

City of Big Bear Lake

Department of Water & Power



BBLDWP

Water System Facilities Automation Projects

Applicant Information: City of Big Bear Lake
Department of Water & Power
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Big Bear Lake, CA 92315

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TECHNICAL PROPOSAL

Section 1. Executive Summary

Date	April 26, 2017
Applicant	City of Big Bear Lake, Department of Water and Power
City, County, State	Big Bear Lake, San Bernardino, California
Project Name	Water System Facilities Automation
Project Length	1.5 years
Estimated Completion Date	December 31, 2018

The City of Big Bear Lake, Department of Water and Power (DWP) is applying for \$75,000 in federal funding assistance from the United States Bureau of Reclamation's (USBR) WaterSMART Small-Scale Water Efficiency Projects (Fiscal Year 2017 Funding Opportunity Announcement No. BOR-DO-17-F011).

If awarded, the DWP will use funds to equip three of its existing pumping plant controls with new variable frequency drive (VFD) units (including pressure sensors and water level monitoring controls) and water meters. Once equipped, the DWP will contract to upgrade, replace or install new telemetry components at all three sites and one additional (recently upgraded) site in order to more accurately control and monitor water use and fluctuations using the new technology. Lastly, DWP staff will install up to twenty production well meters.

The DWP has identified these projects as a high priority as they will allow staff to identify irregular drops in water levels (often indicative of large-scale water loss), increases in water use (as experienced on high-traffic holiday weekends) as well as more accurately compare water production to water consumption, enabling staff to identify and isolate sources of water loss to be addressed. In a basin solely dependent on groundwater, these improvements will help the DWP to improve energy efficiency and have more control, ultimately enabling the Department to conserve and use water more efficiently.

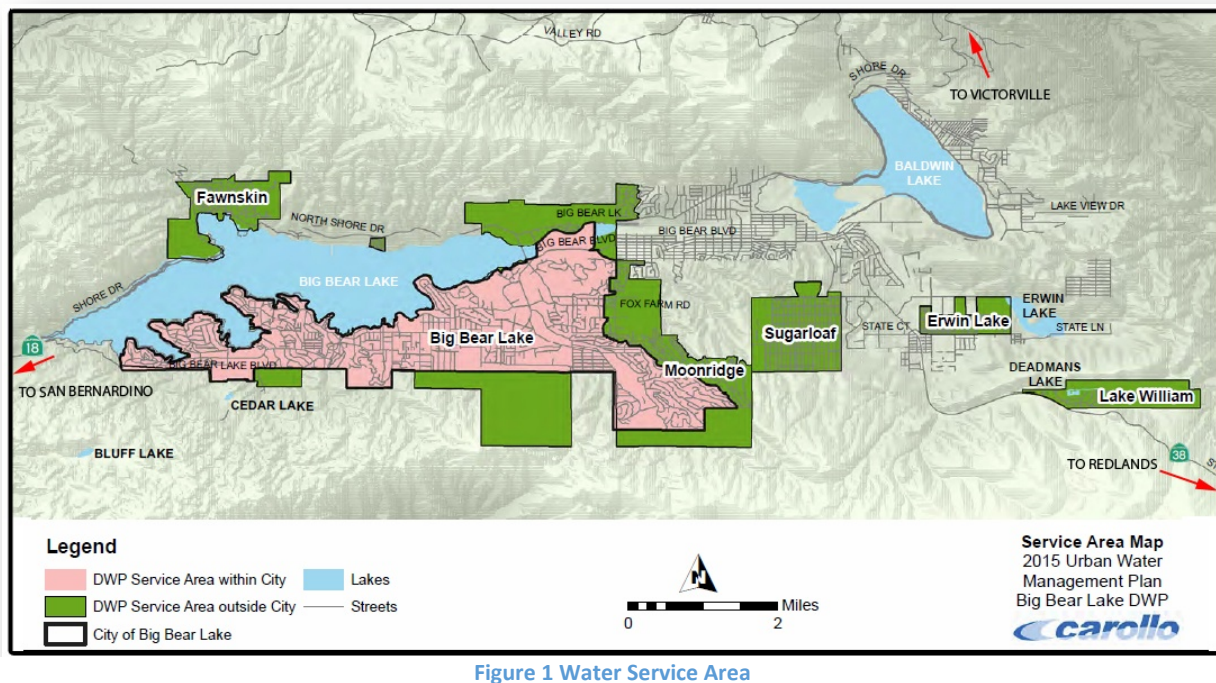
Once the DWP starts the project it is estimated that it will take approximately eight months to install the hardware and another six months to upgrade the telemetry system.

The Project is not located on a Federal Facility.

Section 2. Background Data

2.1 Location

The DWP's water service area is located within the Bear Valley basin, as depicted in Figure 2. The Bear Valley lies, on average, 6,750 feet above sea level at the eastern end of the San Bernardino Mountains in San Bernardino County, California. The DWP's service area is located primarily along the south shore of Big Bear Lake. The Fawnskin service area lies to the north of the lake, and the Sugarloaf-Erwin Lake and Lake William service areas are located east of Big Bear Lake. Portions of DWP's service area serve disadvantaged communities. In total, the DWP's service areas encompass approximately 13 square miles.



2.2 Source of Water Supply

DWP lies within the northeastern portion of the Santa Ana River Watershed and produces potable water from a combination of horizontal wells (gravity) and vertical wells (pumped) in the Bear Valley Groundwater Basin (DWR designation 8-9). The Bear Valley Groundwater Basin is un-adjudicated, however, the DWP works closely with the other public water provider, the Big Bear City Community Services District (CSD), to ensure the basin is not over drafted. The perennial yield of the entire Bear Valley Groundwater Basin is estimated at 5,500 acre-feet per year (afy) while the safe yield within the DWP's service area is estimated at 3,100 afy. The DWP's current demands are below the perennial yield of its service area and the DWP has adequate pumping facilities to meet those demands. Table No. 1, below, demonstrates that the average annual demand is within the safe yield for the DWP service area. The DWP does not use surface or imported water to meet its water demand as importing water into the Bear Valley would be extremely costly and is not a viable option. The DWP, CSD, and Big Bear Municipal Water District (MWD, Lake Management) are working together to form the Bear Valley Groundwater Sustainability Agency to be in compliance with the Sustainable Groundwater Management Act.

Table No. 1 Current and Projected Supply/Demand

Supply Source	Annual Pumping (afy)					
	2015	2020	2025	2030	2035	2040
Groundwater/ Total	2,095	2,169	2,246	2,326	2,408	2,494

Note: The calculations used for the demands are based on a 0.7% growth in demand each year, beginning in 2015. Supplies are assumed to equal Demand, up to 3,100 AFY (DWP’s share of the operating safe yield of the Bear Valley Groundwater Basin). These quantities meet all state water conservation requirements.

2.3 Water Delivery System

The DWP distributes potable water supply through a distribution system consisting of five water systems with 15 separate pressure zones, 180 miles of pipeline, 33 vertical wells, 22 slant wells, 16 reservoirs, 12 booster stations, 41 pressure reducing valves, 26 chlorination stations, and 22 sample stations. The proposed Project will be capable of providing additional water supply to DWP’s Big Bear Lake, Sugarloaf, and Erwin Lake service areas and to CSD, through the aforementioned intertie. Table No.2 is a summary of DWP’s current and projected water demand by customer class. Based on the data collected in the 2015 Urban Water Management Plan (UWMP), the average annual population in the DWP service area in 2015 was estimated at 25,601 (including full-time and temporary populations). The 2015 UWMP assumed a growth rate of 0.7 percent for subsequent years. The proposed project will provide operational flexibility, enhancing the Bear Valley’s drought resiliency without encouraging additional growth in the valley.

Table No. 2 Summary of the Current and Projected Water Demand by Customer Class

Customer Class	2020	2025	2030
	Population 26,510	Population 27,451	Population 28,425
	Demand (afy)	Demand (afy)	Demand (afy)
Residential	1,443	1,495	1,548
Commercial	474	491	509
System Losses	220	227	235
Unbilled Consumption	32	33	34
Total	2,169	2,246	2,326

2.4 Current Water Uses

As of 2016, the DWP maintains 15,612 water meters, of which 14,675 are residential and 937 are commercial. Multi-family residential accounts are classified as commercial accounts. Thus, about 94% percent of the accounts are residential (Figure 2).

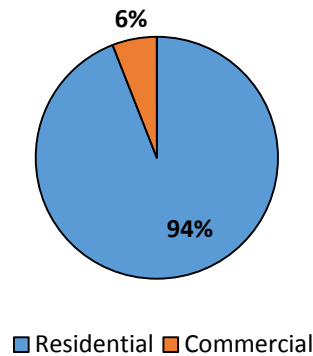


Figure 2 Percentage of Accounts by Customer Class

2.5 Working Relationship with the Bureau of Reclamation

In July 2016, the DWP entered into two assistance agreements with the USBR. Assistance Agreement #R16AP0113 was executed on July 31, 2016 to provide up to \$300,000 in grant funding for the AMI Program Phase II. Phase II of the AMI program was for the purchase and installation of 5,000 AMI meters and necessary components. Phase II is still in progress and is ahead of schedule with an expected completion date of March 1, 2017.

Assistance Agreement #R16AP0116 was the second agreement entered into with the USBR and it was executed on July 31, 2016 to provide up to \$300,000 in grant funding for the replacement of approximately 4,000 feet of 12-inch riveted steel pipeline in Big Bear Boulevard. The 4,000 feet of water distribution main pipeline has been installed and is operational. The contractor is currently working diligently to make the final service and lateral connections. The project commencement was delayed one month due to other contractors working on projects in the same right of way. Winter weather conditions caused additional construction delays. The USBR granted the DWP an extension until June 30, 2017 to complete this project.

Section 3. Project Description

The DWP serves a resort community that experiences wide fluctuations in population, from less than 20,000 full-time residents on a given weekday, to over 100,000 during a holiday weekend or snow event. Given the influx of weekend and holiday visitors to the service area, it is estimated that the temporary population is four times the full-time population. In the past, there were times when the water system did not have the capacity and flexibility to serve all of its customers on a peak demand weekend. In addition, the community is solely reliant on local groundwater. The Big Bear community is a relatively isolated mountain community located near the San Andreas fault line and surrounded by forests. The community has only three (paved) access roads which are susceptible to closures from rock fall, mudslides, wildfires, ice or snow. If the community were to experience a large-scale wildfire or earthquake affecting water supplies, the proposed system upgrades would give DWP water operators vital information to manage and control water during a crisis. For these reasons, a reliable and flexible water supply is of the utmost importance. The ability to collect data and respond, in real time, is critical.

The DWP has identified four well-pumping plant sites that would vastly benefit from the installation of variable frequency drive (VFD) motor starter units. As part of the VFD efficiency upgrade, the DWP will also add new pressure and water level sensing devices and displays. For these four well sites, the DWP will then update the telemetry control system, giving DWP staff the ability to control and monitor the new components remotely and efficiently. Upon project completion, the DWP will be able to control and regulate the pumping of each well, based on system needs and aquifer water levels. The DWP also intends to replace up to twenty 4-inch well production water meters. These meters will be equipped with a Sensus output, enabling the DWP to tie these meters into our radio read network, which will provide real-time information to our operators. Having this ability will enable DWP staff to prepare more accurate monthly production and water loss reports for State mandated reporting.

Section 4. Evaluation Criteria

E.1.1. Evaluation Criterion A—Planning Efforts Supporting the Project

The DWP has an ongoing policy to update water facilities as technology changes. Although the DWP has been successful in locating and developing new water supplies throughout the Big Bear Valley, there are still many facilities that were built in the early 1970's and 1980's. These facilities have older control technology and are not capable of operating as efficiently as they can without the needed upgrades. If funded, the above automation work will commence immediately. Installing well meters, capable of integrating with the radio read Sensus system, is in perfect alignment with the five-year capital improvement plan (already underway) in which the DWP is installing an Automated Meter Infrastructure system for all customer meters. The well meters will give the DWP significant information on the supply-side, complementing the work already being done on the demand-side.

The DWP is currently in the early stages of developing a new five-year capital improvement plan and strategic plan. In 2015 a new California state law, Senate Bill 555, was passed, requiring annually validated water loss reporting. The DWP responded swiftly. A team of three staff members from Water Production, Conservation and Customer Service, have attended all available training through the Water Loss Technical Assistance Program and will be certified auditors by the fall of 2017. Current DWP planning efforts go beyond monitoring water demand through telemetry and VFD's and extend into using that data to minimize water loss and maximize energy efficiency. Current planning efforts support the DWP's longtime planning approach to update facilities and adopt technology as they become available, affordable and reliable.

E.1.2. Evaluation Criterion B—Project Benefits (35 points)

VFD units are a type of motor controller that varies the frequency and voltage supplied to the motor, allowing for variable speed pumping operation. In conjunction with telemetry, they help to eliminate pump-induced water hammer, achieve suction-pressure sustaining pump speed control and achieve discharge-pressure limiting pump speed control. Working together the equipment and technology helps to more efficiently meet varied water demands, such as those experienced most drastically in a resort community such as Big Bear Lake where the population, and water demand, can fluctuate drastically.

Upon the completion of this project, the DWP will have made three necessary improvements to our water system.

- The first consists of installing variable frequency drive units on three older wells, replacing outdated starter equipment. The VFD units allow the DWP to monitor and control each well depending on what the system requires. These VFD units will allow water operators to regulate the production of the well according to what the water level is in the aquifer. Benefits include the ability to operate the well without the possibility of overpumping the aquifer as well as cutting down on electrical costs while lengthening the life of the motor.
- After VFD's are installed, the DWP will contract to upgrade the telemetry systems controlling these sites. This will enable operators to make any adjustments or changes remotely, reducing costly site visits.
- Finally, the DWP will replace up to twenty production well meters. The new meters will be calibrated, tested and equipped with a Sensus radio read output. These meters will be able to

link with the Sensus radio read network. Having these meters connected to our network will assist in the overall production monitoring and reporting and will also be a great asset in calculating our water loss, a new State requirement, and best practice.

E.1.3. Evaluation Criterion C—Project Implementation

Table No. 3 Project Schedule

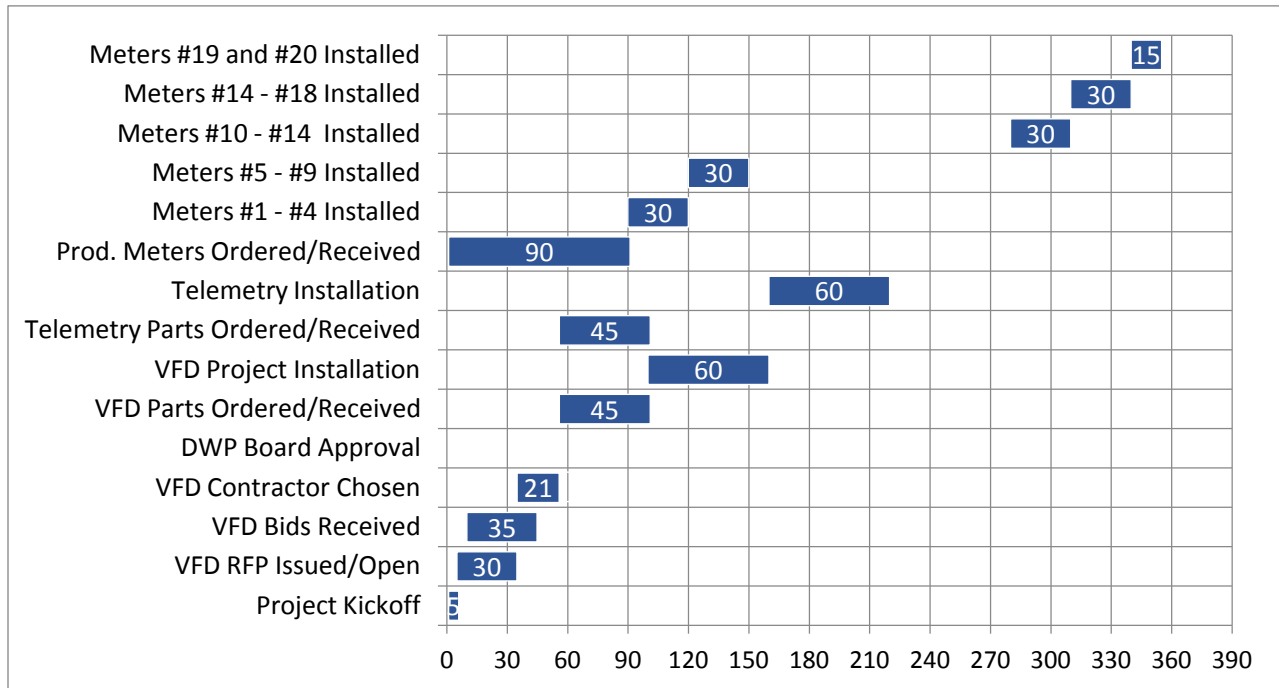


Table No. 3, the project schedule, shows each of the major tasks associated with the DWP Water System Facilities Automation Project. The horizontal axis shows the total number of days from the project kick-off while each horizontal bar shows the number of days that particular task is expected to take. Project kickoff is expected in early July 2017. Each vertical line represents 30 days or approximately one month.

Major milestones include:

- Completion of VFD installation: Approximately December 15, 2017 (Project Day 160)
- Completion of Telemetry Installation: Approximately February 1, 2018 (Project Day 205)
- Completion of Production Meter Installation: Approximately June 25, 2018 (Project Day 355)

Upon approval, the DWP will kick off the project by issuing a Request for Proposals or Bids (tentatively set for July 2017) on the VFD component of the project. This includes the variable frequency drive units, pressure transmitters, level displays and associated electronics. The DWP anticipates this work will be completed by an electrical contractor. Immediately following project kick off DWP staff will order the 4-inch Water specialties Water Meters, with the radio read output, for up to 20 well meters. These meters will then be programmed to connect to our network. The DWP Water Production Supervisor estimates that, given staff's workload and scheduling, they will be able to install up to four meters per month dependent upon the weather. Due to inclement weather patterns generally between December and April, the DWP has not scheduled installation during this period. However, if possible, DWP staff will continue to work through the winter. Within two months of kickoff, the telemetry vendor will be

authorized to order all necessary supplies and materials. The telemetry contractor is a sole source for proprietary equipment; therefore no bid process is required. Once the VFDs and related components are in place, the telemetry equipment will be installed, allowing the DWP to control and monitor the wells.

E.1.4. Evaluation Criterion D—Nexus to Reclamation

How is the proposed project connected to a Reclamation project or activity?

- The proposed project is not connected to a Reclamation project.

Will the project help Reclamation meet trust responsibilities to any tribe(s)?

- The proposed project will not affect any tribes

Does the applicant receive Reclamation project water?

- DWP does not receive any Reclamation project water

Is the project on Reclamation project lands or involving Reclamation facilities?

- The project is not on Reclamation project lands and does not involve Reclamation facilities.

Is the project in the same basin as a Reclamation project or activity?

- The project is not within a Reclamation project basin.

Will the proposed work contribute water to a basin where a Reclamation project is located?

- The proposed work will not contribute water to a basin where a Reclamation project is located.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

- The minor impacts created during construction of the Project will be mitigated with best management practices.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?

- It is not anticipated that any species would be negatively affected by any activities associated with the proposed project.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as "Waters of the United States?"

- There are no wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States."

When was the water delivery system constructed?

- The majority of DWP's water system was constructed during the 1940's, 50's, and 60's. The City of Big Bear Lake acquired the water system from Southern California Water Company in 1989 and has made over \$65,000,000 in improvements.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)?

- The project will not result in any modifications or effects to individual features of an irrigation system.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

- There are no buildings, structures, or features in the project area listed or eligible for listing on the National Register of Historic Places.

Are there any known archeological sites in the proposed project area?

- There are no known archaeological sites in the proposed project area.

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?

- The project will not have a disproportionately high and adverse effect on low income or minority populations.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

- The project will not limit access to any ceremonial use of Indian sacred sites or result in other negative impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

- The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native species known to occur in the area.

REQUIRED PERMITS OR APPROVALS

There are no required permits anticipated for this project.

OFFICIAL RESOLUTION

A DWP Board resolution is attached (Appendix A).

PROJECT BUDGET

Section 1. Funding Plan and Letters of Commitment

The DWP will fund any costs for the Project above and beyond the amount funded by the federal government with revenue from water rates, and/or capital improvement reserves.

Table No. 4 Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCE	FUNDING AMOUNT
Non-Federal entities	
Recipient Capital Improvement Reserves	\$75,000
Non-Federal subtotal:	\$75,000
Other Federal entities	
None	-
Other Federal subtotal	-
Requested Reclamation Funding:	\$75,000
Total Project Funding	\$150,000

Section 2. Budget Proposal

A budget proposal is provided in the following tables. Table No. 4 identifies both the DWP contributions and the WaterSMART grant funds required to implement the project.

Table No. 5 Budget Proposal

Budget item description	Computation		Quantity Type (hours/days)	Total Cost
	\$/unit	Quantity		
Salaries and wages				-
Fringe Benefits				-
Equipment				-
Supplies/materials				
4" Water specialties Water Meter	\$3,000	20	each	\$60,000
Contractual/construction				
Variable Frequency Drive Electrician.	\$15,000	3	each	\$45,000
Telemetry Contractor	\$11,250	4	each	\$45,000
Other				-
Total Direct Costs				\$150,000
Indirect costs				
Type of rate	Percentage -%	\$ Base		-
Total estimated project costs				\$150,000

Section 3. Budget Narrative

Salaries and Wages

The DWP is not including salaries or wages in the budget proposal.

Fringe Benefits

The DWP is not including fringe benefits in the budget proposal.

Travel

DWP is not requesting reimbursement for travel costs for this project.

Equipment

DWP is not requesting any equipment costs.

Materials and Supplies

The DWP intends to purchase twenty 4" production water meters. The meters will be equipped with the radio read output. We have estimated the average price for each meter to be three thousand dollars. The estimation is based on previous meter purchases.

Contractual

If the DWP Water System Facilities Automation Project is approved for funding, the DWP will issue a request for bids to install the new variable frequency drive units, pressure transmitters, level displays and associated electronics at the three designated wells sites. There are no construction management costs included in the project. After proposals are submitted the project will be awarded to the lowest, responsible bidder. Bids are open for 30 days. Once a contractor is chosen, that contract will be submitted to the DWP Board for approval. Cost and time estimates are based on past projects of similar size and scope, and including the same type of work and equipment where possible. The DWP estimates that upon awarding a contract it will take the contractor approximately 45 days to order and receive VFD and related parts and another 60 days to complete the installations.

Also based on past experience, the DWP expects it to take approximately 45 days for the telemetry vendor to order and receive their necessary components. The telemetry contractor is a sole source for proprietary equipment and technology; therefore no bid process is required. The telemetry vendor will complete the upgrades to our telemetry system within 60 days once all equipment is received and VFD equipment has been installed. One well site already has the necessary variable frequency drive; however, it will require telemetry upgrades. This is why there are four sites for telemetry, but only three for the variable frequency drive electrician work.

DWP staff will order and install the 4-inch Water specialties Water Meters, with the radio read output, for up to 20 well meters. The DWP Water Production Supervisor estimated that water operations staff could install up to four meters per month based upon staff's workload and scheduling , as well as weather.

Major milestones include:

- Completion of VFD installation: Approximately December 15, 2017 (Project Day 160)
- Completion of Telemetry Installation: Approximately February 1, 2018 (Project Day 205)
- Completion of Production Meter Installation: Approximately June 25, 2018 (Project Day 355)

Environmental and Regulatory Compliance Costs

Since no environmental review is required (no earth disturbing work to be completed) the DWP anticipates that there will be no cost to the USBR to conduct any environmental compliance activities.

Other Expenses

No other expenses are anticipated for this project.

Indirect Costs

No indirect cost reimbursement is being requested for this project.

Total Costs

The total estimated project cost is \$150,000. The requested Federal share is \$75,000; the total non-Federal share is \$75,000.

UNIQUE ENTITY IDENTIFIER AND SYSTEM FOR AWARD MANAGEMENT

The DWP is registered with SAM, ASAP and Grants.gov. The BBLDWP unique entity identifier has been provided in the SF-424. SAM registration will be maintained throughout the grant period.

Appendix A. Official Resolution

See additional attachment titled: BBLDWP_Resolution_WATERSMART_BOR-DO-17-F011.

RESOLUTION NO. DWP 2017-10

**A RESOLUTION OF THE BOARD OF WATER AND POWER COMMISSIONERS OF
THE CITY OF BIG BEAR LAKE, DEPARTMENT OF WATER AND POWER,
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA,
REGARDING PARTICIPATION IN FUNDING FOR THE BUREAU OF
RECLAMATION SMALL-SCALE WATER EFFICIENCY PROJECTS FOR
FISCAL YEAR 2017 GRANT PROGRAM
FUNDING OPPORTUNITY ANNOUNCEMENT NO. BOR-DO-17-F011**

WHEREAS, the City of Big Bear Lake was incorporated on November 28, 1980, and

WHEREAS, the electors of the City of Big Bear Lake did in 1985 adopt an Amendment to the City of Big Bear Lake Charter which created a Department of Water and Power; and

WHEREAS, the United States Department of Interior, Bureau of Reclamation, under its Small-Scale Water Efficiency Projects for Fiscal Year 2017 Grant Program, has made available to qualifying applicants grant funding on a matching fund basis, funds for Water System Facilities Automation; and

WHEREAS, the City of Big Bear Lake, Department of Water and Power has identified projects that exemplify the objectives of the Small-Scale Water Efficiency Projects for Fiscal Year 2017 Grant Program in its Water System Facilities Automation Project;

NOW, THEREFORE, BE IT RESOLVED that the Board of Water and Power Commissioners of the City of Big Bear Lake, Department of Water and Power does hereby adopt Resolution No. DWP 2017-10 confirming the following:

1. The Board of Water and Power Commissioners of the City of Big Bear Lake, Department of Water and Power verify that the General Manager, Reginald A. Lamson has legal authority to enter into an agreement with Bureau of Reclamation.
2. The Board of Water and Power Commissioners of the City of Big Bear Lake, Department of Water and Power have reviewed and support the attached grant application.
3. The City of Big Bear Lake, Department of Water and Power is capable of providing the amount of funding and/or in-kind contributions specified in the funding plan.
4. That if selected for a Small-Scale Water Efficiency Projects Grant under the Bureau of Reclamation's Fiscal Year 2017 program, the City of Big Bear Lake, Department of Water and Power will negotiate and execute a Cooperative Agreement with the Bureau of Reclamation on/or prior to the established deadline, to fund a minimum of 50% of the projects costs and will provide documentation showing the 50% matching funds are not funded by a Federal Agency.

Resolution No. DWP 2017-10

PASSED, APPROVED, and ADOPTED this 26th day of April 2017.

AYES: *Hjorth, Lee, Saukel, Smith, Tannas*
NOES:
ABSTAIN:
ABSENT:



V. Don Smith, Chair
DWP Board of Commissioners

ATTEST:



Jack P. Roberts, Secretary
DWP Board of Commissioners

CERTIFICATION

**STATE OF CALIFORNIA
COUNTY OF SAN BERNARDINO
CITY OF BIG BEAR LAKE**

I, Jack P. Roberts, Secretary to the Board of Water and Power Commissioners of the City of Big Bear Lake, Department of Water and Power, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2017-10, was duly passed and adopted by said Board and attested to by the Secretary of said Board, all at a Regular Meeting, held on the 26th day of April 2017, and that the same was so passed and adopted by the following vote:

AYES: *Hjorth, Lee, Saukel, Smith, Tarras*

NOES:

ABSTAIN:

ABSENT:



Jack P. Roberts, Secretary
DWP Board of Commissioners