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): **+- 9**

    Estimated total amount of water to be saved (acre-feet):

    Over 10 years **90**

    Estimated benefits to be realized in terms of water quality, instream flow, other: Water conservation & added instream flow

11. Duration of project (month/year to month/year): **11/02-2/03**

12. State Assembly District where the project is to be conducted: 4

13. State Senate District where the project is to be conducted: 1

14. Congressional district(s) where the project is to be conducted: 4th

15. County where the project is to be conducted: Amador

16. Date most recent Urban Water Management Plan submitted to the Department of Water Resources: 02/02

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)

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:
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): River Pines Public Utility District

3. Project Title: Water System Assessment

4. Person authorized to sign and submit proposal:

Name, title	Lori Weir-Weber
Mailing address	P.O. Box 70, River Pines, CA 95675-0070
Telephone	209-245-6723
Fax.	209-245-5710
E-mail	Rppud@centralhouse.net

5. Contact person (if different):

Name, title.	
Mailing address.	
Telephone	
Fax.	
E-mail	

6. Funds requested (dollar amount): $138,000

7. Applicant funds pledged (dollar amount): $5,000 in-kind

8. Total project costs (dollar amount): $143,000

9. Estimated total quantifiable project benefits (dollar amount): +-$4,000/Yr.

Percentage of benefit to be accrued by applicant: 50

Percentage of benefit to be accrued by CALFED or others: 50

Project Summary

The project is located in the community of River Pines/Amador County situated next to the South Fork of the Cosumnes River, which separates Amador and El Dorado counties. Some service extends into El Dorado County.

This grant request is qualitative and quantitative. Beyond the utilitarian realm of this project are the health and welfare needs of this water-deprived community. With this project we will begin a much needed first phase in restoring safe, reliable drinking water to our residents. Long awaited (40 years) infrastructure improvements to better serve the families of this economically needy area could become a reality with support from the State Department of Water Resources.

The nature of this project is to correct a deteriorated water system, which has been plagued with water system breaks, insufficient flows, boil water mandates. This project will bring the system up to American Water Works Association (AWWA) Standards. River Pines Public Utility District provides 55-acre feet of water and of this, there is an 8-acre feet annual loss.

Rather than reflect the District's cost per-acre-foot at the beginning of this document, according to the District's accountant, the District has an end-of-year balance of approximately $3,000. This amount reflects a minimal profit, which is inadequate for emergencies and basic operating needs. One of several steps needed to assist the District is the elimination of further water loss. By assessing an inadequate water system, we will take steps to rectify this impending problem.

The goals and objectives are to assess the entire water system to determine water loss, valve locations, constrictions, metering deficiencies, fire flows or lack thereof, and to develop plans and specifications for system upgrade and conformance to AWWA Standards. With a total annual distribution of approximately 55-acre feet of water and a loss of 9-acre feet, a significant goal is to eliminate this water loss.

The methods are of a specialized process that includes: Electromagnetic, Vacuum Excavation Technology, Ground Penetrating Radar (GPR), Acoustic Leak Noise and Leak Noise Correlation Locating.

The Procedures include utilization of a variety of instruments, which are uniquely suited to a few tasks. Electromagnetic methods will be utilized and are the most frequently employed techniques to detect underground utilities made of or containing conductive materials e.g. steel, copper. In order to detect these utilities using electromagnetic survey techniques, a radio frequency is induced onto the utility. This signal is carried by the conductor along its length and is detected above ground with a radio frequency antenna.

Non-metallic pipes do not accept, produce or transmit an electromagnetic frequency. If such a utility is found, a transmitter is introduced into the pipe and traced. The use of several different utility locating instruments will help determine the surface trace of utilities from a small, single frequency line to large diameter pipes. Advanced geophysical technology will be part of the procedure to assist in water line location where field conditions warrant the use. The procedures used also have the ability to confirm exact locations and depths by potholing with the latest vacuum excavation technology. This information enables design teams to navigate proposed new routes around existing utilities with extra confidence. Also used will be Ground Penetrating Radar (GPR) which obtains a subsurface "picture" by inducing a pulse of electromagnetic energy into the ground at very

high frequencies. A portion of the induced pulse is reflected upward to the antenna from a reflection boundary. The reflection boundary is the interface between materials, each having a measurable contrast in electrical properties. The graphic results are viewed on a video monitor and/or printed out. This graphic data, or GPR "records," are interpreted in the field.

Acoustic Leak Noise Locating is another method whereby water pipes under pressure will make a noise when they leak from a broken or faulty pipe. This noise can be used in a number of ways to help pinpoint leaks in pipelines.

There are a number of ways of using the produced sound for acoustic leak location.
Ground microphones are highly sensitive microphones connected to a portable amplifier. The sound produced from the leak is amplified, filtered and monitored by headphones worn by the surveyor as well as by a visual reading taken off the amplification unit.

This unit contains a number of special filters to help remove background noise. Typical background noise would include cars traveling past or machinery working close by. With up to nine filter combinations, it is possible to decrease outside noise so the surveyor can concentrate on the leak with minimal interference.

In certain circumstances, surface conditions and the depth of the pipeline in question make it impossible to locate leaks from the surface using the methods described above. In these circumstances, an advanced technology known as Leak Noise Correlation will be utilized.

Leak Noise Correlation uses the principle that although leaks may not be visually detected from the surface, the sound of the leak will travel along the pipe. Two sensors are placed on the pipe, normally at fittings such as valves or hydrants, one on either side of the leak. These sensors pick up all signals at frequencies between 250 Hz and 5 kHz; understanding that sound produced from a leak usually falls within this bandwidth. The Leak Noise Correlator receives these sounds and measures the difference in time between the component of the signal representing the leak at one sensor and its arrival at the other sensor. Leaks produce a sound that usually remains constant in relation to its position on the pipe. Therefore, the signal received through radio link at the Leak Noise Correlator is computed and displayed in a graphic format, showing a "peak" or "spike" at the point of the leak.

Expected outcomes will be a complete analysis of the water system infrastructure identifying conditions contributing to water loss, as well as overall efficiency for maintenance and operations.

From the assessment, we will develop plans and specifications critical for a system-wide upgrade for improved water quality and quantity.

Subtronic strives to produce survey results to each of our client’s unique specifications.

In addition to engineering drawings, site sketches will be utilized for a permanent record of survey. Utilities are referenced to fixed points such as buildings or street furniture. This method of presentation will provide us with a quick, permanent and economical hard copy of the survey results.

High quality scale drawings to relevant engineering standards will also be a critical outcome for future construction.

We will also have in-house, digital survey presentations available. Ground marks are collected by the surveyors using a total station or GPS (Geophysic Positioning Systems). Coordinates are then transferred to computer for digital presentation using AutoCad Release 13.

Costs for the proposed project are expected to be $138,000
.
Benefits will be the savings of approximately nine (9) acre-feet of water per year once construction is complete.

We will also review the current system to determine fire flows needs that meet state standards (currently have below minimum fire protection) and develop plans and specifications that will allow us to upgrade the entire system providing for long-term costs savings to the user and supplier. State-of-the-art materials, instruments and appurtenances will be included in the plan.

Assessment of meters and valves will be included in this project. Proper meter quality and quantity and associated valves will enable us to more efficiently operate our system and avoid the total shut down of the system for needed repairs

A. Scope of Work-Relevance and Importance

1. Nature, scope and objective of the project is to ascertain information needed to construct a water system which will improve overall system effectiveness, eliminate undersized and poor quality water lines and stop further loss of water.
2. The critical local water issue is water quality (high coliform counts), water quantity (lack of year-round source of domestic water), breaks in a 40-year old system, patchwork repairs and retrofits.
   The need for the project is directly tied to the major issues mentioned above. With an annual use of approximately 55-acre feet of water and a loss of approximately 9-acre feet, this 16% water loss is critical.
   The current system is comprised of ¾" galvanized pipe and pvc pipe varying from 1" to 10" maximum size.
   When a major break occurs, the entire town is often 'shut-down' due to insufficient and improperly located shut off valves.

   The proposal is consistent with local/regional management plans which currently includes the construction of a new filtration system for improved water quality and the overall intent of the River Pines Public Utility Board (RPPUD) to provide safe drinking water and reliable water delivery for the needs of the River Pines Community.

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

1. The methods, procedures and technical adequacy of this proposal is utilization of high-tech equipment, which is at the forefront of international subsurface surveying, both technologically and professionally. By utilizing a company with a full range of underground utility survey expertise and geophysical services, we feel that we can accomplish our needs with a minimum of site disturbance and the outcome will be improved public service. Readiness to proceed will occur upon award of grant funds and completion of a contract with the sub-surface company selected to do the work.

2. Task list and schedule, deliverable items, due dates, project costs for each task, quarterly expenditure, start and completion dates of each task.

Task & Items	Due Dates	Costs	Quarter	Start/End Date
#1	**11-1/02**		**4th**	**11-1 to 12-1/02**
Locate underground pipework		$ 48,000		
Admin./Coord./Cont. (15%)		$ 7,200		
Total		$ 55,200		
#2	**11-15/02**		**4th**	**11-15 to 12-1/02**
Locate and uncover valves		$ 13,500		
Admin./Coord./Cont. (15%)		$ 2,025		
Total		$ 15,525		

Task & Items	Due Dates	Costs	Quarter	Start/End Date
#3	**12-15/02**		**4th**	**12-15 to 12-30/02**
Conduct water leak survey (entire system)		$ 12,000		
Admin./Coord./Cont. (15%)		$ 1,800		
Total		$ 13,800		

Task & Items	Due Dates	Costs	Quarter	Start/End Date
#4	**12-30/02**		**1st**	**12-30 to 1-15/03**
Survey located pipework (entire system)		$ 27,000		
Admin./Coord./Cont. (15%)		$ 4,050		
Total		$ 31,050		
#5	**1-15/03**		**1st**	**1-15 to 1-30/03**
Create drawing and plot (entire system)		$ 3,500		
Admin./Coord./Cont. (15%)		$ 525		
Total		$ 4,025		
#6	**1-30/03**		**1st**	**1-30 to 2-28/03**
Engineers assessment (entire system)		$ 16,000		
Admin./Coord./Cont. (15%)		$ 2,400		
Total		$ 18,400		
Grand Total		$138,000		

3. Monitoring and assessment, list of project-specific performance measures, how data will be handled and made available, list of expected products/outcomes

River Pines Public Utility Staff and Project Coordinator will provide complete overview and inspection of work performed.
Project Coordinator will review all final designs with Amador Water Agency and state engineers with the Safe Drinking Water Program.

The project-specific performance measures will be timely initiation of tasks by the contractor and their successful completion on due dates indicated in the agreement.

The actual data derived from the surveys will be plotted on an as-built map and the final engineers' drawings will reflect proposed upgrades to the system.

The expected outcome will be reliable data and drawings which will be used for construction of a more efficient and reliable water system.

4. Preliminary plans and specifications, certification that project is feasible

Technical data sheets describing the equipment utilized have been attached to this report for review. A preliminary meeting has been completed with an organization that provides services required. The proposal is feasible and appropriate for the work intended due to the specialty nature of infrastructure surveys.

C. Qualifications of the Applicants and Cooperators

1. Resume applicants (attached)
2. Role of external cooperators (attached)

D. Benefits and Costs

Each task and associated items are specified in item B. 2. The figures are derived from a cost estimate from Subtronics Corporation.

River Pines Public Utility District has included a 15% cost for administration, coordination and contingency. Considering the fact that the grant program allows for a maximum contingency of 15%, we have reflected a contingency of 2% due to the nature of the work.

The figures represented in the budget are a direct estimate from the vendor. Upon award of funds to proceed with this project, the District will most likely initiate a formal bid process.

a.	Land Purchase/Easement	NA
b.	Planning/Design/Engineering	NA
c.	Materials/Installation	NA
d.	Structures	NA
e.	Equipment Purchases/Rentals	$120,000
f.	Environmental Mitigation/Enhancement	NA
g.	Construction/Administration/Overhead	$18,000
h.	Project/Legal/License Fees	NA

i. Contingency (up to 15%, amount must be fully justified by applicant Incl.
j. Other

1. Cost-Sharing (match)

In general terms, administration and staff support would cost out at approximately 25% of total project costs and contingency would be 10%. We are requesting a total of 15%.

The district match computes to approximately 20% of total project costs and is not reflected in the budget Ancillary services. This 20% figure represents accounting, field reviews, progress reports, administration, supervision, contract administration, public review and comment.

The $120,000 figure represents contract services to perform the under ground survey and develop as-built drawings as well as construction drawings.

2. Benefit summary and breakdown – list expected project outcomes

The outcomes will be a completed engineering design, which will reflect:
- Valve location (existing & proposed)
- Line size (existing & proposed upgrades)
- Total system routing and proposed re-routes
- System design for adequate fire flow
- Meter upgrades
- Leak detection/prevention methods

a. Quantify project outcomes and benefits
b. Qualitative description if you can't quantify above

The outcome and benefits will be a savings of approximately 20% in current water loss. We also will reduce man-hours, equipment and maintenance costs once a new system has been installed.

Another expected outcome will be reliable data which can be used to determine total and incremental water loss, system reliability, trouble shooting procedures and system expansion techniques, as needed.

3. Assessment of Costs and Benefits

a. List and explain major analysis assumptions and methodologies

#1 Water Leaks – With a calculated water loss of approximately 20%, the methods determined to be appropriate to address this assumption include Acoustic Leak Noise Locating. This is another method whereby noise from a leaky, broken, or faulty pipe can pinpoit leaks in pipelines. Water pipes under pressure make noise when they leak from a broken or faulty pipe.

There are a number of ways of using the produced sound for acoustic leak location.

Ground microphones are highly sensitive microphones connected to a portable amplifier.

The sound produced from the leak is amplified, filtered and monitored by headphones worn by the surveyor as well as by a visual reading taken off the amplification unit. This unit contains a number of special filters to help remove background noise.

Typical background noise would include cars traveling past or machinery working close by. With up to nine filter combinations, it is possible to decrease outside noise so the surveyor can concentrate on the leak with minimal interference.

It might be necessary to utilize a Leak Noise Correlation which uses the principle that although leaks may not be visually detected from the surface, the sound of the leak will travel along the pipe. Two sensors are placed on the pipe, normally at fittings such as valves or hydrants, one either side of the leak. These sensors pick up all signals at frequencies between 250 Hz and 5 kHz; understanding that sound produced from a leak usually falls within this bandwidth.

The Leak Noise Correlator receives these sounds, and measures the difference in time between the component of the signal representing the leak at one sensor and its arrival at the other sensor. Leaks produce a sound that usually remains constant in relation to its position on the pipe. Therefore, the signal received through radio link at the Leak Noise Correlator is computed and displayed in a graphic format, showing a "peak" or "spike" at the point of the leak.

#2 Water line location/type – The current system is approximately 40 years old; as-built drawings of the water infrastructure are not available. Electromagnetic methods will be utilized, They are the most frequently employed techniques to detect underground utilities made of or containing conductive materials, e.g. copper, steel. In order to detect utilities using electromagnetic survey techniques, a radio frequency is induced onto the utility. This signal is carried by the conductor along its length and is detected above ground with a radio frequency antenna.

Non-metallic pipes do not accept, produce or transmit an electromagnetic frequency. If such a utility is found, a transmitter is introduced into the pipe and traced. The use of several different utility locating instruments will help determine the surface trace of utilities from a small, single frequency line to large diameter pipes. Advanced geophysical technology will be part of the procedure to assist in water line location where field conditions warrant the use. The procedures used also have the ability to confirm exact locations and depths by potholing with the latest vacuum excavation technology. This information enables design teams to navigate proposed new routes around existing utilities with extra confidence. Also used will be Ground Penetrating Radar (GPR) which obtains a subsurface "picture" by inducing a pulse of electromagnetic energy at very high frequencies into the ground. A portion of the induced pulse is reflected upward to the antenna from a reflection boundary. The reflection boundary is the interface between materials, each having a measurable contrast in electrical properties. The graphic results are viewed on a video monitor and/or printed out. These graphic data, or GPR "records," are interpreted in the field.

b. Express benefits and costs in 2001 dollars

Item	Cost Benefit/Year
Water Savings (9 ac. ft.@ $300)	$ 2,700
Reduced Labor Costs	900
Gas & Vehicle Savings	125
Total	$ 3,725

c. Convert all costs & benefits to present value equivalents

The costs would increase by approximately 4%/year thus an annual savings of $3,874.

d. Table of present value, quantified costs & benefits for applicant & each beneficiary

Item	Value (Annual)	Benefits	Beneficiary
Water	$300/AC.FT.	$2,700	RPPUD
*Water	$2,700	9AC.FT.	Delta
Labor Costs	$900	$900	RPPUD
Gas & Vehicle Savings	$125	$125	RPPUD

*Water saved (9AC.FT.) could avoid the treatment process and remain in the Cosumnes River for downstream flows toward the delta.

e. Demonstrate that it is locally cost effective

With an approximate annual savings of $3,725 (excludes 4% annual increase), the district will greatly benefit from the survey with drawings that can be utilized for system upgrades. With a water loss of 9 acre feet each year, the district will realize one years' water supply within 6 to 7 years.

Again, the District's accountant has pointed out that the District has an end-of-year balance of approximately $3,000. This amount reflects a minimal profit, which is inadequate for emergencies and basic operating needs. In spite of the savings which could occur in avoiding the 9 acre foot loss, the monetary value would double our annual balance.

E. Outreach, Community Involvement and Acceptance

Public outreach, regarding these improvements, began several years ago at district meetings and through emergency water situations that brought awareness to the citizens for system upgrades. The public expects staff to provide public service at the best cost and best management practices. The proof of public support can be noted in the fact that the district has actively pursued grants and outside financial and technical assistance to improve their system.

Training and employment will impact district staff and outside consultants only. Economic benefits would be substantial water savings (as well as ancillary activities) which directly relate to the much needed proposed system.