

Existing 10-inch Pipeline

Water from Bear Creek is diverted via a permanent concrete check dam in the creek. A culvert pipe equipped with a slide gate near the south bank is used to regulate the rate of diversion. Currently the check dam is approximately 90% full of sediment. Periodically, sediment needs to be removed from behind the check dam adjacent to the diversion culvert but this does not appear to be greatly effecting operation of the facility. The diverted water is passed to a small concrete stilling basin used to remove sediment. The water then passes through a parshall-type flume and then to the 10-inch pipe inlet. The parshall-type flume is designed to measure flow into the pipeline, however flow measurement equipment was removed some time ago and currently flow diversion rates are not measured.

The existing raw water pipeline follows the alignment of an old mining ditch that was filled decades ago to form a level bench area along the hillside. The existing pipeline route runs up and down steep ravines, and since the installation of the 10-inch pipeline, the route has become greatly inundated with brush and woody debris. There are reaches that have become increasingly narrow due to large rocks along the bank.

While the original pipeline is thought to have been constructed using 10-inch concrete pipe, it is apparent that the pipeline has undergone many modification and repairs. While on a site visit, segments of discarded PVC, concrete, and asbestos pipe were observed along the pipeline route. Without complete excavation, it is impossible to determine the size and pipe material for each portion of the pipeline.

Along the pipeline, many repairs or patches have been made over the years. Unfortunately, many of these segments were left uncovered and the ground under the repairs has eroded, undermining the pipe and concrete block repairs. Figure 2-4 shows an area of damage along the pipeline.

Figure 2-4. Damage to the Bear Creek Raw Water Pipeline

There are other areas where the original concrete pipe has been replaced with PVC. CCWD recently replaced approximately 130 feet of concrete pipe with 10-inch PVC. PVC standpipes were observed along the lower portion of the pipeline route indicating that additional sections of PVC pipe have also been installed.

Sixteen standpipes were observed along the pipeline. The standpipes are constructed of PVC along most of the lower portion of the pipeline, and concrete throughout the upper portion of the line. Weather deterioration and stress cracks were observed on most of the concrete standpipes. In one instance, a concrete standpipe was full of water, flowing over and through cracks.

The terminus of the existing pipeline is at a junction connection near the Regulating Reservoir where the flow is divided into three directions. A six-inch diameter pipeline is directed toward the water treatment plant, a second six-inch diameter pipeline terminates into the lower portion of the Regulating Reservoir, and the third six-inch diameter pipeline was used as an overflow device to direct excess flow to the Regulating Reservoir spillway (currently the overflow pipeline is blocked off and is not in use). The pipeline directing water to the reservoir terminates too close to the outlet of the reservoir. This prevents water from circulating within the reservoir causing stagnation to occur. The new design includes a junction structure with two 16-inch HDPE pipes exiting the system. The first will be directed to the water treatment plant, and the second will be routed around the Regulating Reservoir and terminate at the north end of the reservoir. Motorized butterfly valves will be installed in each pipeline exiting the junction structure. These valves will be used to divert water as necessary to feed the water treatment plant or regulating reservoir. They will be controlled by the central SCADA system.

Hydraulic Evaluation and System Design

The proposed pipeline will be placed along the same route as the existing 10-inch pipeline. A 3D digital AutoCAD contour model of the alignment of the proposed pipeline was developed from the topographic survey conducted in December 2000 and January 2001. From this model, a pipeline profile was created detailing the configuration of the vertical alignment. A hydraulic model was created using the information provided from the alignment and profile. It was assumed that the proposed pipeline would be constructed utilizing HDPE pipe. New HDPE pipe has a Hazen-Williams coefficient of 150, however the pipeline was modeled for possible future conditions and implemented a less efficient coefficient of 130. At 4-cfs and coefficient of 130, the friction slope was calculated as approximately 0.002. Under these criteria, it was determined that a 16-inch HDPE pipe would pass the design flow sufficiently.

As stated above HDPE pipe was utilized for the hydraulic model. This pipe material offers many benefits for this type installation. HDPE is flexible pipe that can conform to the slight angle changes that will take place along the proposed route. This will reduce miscellaneous fittings that would be otherwise necessary. Butt fusion joints are utilized providing a restrained pipe system. Another benefit to HDPE is its long pipe laid lengths. HDPE comes in 20 or 40-foot pipe lengths which reduces the number of joints in the system. The pipe is also lightweight related to conventional material, which accommodates easier installation in difficult areas.

Modifications to the pipeline will be required to incorporate new control valves and the SCADA system. New valves will be installed and be used for the regulating flow. The valves will be motorized and controlled by the proposed SCADA system. These valves will be used to control the amount of flow into the system. If it becomes necessary to reduce or increase flow to the system, the valves can be controlled remotely through the SCADA system to open or close as required.

Flow measurement will consist of a flow meter located near the WTP. The flow rate information will be transmitted by the SCADA system for use by the CCWD operators or other CCWD staff.

A similar system will be installed at the regulating reservoir. The control panel will control two butterfly valves and a level sensor in the regulating reservoir. This information will be transmitted to the CCWD central SCADA system located in the CCWD office and displayed with use of a desktop computer system.

Other valving that is required throughout the system includes combination air release/vacuum valves and blow-off valves. Combination valves will be implemented to protect the pipeline from collapsing during a sudden shut down of the system, and will provide air release at highpoints along the system to reduce turbulent flow. The combination valves vary in size from 2-inches to 6-inches depending on the steepest localized slope. Four-inch blow-off valves will be placed at low points along the system. The blow-off valves will be used to drain the system for maintenance purposes or for times when the system is off line for any extended period. The drain water will be returned to the watershed that it originally came from. Energy dissipaters at the valves will be used to prevent scour along with sediment basins to prevent sedimentation and siltation. The combination valves will be automatic and the blow-off valves will be manually controlled. Neither will be connected to the SCADA system.

Water Savings Produced by the Project

By replacing the existing 10” raw water pipeline continuing leakage problems will be eliminated. Of the current diversion capacity, only approximately 1 cfs can be delivered through the leaking pipeline. The maximum allotted diversion volume is 1830 ac-ft per year. At 1 cfs maximum diversion through 10 months (available stream flows) only 604 acre-ft can be delivered through the leaking pipe. The district currently takes their maximum allowable diversion at the diversion structure, however they lose the more than 1200 ac-ft as leakage along the pipeline, and overflow at the diversion due to inadequate pipe size.

As seen in the following photos, the existing leaks are extensive. When the pipe is flowing full at the diversion, it is obvious that less than half can be conveyed through this pipeline. Complete failures of sections of pipe have made it impossible to deliver any flow through the pipeline until emergency repairs can be made. This is a re-occurring problem along the entire reach of the Bear Creek Pipeline. Another water saving component of the Bear Creek Raw Water Pipeline will be the SCADA controls. By increasing the efficiency of the pipeline, water can be taken at the proper times and intervals to reduce potential for overflow spills at the plant or added losses from storage facilities due to excess diversions to regulating storage.

Figure 2-5. View of breaks in Bear Creek Raw Water Pipeline

Figure 2-6. View of breaks in Bear Creek Raw Water Pipeline

Preliminary Cost Estimate

The preliminary construction costs for the Bear Creek diversion pipeline can be found in Table 2-2.

Table 2-2. Preliminary Construction Cost Estimates

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
Materials/Installation				
Division 1 - General Requirements				
Mobilization, Bonds, Insurance	1	LS	$30,000	$30,000
Division 2 - Site Work				
12" Rip Rap	14.9	TON	$65	$970
Replacement of Pipe (Excavation/Backfill)	9,976	LF	$52.44	$523,150
Cross line - Cable service	2	EA	$75	$150
Fencing Removal and Replace	70	LF	$4.50	$320
Haul off AC Pavement 4" Depth	140	LF	$5.20	$730
Haul Road and Maintenance - 4" Agg Base, 15 feet wide	13,918	SY	$9.30	$129,240
Permanent Erosion Control	700	LF	$20.00	$14,000
Remove 12" Asbestos Pipe Debris	60	LF	$16.40	$980
Remove Manholes, Valve Boxes, etc.	6	EA	$150	$900
Remove Misc Concrete	1	LS	$5,000	$5,000
Remove/Haul off Existing Pipe (Size Varies)	8,351	LF	$20.00	$167,020
Repaving, 9' wide section, 4" AC, 6" base, 16" pipe trench	140	LF	$23.10	$3,230
Sawcut/Break AC Pavement 4" Depth	140	LF	$2.10	$290
Site Clearing/ROW 15' Wide ROW, Up to 12" Diam. Trees w/ Stump Removal	8,376	LF	$12	$100,510
Temporary Erosion Control	7,980	LF	$0.90	$7,020
Division 3 - Concrete				
Headwall (4" Blowoff Valves)	12	EA	$200	$2,400
Reinforcing Steel Per Headwall	12	EA	$100	$1,200
Division 5 - Metals				
Grating	16	SF	$19.50	$310
Checkered Plate	16	SF	$36	$580
Diversion Channel Wall Supports	4	EA	$350	$1,400
Division 10 - Specialties				
Testing, 1000' test lengths, hydrostatic, 16" pipe	9,976	LF	$4.60	$45,890
Division 15 - Mechanical				
Flow meter station	1	LS	$41,000	$41,000
16" O.D. HDPE Pipe	9,976	LF	$13.40	$134,080

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
String Pipe - 16"	9,976	LF	$2	$19,950
4" Steel Pipe	60	LF	$29.50	$1,770
2 - 16" Butterfly Valve	2	EA	$13,500	$27,000
Mechanical Slide Gate, 16"	2	EA	$9,000	$18,000
Combination Air Release/ Vacuum Valves	1	LS	$17,590	$17,590
4" - Blow off Valve	12	EA	$690	$8,280
Division 16 - Electrical and Instrumentation				
2 - Control panel and Metering Pedestal	2	LS	$6,000	$12,000
2 - 2" PVC Conduit	300	LF	$20	$6,000
2 - Testing/startup	2	EA	$3,500	$7,000
2 - Telemetry Panel	2	EA	$5,000	$10,000
Pull Boxes	4	EA	$600	$2,400
2 - Transformer	2	EA	$3,000	$6,000
	Materials/Installation subtotal =			**$1,350,000**
Land Purchase/Easement	3%	LS		$40,000
Planning/Design/Engineering	8%	LS		$108,000
Environmental Mitigation/Enhancement	3%	LS		$41,000
Construction/Administration/Overhead	10%	LS		$135,000
			SUBTOTAL =	$1,674,000
Contingency Costs	15%	LS		$251,000
			TOTAL ESTIMATED COST =	**$1,925,000**

B1b. Bummerville Tank Replacement

Introduction

The purpose of this component of the project is to replace the treated water storage tanks, which consist of the two dilapidated redwood water storage tanks in Bummerville.

Existing Tanks

Currently, the treated water storage consists of the West Point Treatment Plant clearwell, which serves West Point and Wilseyville and two redwood tanks that serve Bummerville. The clearwell capacity is 500,000 gallons and is located at 2,910 feet elevation. The two redwood tanks are located at an elevation of 3,180 feet and have maximum volumes of 40,000 gallons and 10,000 gallons. The two redwood tanks are connected and leak, thus the maximum storage potential cannot be met. The combined useable storage is estimated at 30,000 gallons. The redwood tanks and clearwell have been identified for replacement in the CMA report. The existing redwood tanks have inadequate storage capacity for single family residential fire flow demand. Figures 2-7 and 2-8 below show the existing tanks and the leakage currently occurring.

Figure 2-7. View of the Two Existing Treated Water Storage Tanks

Figure 2-8. View of the Damage and Leakage on the Tanks

Replace Bummerville Tanks

This project component consists of replacing the existing Bummerville Tanks, and providing a booster pump station to provide additional pressure for fire flows. The existing Bummerville Tanks would be replaced with one 50,000 gallon steel tank. This will allow CCWD to replace the existing leaking tanks, but does not allow for additional storage.

Water Savings Produced by the Project

The proposed Bummerville storage tank is sized at approximately 50,000 gallons and has been sited at the location of the two wooden tanks to be replaced. The existing tanks leak continuously at an estimated rate of 40 to 60 gallons per hour depending on the depth in each tank. This equates to more than one acre-foot of treated water per year that will be recovered with a new tank.

Preliminary Cost Estimate

Construction costs can be found in Table 2-3 and include materials and estimated installation costs.

Table 2-3. Preliminary Construction Cost Estimates

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
Materials/Installation				
6-inch Pipe	1,950	LF	$50	$97,500
		Materials/Installation subtotal =		**$98,000**
Structures				
Pump Station	1	LS	$100,000	$100,000
Steel Tank for Bummerville	50,000	GAL	$1.38	$69,000
		Structures subtotal =		**$169,000**
Planning/Design/Engineering	23%	LS		$61,000
Environmental Mitigation/Enhancement	3%	LS		$8,000
Construction Administration/Overhead	18%	LS		$27,000
			SUBTOTAL =	$363,000
Contingency Costs	15%	LS		$54,000
TOTAL ESTIMATED COST =				**$417,000**

B1c. Bummerville Water Distribution System

Introduction

The existing Bummerville distribution system was analyzed as part of the feasibility study to determine if it meets CCWD standards and to propose upgrades. It is proposed that any existing pipeline, smaller than 6-inch diameter, be replaced with a minimum 6-inch diameter polyvinyl chloride (PVC) water pipeline that will follow along the same route as the existing pipe. In addition, new pipe will be sized in order to meet the minimum residual pressure while providing the necessary fire flow.

This section describes the criteria used to evaluate the system, the proposed improvements and a preliminary cost estimate.

Evaluation Criteria

The following criteria, based on CCWD 1997 improvement standards, were used to determine improvements to the distribution system.

- Fire flow is defined as the minimum design flow requirement that will provide sufficient water to control a major fire in a specific structure. The fire flow for single family and duplex residential areas is 500 gpm. For townhouses, multiple residential and similar density two and three floor structures the fire flow is 1,000 gpm. Commercial Districts have a fire flow of 1,500 gpm or what is deemed appropriate by the fire protection agency. Bummerville has been modeled as entirely of single-family homes. See Figure 2-9 for the existing Bummerville pipe network.
- The maximum daily flow (MDF) was determined by multiplying the average daily flow (ADF) by a factor of two. Maximum hourly flow (MHF) was determined by multiplying the ADF by a factor of three.
- The minimum pipe size shall not be less than 6-inch diameter for residential areas and 8-inch diameter for commercial areas. The minimum design pressure for the distribution system is 35 psi at the highest point of lot to be served, while the maximum is 115 psi at the lowest point of lot to be served. The design flow rate is the fire flow demand rate plus MDF. The minimum residual pressure for fire flow scenarios shall be 20 psi at all service points in the distribution system.

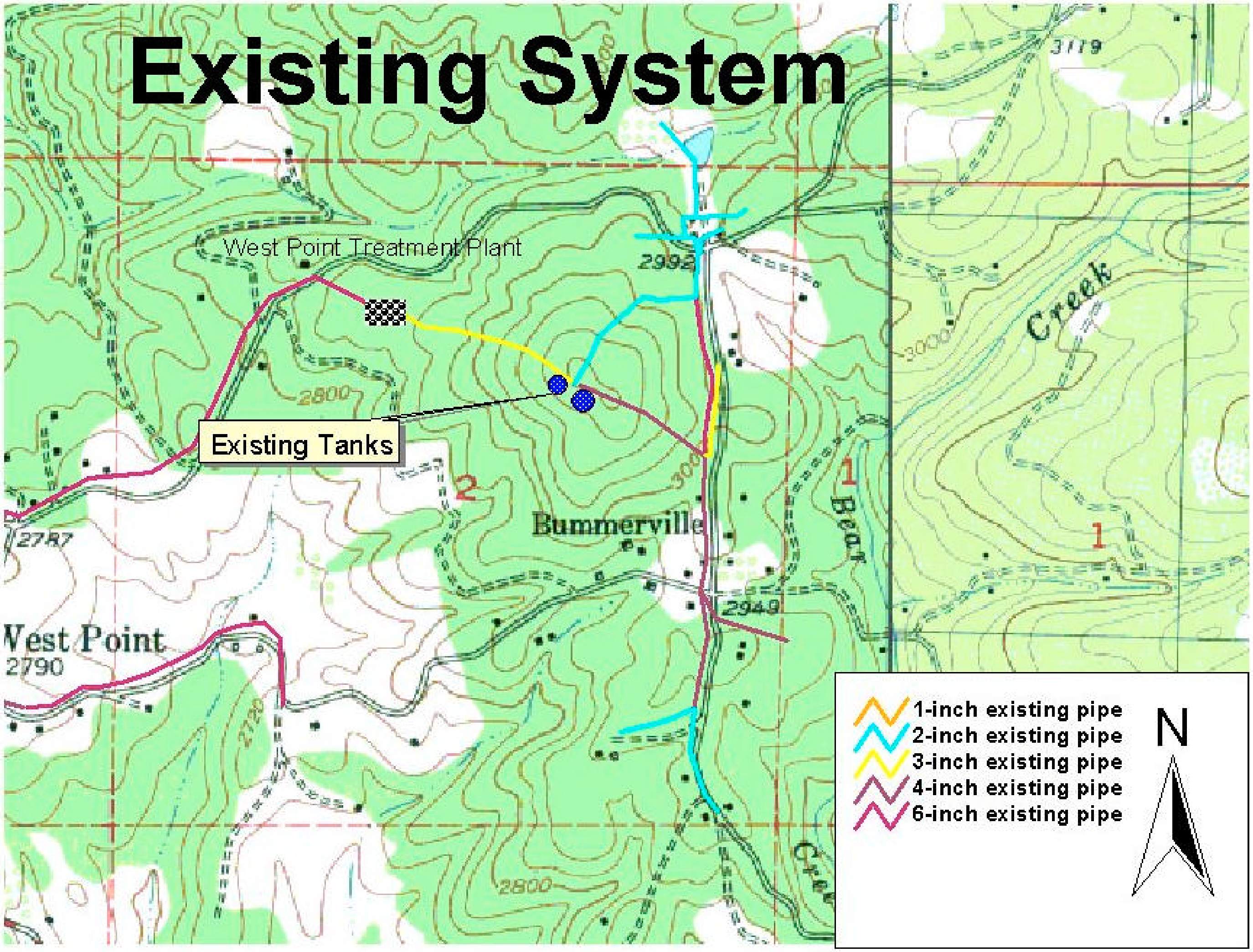

Figure 2-9. Bummerville Treated Water Distribution Infrastructure Existing Pipe Network

System Model

The existing water distribution system was modeled using Cybernet version 3.1 to determine the current available fire flow. EPANET version 2.0 was used to build a grid of the Bummerville pipelines. The MDF was applied at service nodes throughout the entire grid. At the same time, the available fire flow was calculated at each node, while maintaining minimum residual design pressures. The model utilizes the Hazen-Williams pipe flow equations. All new pipes received a C-factor of 140 and old pipes received a C-factor of 120.

Demand

The demand at each node was determined by the number of services found recorded on the water system grid maps. The demand applied to each service unit was determined from the “Calaveras County Water District West Point/Wilseyville Domestic Water System Master Plan,” by Charpier Martin and Associates (CMA), September 12, 1996. Evaluation of average recorded demand from 1990 to 1994 resulted in an estimated 176 gallons per person per day at 1.74 people per household. The daily use per capita was estimated from drought years. Thus, for planning purposes, per capita demand was increased to 200 gallons per person per day. Based on these estimates, a total per service demand of 350 gallons per day was used to represent existing demands.

Distribution System

The primary deficiency for the Bummerville Distribution System is inadequate pipe size. The Bummerville distribution grid also consists of 4-inch diameter and 6-inch diameter pipe. The primary service main runs north/south on Bummerville Road and is connected to the two redwood storage tanks, by a 4-inch loop.

Storage

The Bummerville zone is served by 2 redwood storage tanks that receive treated water from the West Point Treatment plant, which is pumped up to 3,160 feet elevation, the elevation of the redwood tanks. These tanks are insufficient to meet any emergency or fire flow demand requirements. In addition, both redwood tanks leak and there are no seismic restraints or tie downs on either tank.

Future Demand

The future demand was determined by using the recorded population of 1,300 people in year 2000 projecting the estimated growth rates to 1,393 in year 2020. This population encompasses all three zones of West Point, Wilseyville, and Bummerville. It was determined by the local authorities and county engineers that the ADF used would be 200 gallons per person per day. This is the estimated demand for communities above 3,000 feet elevation, referenced from the CCWD Standards. The projected demand was determined by calculating the difference in the population between year 2000 and year 2020 and calculating the associated demand corresponding to the increased population. The net increase in demand was divided up into seven zones where growth is projected over the next twenty years. The projected zones of increase demand were determined by evaluating existing developments that are not on the existing distribution system and where suitable terrain features favor development. It is assumed that existing development that is not being served by the existing distribution system have a high likelihood of becoming services in the future. Meeting fire flow demands is the driving factor for increasing pipe sizes beyond the minimum recommended improvements.

The alternatives for the proposed distribution system still have deficiencies that are not due to inadequate pipe size. These inadequacies are due to one primary reason. There are areas where the elevation difference between the source and the service are not great enough to provide the adequate pressure or flow.

With the recommended pipe replacements, Bummeville will not have particular areas of inadequate pressure except a few homes just adjacent to the proposed tank.

Recommended Improvements

Recommended improvements to the distribution system reflect the CCWD Improvement Standards. In general, all pipes less than 6-inch diameter will be upgraded to a minimum of 6-inch diameter and 8-inch diameter mains will be required for commercial districts. Almost all of the Bummerville pipes would need to be replaced with larger diameter pipelines to meet fire flow demand.

See Figure 2-10 for proposed improvements to the Bummerville distribution system.

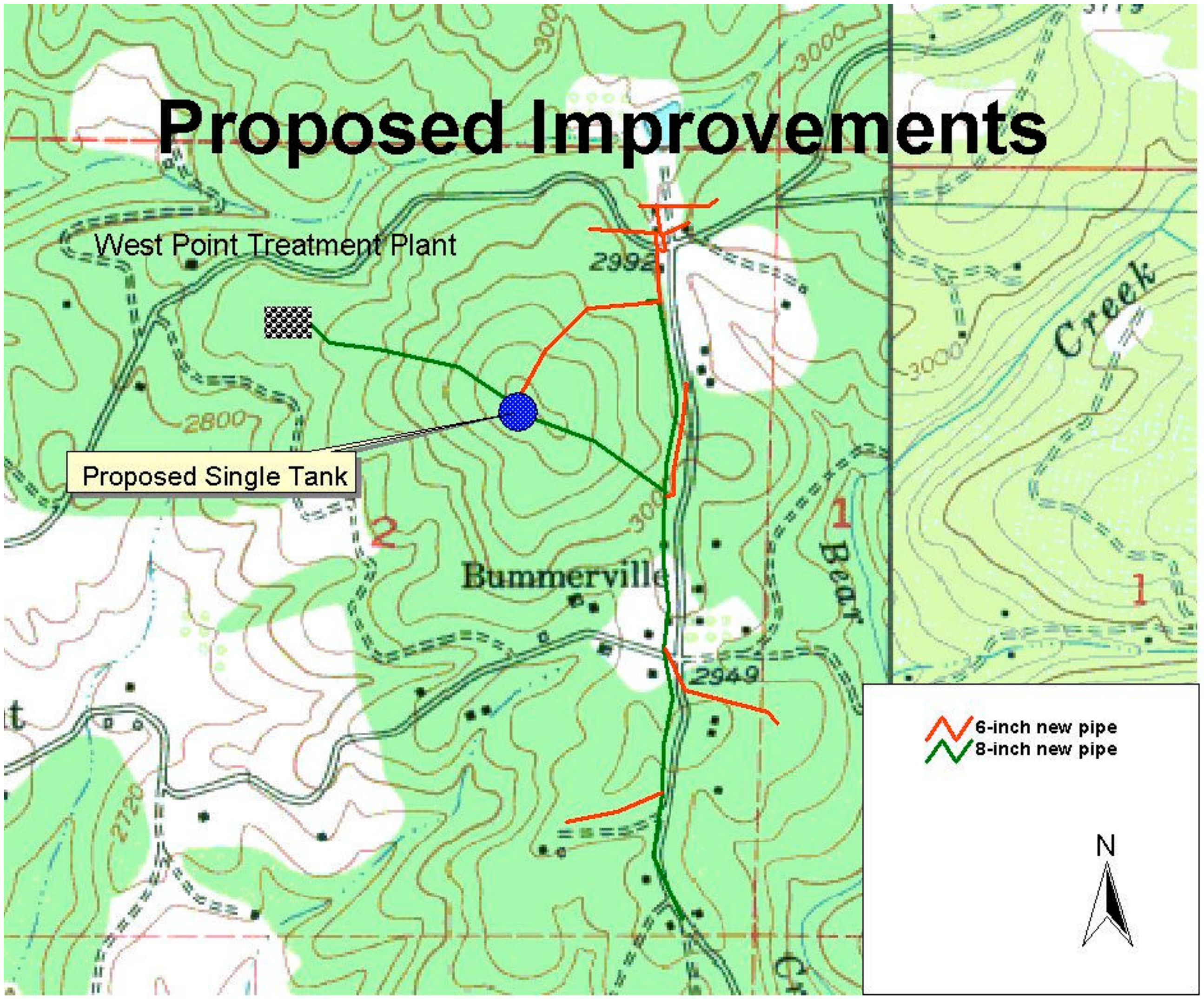

Figure 2-10. Proposed Improvements to the Bummerville Distribution System

Water Savings Produced by the Project

Almost, the entire distribution system in Bummerville is over 50 years old, and inadequate in capacity to deliver fire flows. Based on the treated water loss records provided by the District (see attachment G-3), approximately 40% (or 74 acre –feet) of the delivered treated water is lost in the water distribution systems within the service district each year. With the Bummerville system comprising of approximately 11% of the service district deliveries, this equates to a potential loss of 8 acre-feet per year in the Bummerville system alone.

Preliminary Cost Estimates

The estimated cost for improving the Bummerville Distribution system is $940,000. Estimated total costs can be found in Table 2-4.

Table 2-4. Estimated costs for Bummerville Distribution System Improvements

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
Materials/Installation				
Pipeline				
6-inch Pipe	3,450	LF	$45	$155,250
8-inch Pipe	7,100	LF	$55	$390,500
Valves, Installed				
Along the 6-inch Pipe	12	EA	$850	$9,775
Along the 8-inch Pipe	24	EA	$1,000	$23,667
Pavement Replacement	6,000	LF	$10	$60,000
Service Connections	43	EA	$950.00	$40,850
	Materials/Installation subtotal =			**$680,000**
Land Purchase/Easement	5%	LS		$35,000
Planning/Design/Engineering	12%	LS		$82,000
Environmental Mitigation/Enhancement	3%	LS		$20,000
			SUBTOTAL =	$817,000
Contingency Costs	15%	LS		$123,000
TOTAL ESTIMATED COST =				**$940,000**

B2. Task List and Schedule

The following figure provides a work schedule with tasks and associated start and competition dates. Table 2-5 includes the associated deliverables, projected costs and quarterly expenditures estimated for each task.

Figure 2-11. Project work schedule

Table 2-5. Task List and Quarterly Expenditures

			Quarterly Expenditures							
Task	**Deliverable**	**Cost**	**Jan-02**	**Apr-02**	**Jul-02**	**Oct-02**	**Jan-03**	**Apr-03**	**Jul-03**	**Oct-03**
Application Submittal	Application	NA								
Develop Financing		NA								
Environmental Documentation *	Neg Dec	NA								
Acquire Permits (all 3 projects)	Local permits	$ 36,000			$ 20,000	$ 16,000				
Final Design - Bear Creek Pipeline	Bid Documents	$ 85,000		$ 38,000	$ 47,000					
Final Design Bummerville Tank	Bid Documents	$ 60,000		$ 60,000						
Final Design Bummerville distribution	Bid Documents	$ 70,000		$ 22,000	$ 48,000					
Easements Bear Creek	Construction easements	$ 40,000		$ 5,000	$ 3,000	$ 2,000	$ 30,000			
Easements Bummerville tank	None required									
Easements Bummerville Distribution	Construction Easements	$ 35,000			$ 5,000	$ 5,000	$ 25,000			
Bidding and award Bear Creek Pipeline	Construction contract	$ 10,000				$ 10,000				
Bidding and Award Bummerville Tank	Construction contract	$ 8,000				$ 8,000				
Bidding and Award Bummerville Distribution	Construction contract	$ 10,000				$ 10,000				
Construction - Bear Creek Pipeline **	Completed construction	$ 1,642,000					$ 558,000	$ 542,000	$ 542,000	
Construction- Bummerville tank **	Completed construction	$ 329,000				$ 85,000	$ 122,000	$ 122,000		
Construction-Bummerville Distribution **	Completed construction	$ 823,000					$ 210,000	$ 200,000	$ 200,000	$ 213,000
Construction Administration (all 3 projects)	Ongoing during construction	$ 134,000					$ 42,000	$ 40,000	$ 30,000	$ 22,000
TOTAL COSTS		**$ 3,282,000**		**$ 125,000**	**$ 123,000**	**$ 136,000**	**$ 987,000**	**$ 904,000**	**$ 772,000**	**$ 235,000**

B3. Monitoring and Assessment

This section describes the process for documenting progress on how successful the three project components are in meeting the program goals and objectives. Monitoring, information gathering and processing will be similar for each component in that reductions in water loss will be measured. The following provides an outline of how this process will work for each project component.

Bear Creek Raw Water Pipeline

The purpose of the replacement of the Bear Creek Raw Water Pipeline is to eliminate the significant loss of raw water due to the age and deteriorated condition of the pipe. As stated in Section 1 above, nearly one half of the diversion capacity is lost through the leaking pipeline. In order to determine the effectiveness of the proposed pipeline, a flow metering station will be installed at the upstream end of the pipeline to measure the flow conveyed through the pipe. The flow meter compared to the flow read at the weir after the installation. This process of measuring the flow diverted versus the flow delivered at the upstream end of the pipe will accurately measure the effectiveness and the success of the project, throughout the life of the project.

The flow meter will provide a continuous electronic output, which can be recorded at the West Point Treatment Plant SCADA central. Records to be saved and made available will include; total monthly flow, total daily flow, peak flows for the month, and weekly flow recorded during times of visual recordings at the diversion weir. Visual recordings at the weir will be made and transferred to the electronic data base at SCADA central. These visual recordings will be checked against the flow meter records and will be plotted and made available for review and comparison to indicate quantity of water lost in the pipeline. With the new pipeline, the losses should be negligible for quite some time, and with the monitoring and continuous metering, any unexpected leak or line break can be detected and responded to promptly.

Bummerville Tank

The effectiveness of the Bummerville Tank replacement will be measured immediately upon completion of the tank. The new tank should not leak. This will save significant water currently being lost as described in Section 1 above.

The new tank will be visually monitored weekly as part of the District's routine operation and maintenance plan. Any detection of leaks in the tank will be recorded. Water quality tests will also be taken (monthly or bi-monthly) to monitor the water quality. By replacing the old redwood tanks, the potential for bacteria growth will be decreased. All water quality and leak monitoring records will be available for review at any time.

Bummerville Distribution System

The Bummerville distribution system is currently in such a condition to where the District has estimated that nearly 40% of the treated water to the system is lost between leaking pipelines and the leaking tanks described above. The distribution losses are the main component of this water loss. The Bummerville system is one of the oldest systems in the area and is entirely sub-standard in terms of capacity to deliver fire flows and overall reliability to serve the community. Replacement of the pipelines will show immediate improvement in water pressure and capacity.

With all services within the Bummerville distribution system metered, the success of the improvements can be measured by taking the difference between the metered usage and the supply volume recorded at a new mainline flow meter on the supply line from the treatment facility. The Bummerville system is isolated from the rest of the systems supplied from the treatment plant, therefore water conveyed through the single supply line to Bummerville will be used by services on the Bummerville system only. The new flow meter will send electronic data directly to the SCADA central location at the treatment plant and will provide records of the total flow delivered to the Bummerville community, along with any instantaneous or peak flow data desired. Individual metered flow data collected monthly for billing purposes will be used to determine the total water actually used by the community. The total flow delivered minus the total flow used will indicate the water lost in the system. This result should be an accurate measure of the immediate success (reduction in leakage) and will show long term trends if losses increase over time.

B4. Preliminary Plans and Specifications

Preliminary plans and specifications for the project have been provided for review. A certification statement signed by a California Registered Civil Engineer can be found on the following page.

Certification Statement

Engineering feasibility statement

I, Joe Domenichelli, a California registered civil engineer, have reviewed the information presented in support of this application. Based on this information, and any other knowledge I have regarding the proposed project, I find that it can be designed, constructed, and operated to accomplish the purpose for which it was planned. There is sufficient water supply for the project.

The information I have reviewed to document this statement has included the Calaveras County Water District West Point Wilseyville/Bummerville System Improvements Draft Feasibility Report and Preliminary Plans, West Point/ Wilseyville Domestic Water System Master Plan and the Calaveras County Water Master Plan.

C. Qualifications of the Applicants and Cooperators

C1. Resume of Project Manager

Resumes have been provided at the end of this application.

C2. Role of External Cooperators

CCWD will hire an engineering consulting firm to complete the designs of the three project components. Construction management will be preformed both in-house and with the assistance of an engineering consultant.

Currently, the design-engineering firm is HDR Engineering Inc. located in Folsom California.

D. Benefits and Costs

D1. Budget Breakdown and Justification

Costs for the project were found by totaling the costs for each component of the project. A breakdown of the costs for the project can be found in Table 2-6 below. The costs for each individual component of the project are summarized in Table 2-7. For details on the cost estimates please see Section 2-A of this application.

Table 2-6. Capital Costs for the project

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Dollars (d) (b x c)	Subtotal (e) (b + d)
(a)	Land Purchase/Easement	$75,000	0.15	$11,250	$86,250
(b)	Planning/Design/Engineering	$251,000	0.15	$37,650	$288,650
(c)	Materials/Installation	$2,127,570	0.15	$319,136	$2,447,000
(d)	Structures	$169,130	0.15	$25,370	$194,500
(e)	Equipment Purchases/Rentals	*Not applicable*	0.15	---	---
(f)	Environmental Mitigation/Enhancement	$68,800	0.15	$10,320	$80,000
(g)	Construction/Administration/Overhead	$162,000	0.15	$24,300	$18,300
(h)	Project/Legal/License Fees		0.15	---	---
(i)	Other	*Not applicable*	0.15	---	---
(j)	Total (1) (a + ….+j)	$2,853,500	0.15	$428,025	$3,282,000
(k)	Capital Recovery Factor 0.0634 (6%; 50 years)	---	---	---	0.0634
(l)	Annual Capital Costs (jxk)	---	---	---	**$209,000**

Table 2-7. Summary of costs for each component of the project

	Capital Cost Category (a)	Bear Creek Raw Water Pipeline Cost (b)	Bummerville Treated Water Storage Tank Replacement Cost (c)	Bummerville Distribution System Improvements Cost (d)	Total (e) (b + c + d)
(a)	Land Purchase/Easement	$40,000	$0	$35,000	$75,000
(b)	Planning/Design/Engineering	$108,000	$61,000	$82,000	$251,000
(c)	Materials/Installation	$1,350,000	$98,000	$680,000	$2,128,000
(d)	Structures	$0	$169,000	$0	$169,000

	Capital Cost Category (a)	Bear Creek Raw Water Pipeline Cost (b)	Bummerville Treated Water Storage Tank Replacement Cost (c)	Bummerville Distribution System Improvements Cost (d)	Total (e) (b + c + d)
(e)	Equipment Purchases/Rentals	*Not applicable*	*Not applicable*	*Not applicable*	*Not applicable*
(f)	Environmental Mitigation/Enhancement	$41,000	$8,000	$20,000	$69,000
(g)	Construction/Administration/Overhead	$135,000	$27,000	$0	$162,000
(h)	Project/Legal/License Fees	*Not applicable*	*Not applicable*	*Not applicable*	*Not applicable*
(i)	Other	*Not applicable*	*Not applicable*	*Not applicable*	*Not applicable*
(j)	Total (1) (a + ….+j)	$1,674,000	$363,000	$817,000	$2,854,000
(k)	Contingency (15% x j)	$251,100	$54,450	$122,550	$428,000
(l)	Total (k+j)	$1,925,100	$417,450	$939,550	**$3,282,000**

CCWD's Director of Operations estimated annual operations and maintenance costs (O&M) after the completion of the project. The costs come from the current operations and maintenance budget and can be found in the Table 2-8. The annual O&M costs can be found in Table 2-9.

Table 2-8. Annual Operations and Maintenance Costs for Project Area

Cost Category	Raw water supply		Water delivery for Bummerville	
	current	after project	current	after project
Labor	$23,250	$23,250	$3,300	$3,300
Utilities	$10,000	$10,360	$0	$0
Materials & Supplies	$3,000	$1,300	$770	$770
Outside Services	$3,550	$2,030	$578	$578
Insurance	$155	$155	$0	$0
Vehicles	$1,900	$1,900	$220	$220
Office supplies	$100	$100	$2	$2
Training/Certification	$250	$250	$6	$6
Regulatory fees	$1,000	$1,000	$0	$0
Total =	$43,205	**$40,345**	$4,875	**$4,875**

Table 2-9. Annual operations and maintenance costs

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
$1,513	$39,030	$4,678	---	**$45,220**

The annual cost for the project including O&M costs can be found in Table 2-10.

Table 2-10. Annual cost

Annual Capital Costs (1) (a)	Annual O&M Costs (2) (b)	Total Annual Costs (c) (a + b)
$209,000	$45,220	**$254,220**

D2. Cost-Sharing

This section is not applicable to this application

D3. Benefit Summary and Breakdown

3a. Project Outcomes and Benefits

The expected outcome from this project is a total annual water savings of approximately 1,210 acre-feet. The water savings for each project component are summarized in Table 2-11 below. Details on how each water saving was calculated can be found in section 2A of this application.

Table 2-11. Summary of estimated water savings from each component of the project.

Project Component	Annual Water Savings (AF)
Bear Creek Raw Water Pipeline	1,200
Bummerville Treated Water Storage Tank Replacement	1.6
Bummerville Distribution System Improvements	8
Total Estimated Water Savings	**1,209.6**

The total project benefits were found by first determining the benefits for each individual project component. The benefits for each project component were then summed to find the overall project benefit. The following pages show how the benefits for each project component were calculated. The table below summarizes the benefits found for each component.

Table 2-12. Summary of project benefits

Project Component	Project Benefit ($)
Bear Creek Raw Water Pipeline	$259,950
Bummerville Treated Water Storage Tank Replacement	$98.00
Bummerville Distribution System Improvements	$2,370
Total Project Benefit =	**$262,420**

Bear Creek Raw Water Pipeline

The benefits for Bear Creek Raw Water Pipeline were found by considering three different benefit options. The first option calculates the costs that would be avoided by implementing the project. This includes the avoided cost of pumping from the Mokelumne River the same amount of water currently lost through the leaking raw water pipeline. This cost can be found in Table 2-13 below.

Table 2-13. Avoided costs of current supply sources

Supply Sources (a)	Cost of Water ($) (b)
Pumping 1,200 AF out of the Middle Fork Mokelumne River *	**$220,550**

*this cost does not include costs to obtain additional water rights (beyond the current 100 AF) from the Middle Fork Mokelumne River

Assumptions for calculating cost of pumping from MFMR:

- TDH = 800 ft.
- Pump Efficiency = 60%
- Cost of power = $0.12/kW-hr
- Cost of purchasing water from CPUD = $20/AF

The second benefit considered is the alternative costs of future supply sources. In this case an alternative future supply source would be to increase the regulating reservoir size to store additional water and make up some of the current lost supply. The capital costs associated with the enlargement of the regulating reservoir were found during the development of the CCWD Feasibility Study (HDR, 2001) and can be found in Table 2-14 below.

Table 2-14. Cost Estimate for Enlargement of West Point Regulating Reservoir

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
Materials/Installation				
Earthwork				
Clearing, Grubbing & Stripping	3	Acres	$1,000	$3,000
Embankment Foundation & Core Trench				
Excavation and Clean-up	60,000	CY	$2.50	$150,000
Embankment Fill - On-site Source	98,000	CY	$3	$294,000
4' Wide Chimney Drain	3,200	CY	$50	$160,000
2' Thick Blanket Drain	1900	CY	$45	$85,500
Outlet Conduit				
18" dia. Concrete Encased Pipe	250	LF	$175	$43,750
Gate Controls and Trash Rack	1	LS	$12,000	$12,000
Diversion Ditch	1,500	LF	$25	$37,500
Rip Rap	50	Tons	$30	$1,500
	Materials/Installation sub-total =			$787,000
Structures				
Concrete Lined Spillway	140	CY	$300	$42,000
	Structures sub-total =			$42,000
Planning/Design/Engineering	10%	LS		$83,000
Environmental Mitigation/Enhancement	3%	LS		$25,000
Construction/Administration/Overhead	10%	LS		$83,000
Project Legal/License Fees - Division of Safety of Dams (DSOD) Approval and Inspection	10%	LS		$83,000
Other/Environmental Documentation	1	LS	$40,000	$40,000
			SUBTOTAL	$1,143,000
Contingency Costs	15%	LS		$171,500
			TOTAL ESTIMATED COST =	**$1,315,000**

The annualized cost associated with this alternative can be found in Table 2-15.

Table 2-15. Alternative costs of future supply sources

Future Supply Sources (a)	Total Capital Costs ($) (b)	Capital Recovery Factor (1) (c)	Annual Capital Costs ($) (d) (b x c)	Annual O&M Costs ($) (e) (b + d)	Total Annual Costs ($) (f) (d + e)

Future Supply Sources (a)	Total Capital Costs ($) (b)	Capital Recovery Factor (1) (c)	Annual Capital Costs ($) (d) (b x c)	Annual O&M Costs ($) (e) (b + d)	Total Annual Costs ($) (f) (d + e)
Regulating Reservoir Enlargement	$1,315,000	0.0634	$83,370	$3,000	**$86,370**

The final benefit analyzed was the potential water sales revenue that is currently lost through leaks in the raw water pipeline. The projected selling price was estimated from current water rate records given by the district. The rates for 2001 were used, as the district did not anticipate a change in rates in the near future. The water sales revenues are calculated in the table below.

Table 2-16. Water sales revenue (vendibility)

Parties Purchasing Project Supplies (a)	Amount of water to be Sold (1) (AF) (b)	Projected Selling Price ($/AF) (c)	Expected Frequency of Sales (2) (%) (d)	Actual Sales Revenue ($) (e) (b x c x d)	"Option" Fee (3) ($) (f)	Total Sales Revenue ($) (g)
Residential and commercial customers in the West Point, Wilseyville and Bummerville areas	1,000	$370/AF see current rates	0.8	$296,000	N/A	**$296,000**

The total benefits for the Bear Creek Raw Water Pipeline component were found by taking a weighted average of the benefits found in each of the above tables. The greatest weight was given to the water sales revenue, as this would produce increased income for the district.

$$AnnualBenefits = \frac{(2\times\$220{,}550) + (1\times\$86{,}370) + (7\times\$296{,}000)}{10} = \$259{,}950$$

Bummerville Treated Water Storage Tank Replacement

The benefit from replacing the Bummerville Treated Water Storage Tanks is the avoided cost of pumping the 1.6 acre-feet from the treatment plant to the tanks. Currently an additional 1.6 acre-feet must be pumped each year to replace the volume lost to leakage. The avoided cost of pumping can be found in the table below.

Table 2-17. Avoided costs of current supply sources

Supply Sources (a)	Cost of Water ($) (b)
Pumping 1.6 AF from the Treatment Plant to the Tanks	**$98.30**

Assumptions for calculating cost of pumping from the Treatment Plant to the Bummerville Tanks:

- TDH = 300 ft.
- Pump Efficiency = 60%
- Cost of power = $0.12/kW-hr

The total benefits for the Bummerville Storage Tank Replacement component were found to be $98.30.

Bummerville Distribution System Improvements

The benefit from improving the Bummerville Distribution System is the increased water sales revenue. The same water rates were used as in the Bear Creek Raw Water Pipeline and Diversion analysis. The benefits for the Bummerville Distribution System Improvements can be found in the table below.

Table 2-18. Water sales revenue (vendibility)

Parties Purchasing Project Supplies (a)	Amount of water to be Sold (1) (AF) (b)	Projected Selling Price ($/AF) (c)	Expected Frequency of Sales (2) (%) (d)	Actual Sales Revenue ($) (e) (b x c x d)	"Option" Fee (3) ($) (f)	Total Sales Revenue ($) (g)
Residential and commercial customers in the West Point, Wilseyville and Bummerville areas	8	$370/AF see current rates	0.8	$2,370	N/A	**$2,370**

The total benefits for the Bummerville Distribution System Improvements component were found to be $2,370.

3b. Additional Benefits (Qualitative)

The total project benefits shown do not include any benefits from a reduction in risk of failure. There are a few components in the project that may threaten the safety, welfare and economy of the service area. These components include the Bummerville Storage Tanks and the Bummerville Distribution System.

The Bummerville treated water storage tanks pose a potential threat to the health and safety of the area. The tanks are currently made of redwood and have a threat of bacteria development through the leaks in the tanks. Treated water storage tanks should be properly sealed in order to assure that sanitary conditions are met. The Bummerville distribution system is currently experiencing up to 40% leakage of treated water. During dry years when water from Bear Creek is not accessible these leaks could endanger the welfare of the community by drastically limiting the volume of water delivered.

Implementing the proposed infrastructure rehabilitation project would alleviate all of these problems. Although these benefits are difficult to quantify it is important to note that benefits of the project exist beyond what is shown for the Benefit/Cost ratio calculation.

D4. Assessment of Costs and Benefits

Analysis Assumptions and Methodologies

This cost benefit analysis follows the following assumptions:

- Period of analysis: 50-year economic analysis period
- Inflation and escalation: Assumed zero future inflation and escalation
- Discount rate: 6-percent discount rate
- Capital Recovery Factor = 0.0634

The following list outlines the analysis methodologies:

- Costs are the sum of the capital costs and the annual operations and maintenance costs (O&M)
- Benefits were found by taking a weighted average of the following alternatives
    - Avoided costs of current sources
    - Alternative costs of future sources
    - Sales to other agencies/customers

Present Value of Costs and Benefits

Table 2-19. Summary of Project Costs and benefits (Present Value)

Project Component	Capital Cost (PV)	Project Annual O&M costs	Total Project Costs (PV)	Benefit (PV)	Beneficiary
Bear Creek Raw Water Pipeline	$122,000	$30,300	$152,300	$259,950	Calaveras County Water District and its customers
Bummerville Treated Water Storage Tank Replacement	$27,000	$10,045	$37,045	$98.00	Calaveras County Water District and its customers
Bummerville Distribution System Improvements	$60,000	$4,875	$64,875	$2,370	Calaveras County Water District and its customers
Total:	**$209,000**	**$45,220**	**$254,220**	**$262,420**	

Table 2-20. Summary of non-quantified benefits

Project Component	Non-quantified Benefit of Project
Bummerville Treated Water Storage Tank Replacement	• Existing Redwood tanks pose a health threat from bacteria development
Bummerville Distribution System Improvements	• During dry years leaks in the system could endanger the welfare of the community

Project Cost Effectiveness

Table 2-21 below shows the final Benefit to Cost (B/C) ratio calculated for the project.

Table 2-21. Benefit/cost ratio

(a)	Annual Project Benefits ($)	$262,420
(b)	Annual Project Costs ($)	$254,220
(c)	**Benefit/Cost Ratio (a / b)**	**1.03**

This project is considered locally cost effective because the B/C ratio is greater than 1.

References

1. Borcalli & Associates, Inc. 1996 (Rev). Calaveras County Water District, Countywide master plan: making effective use of supplies. Sacramento, CA.
2. Charpier, Martin & Associates. 1996. West Point/Wilseyville domestic water system master plan for Calaveras County Water District. Sacramento, CA.
3. HDR Engineering, Inc. 2001. Calaveras County Water District West Point, Wilseyville, Bummerville System Improvements Draft Feasibility Report. Sacramento, CA.

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E. Outreach, Community Involvement and Acceptance

During the course of the modification of the West Point Water Treatment Plant and preliminary plan development for the West Point Water System through a California Safe, Clean and Reliable Water Supply Act Feasibility Study Grant, community informational meetings have been held to update the public on CCWD's progress.

The first community meeting was held on August 23, 2000 at the West Point Community Hall in downtown West Point. CCWD staff and board members presented a history of the water system and an overview of CCWD's accomplishments in West Point in recent years, including construction and implementation of:

- The West Point-Wilseyville System Intertie, which linked together two service areas and utilized Wilseyville's water treatment plant as a backup raw water pump station
- The West Point Wastewater Treatment Plant, which replaced a failing community leachfield system
- The West Point Water Treatment Plant (WTP), which will upgrade the existing water treatment plant to meet new drinking water standards. The WTP is currently under construction with estimated completion in 2002.

Service and connection fees and the District's plan for the future were reviewed. The meeting provided a forum for discussion of CCWD's feasibility study to formulate a plan for upgrade and replacement of the aging supply and distribution systems in the West Point/Wilseyville area and possible sources of additional funding for construction of these projects.

Approximately 50 members of the West Point/Wilseyville community attended the meeting, which concluded with an interactive discussion between board members, staff and the audience.

On December 7, 2000 a groundbreaking ceremony was held at the West Point Water Treatment Plant. CCWD board members and staff along with funding agency representatives, dignitaries, media, consultants, contractors and members of the public attended. Again, the long-range water system plans for the West Point/Wilseyville area were presented and discussed.

A second community meeting was held at the West Point Community Hall on February 1, 2001. The purpose of the meeting was to update the community on the status of the water treatment plant construction and the progress of the supply and distribution systems feasibility study. Presentations by General Manager Simon Granville, District 5 Board Member Leroy Fonceca, consulting engineers and staff focused on issues addressed by the feasibility study. The meeting attracted over 50 members of the community at large and included news media, local politicians and dignitaries, all of whom agreed that health and safety issues faced by the community would be solved by the planned improvements in the water system infrastructure. The next West Point community meeting is scheduled for late March 2002.

CCWD PROJECT MANAGER

James Cornelius, P.E., Water Resources Engineer
West Point Urban Water Conservation Capital Outlay Grant, Project Manager

Experience/Qualification Highlights

- Over 40 years of professional experience as a water resources engineer
- Managed the planning, design, and construction of wastewater facilities for the California State Water Resources Control Board
- Served as Chief of the Regulatory Programs Branch of the California State Water Resources Control Board
- Broad experience directing watershed management, water quality protection and compliance programs, including NPDES permits, water quality planning, non-point source/storm water management and mining waste management
- Extensive experience in governmental regulatory policies and procedures

Positions Held

Calaveras County Water District **April 1999 - Present**

Director of Regulatory Affairs (Part Time)

- Calaveras County Water District's point of contact with water quality regulatory agencies
- Develop and Manage Water Resources Projects (surface and groundwater)
- Advise on water rights issues
- Direct watershed management activities
- Prepare grant applications for water and wastewater grants

Private Consulting Firms **1996 - 1999**

- Project manager for water resources projects
- Served as the advisor to other project managers on water regulatory issues
- Assisted in developing government permit applications for clients
- Prepared grant applications for clients

California State Water Resources Control Board **1986 - 1995**

Principal Water Resources Control Engineer and Chief, Regulatory Program Branch, Division of Clean Water Programs

- Managed a staff of 140 at the State Water Resources Control Board (SWRCB) and through statewide program managers, coordinated the work of an additional 250 Regional Water Quality Control Board (RWQCB) staff at 12 offices statewide relative to Water Quality Regulatory Programs
- Served as the Water Quality Advisor for Governor Pete Wilson's Military Base Reuse Task Force and managed the SWRCB program at US Department of Defense facilities within California
- Served as the SWRCB's primary representative on numerous local, state, and national forums on all aspects of water quality issues

California State Water Resources Control Board **1984 - 1986**

Principal Water Resources Control Engineer and Chief, Operations Branch, Division of Water Quality

- Managed the SWRCB program on surface water and groundwater regulatory and planning programs
- Responsible for developing the SWRCB groundwater Protection Strategy
- Managed the Section 205J Water Quality Management Planning Program
- Supervised the development of the first non-point source projects for the SWRCB

California State Water Resources Control Board 1970 - 1984

Consecutively Served as Senior Water Quality Control Engineer, Supervising Water Resources Control Engineer, Assistant Division Chief, And Principal Water Resources Control Engineer, Division of Loans and Grants

- Held an integral role in the development and implementation of the California Clean Water Grants Program, developing the Agreement-in-Principle and the 26 functional subagreements delegating the program from the US EPA to the State of California
- From 1979 through 1984 served as Chief Engineer for the Program with responsibility for all SWRCB's final engineering decisions for $500 million per year of federal and state grant funded wastewater projects, including the planning, design, construction, and start up of facilities

California Department of Public Health, Berkeley 1960 - 1970

Staff Engineer (Junior Civil, Assistant Sanitary Engineer, Associate Sanitary Engineer)

- Conducted sanitary engineering, public health studies, and water quality evaluations relative to drinking water supplies, sewage treatment, water quality protection, solid waste management, and toxic waste
- Task Leader and principle author or the comprehensive study and report, "Solid Waste and Water Quality – A Study of Solid Waste Disposal and Their Effect of Water Quality in the San Francisco Bay-Delta Area," published by the California Department of Health in 1968
- Expert witness for the State during two major court actions relative to NPDES permit violations resulting from wastewater runoff into Lake Tahoe

Registrations, Education, and Selected Affiliations

- California Professional Civil Engineer, License No. C17438
- Masters of Public Administration, California State University, Sacramento
- Bachelor of Science, Civil Engineering, South Dakota State University
- Past member, California Department of Health Services Public Policy Committee for its Source Water Assessment and Protection Program
- Past member, CalEPA Private Site Manager's Program Advisory Committee
- Past member, served 3 years on the US EPS's Policy Dialogue Committee on Mining Waste
- Past member, served 4 years on the California Department of Toxic Substances Control Site Mitigation Advisory Committee
- Served as Workshop Program Chair for the Western State Water Council, July 25-28, 1989, Non-point Source Pollution Control Workshop
- Past member, Lahontan Regional Water Quality Control Board Task Force on Lake Tahoe Water Quality, which developed the "Water Quality Control Policy – Lake Tahoe," June 1966

Selected Publications and Courses Taught

- Taught "Politics of Water in California," for the Government Department at California State University, Sacramento, 1975
- Presented paper, "Development of a California Groundwater Quality Protection Strategy," on September 18, 1985, at the Western Regional Groundwater Conference in Salt Lake City, Utah
- Developed and facilitated a 3-day seminar for UC Davis Extension on Ground Water Quality Planning and Policy, January 12-14, 1987
- Presented paper, "How States Define Non-point Sources," at the Water Pollution Control Federation Pre-conference Workshop, October 13, 1989, San Francisco
- Presented paper, "Role of Regulatory Agencies in Soil and Groundwater Remediation," on November 8, 1994 at the University of California, Los Angeles Extension Short Course on Soil and Groundwater Remediation
- Principle author of over 100 other technical papers and reports