March 18, 2021

Remote Data Acquisition for High Production Groundwater Wells and Coastal Distribution System Turnouts

in the Pajaro Valley Santa Cruz and Monterey Counties State of California

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Funding Opportunity Announcement No. BOR-DO-R21AS00300

Water SMART Grants: Small-Scale Water Efficiency Projects for FY'21

3/18/21
1206

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Executive Summary

The Pajaro Valley Water Management Agency (PV Water) is pleased to submit to the U.S. Bureau of Reclamation (Bureau) a proposal for the Remote Data Acquisition for High Production Groundwater Wells and Coastal Distribution System Turnouts project (Project) remote telemetry equipment that will support water conservation activities and prevent water loss. PV Water manages the Pajaro Valley Groundwater Basin (Basin), which is located in Central California, adjacent to Monterey Bay in Monterey, Santa Cruz, and San Benito counties, California. The Basin provides over 90% of the total water supply to the community. The largest municipality is the City of Watsonville, a Disadvantaged Community.

Bureau funds will be used to deploy remote telemetry equipment on **fifty-nine** (59) metered irrigation wells and **eight** (8) turnouts that supply irrigation water to farms within the Basin. The groundwater wells prioritized for this Project are the highest capacity production wells in the Basin. The turnouts are newly activated components of the Coastal Distribution System (CDS), upon which PV Water is in the process of completing a successful telemetry installation project on turnouts that had already been in use, a project funded from a previous USBR Water SMART grant (referenced in next paragraph). All turnouts and wells to be retrofitted are currently measured with mechanical propeller meters. Consequently, these meters must be read manually by district staff. The telemetry technology proposed herein would integrate remote telemetry equipment directly into the meter registry as well as replace the mechanical register with a digital display for greater dependability of operation and accuracy of delivered data.

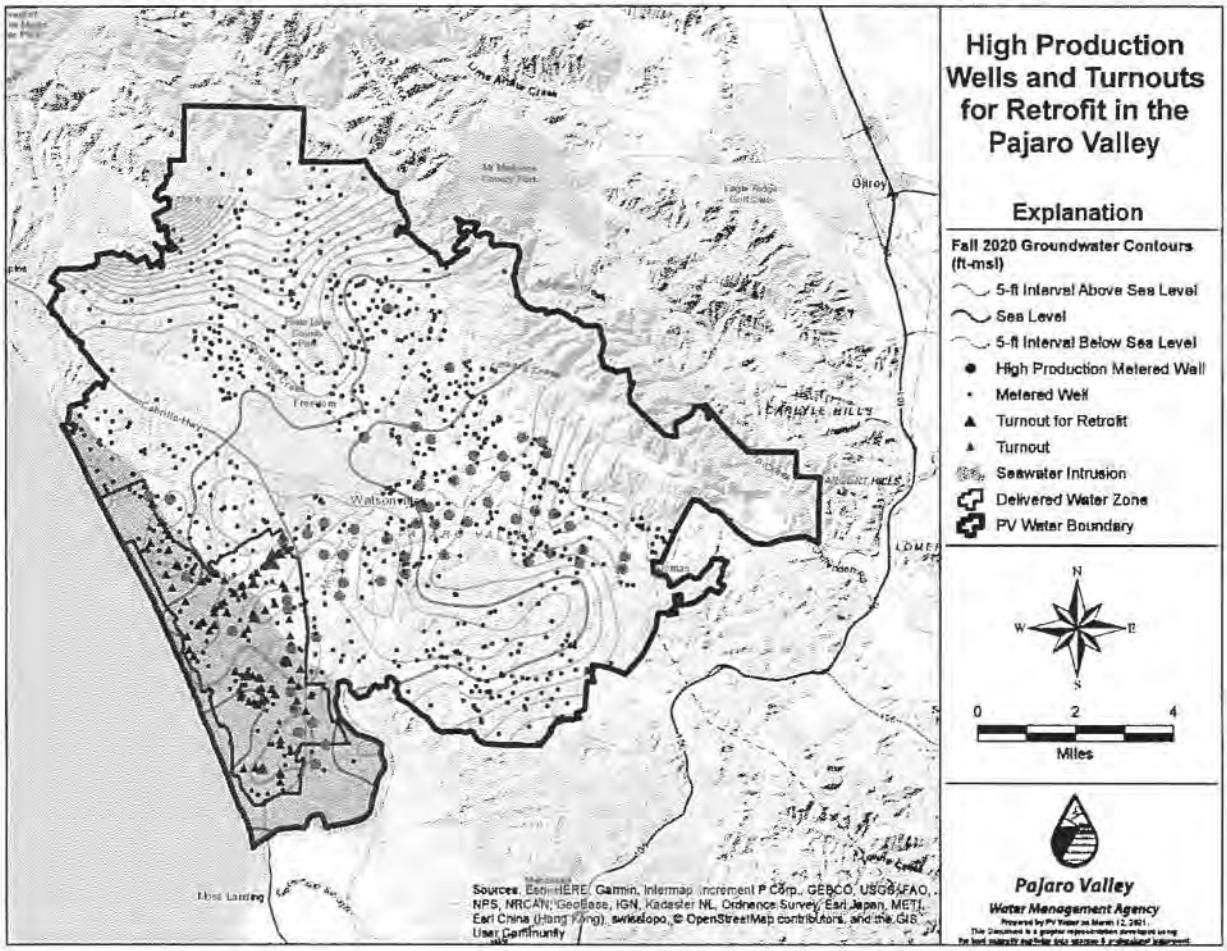
Historic use of groundwater for irrigation has caused groundwater declines in the local aquifer which has caused seawater intrusion into the groundwater in the Pajaro Valley. The ability to acquire remote water use data will improve water conservation, help prevent unauthorized or excessive use of CDS water, aid in irrigation management and improve groundwater pumping data. Communications technology for data transmission will be either cellular or satellite depending on the site. A web-based server will deliver data directly to the district as well as to farmers for irrigation water management purposes. PV Water is in the process of completing a successful project funded by the Small-Scale Water Efficiency Program in FY'18 for similar technology implemented in the CDS for water from the Watsonville Area Water Recycling Project (WAWRP). This two-year project will complete the upgrading of meters with telemetry for the remaining CDS turnouts, and expand upon the earlier project by deploying telemetry technology to the highest producing groundwater wells in the Pajaro Valley.

Background Data

The Pajaro Valley is a coastal valley that straddles southern Santa Cruz County and northern Monterey County. Located adjacent to Monterey Bay, the roughly 120 square mile Pajaro Valley produces approximately $1 billion of conventional and organic, high-value fruit, vegetable, and flower crops annually on about 28,000 irrigated acres. The

Valley is bordered on the northeast by the coastal Santa Cruz Mountains and on the southwest by the Pacific Ocean. The northern boundary of the Valley is generally considered to be the drainage divide between the Aptos Creek watershed and the Pajaro River watershed. The southern boundary of the valley is generally considered to be the drainage divide between Elkhorn Slough and Morro Coho Slough (Johnson et al., 1988). The PV Water statutory boundary is shown on Figure 1 below.

Figure 1. High Production Wells and Turnouts for Telemetry Retrofit in the Pajaro Valley



Seawater intrusion in the Pajaro Basin, a result of long-term groundwater over-draft, was first documented in 1953 (Bulletin 5, SWRCB). Over time the problem has become more severe and seawater intrusion has progressed further inland. The Basin is critically over-drafted, which has caused groundwater elevations to fall below sea level on a regular basis (Figure 1). The lowering of groundwater elevations not only leads to seawater intrusion, but also to groundwater quality degradation, which further impacts the groundwater resources. Seawater intrusion has caused chloride contamination of groundwater wells up to three miles inland and is an immediate and direct threat to the Pajaro Valley economy. Elevated chloride concentrations make the groundwater unusable for irrigation due to the high value, salt sensitive crops typically grown in the Basin. Lost agricultural production, which has an estimated annual value of

approximately $1 billion, would result in the loss of approximately 12,000 jobs (BMP Update, PV Water, 2014).

The drought tolerant Watsonville Area Water Recycling Project (WAWRP) was constructed with the support of Bureau Title XVI funds to produce up to 4,000 acre-feet per year (AFY) of recycled water for irrigation of high value food crops in the critically over-drafted Pajaro Valley. The project was constructed to help sustain the local high-value agricultural production and to help support over 12,000 jobs.

The Pajaro Valley Water Management Agency (PV Water), in cooperation with the City of Watsonville, completed construction of the WAWRP in 2008. Facility operations began in 2009 with delivery of recycled water to agricultural water users in the coastal area of the Pajaro Valley. The WAWRP project consists of three primary components:

- Recycled Water Treatment Facility (RWTF), which provides high quality water from the City of Watsonville's wastewater treatment plant.
- Coastal Distribution System (CDS), which conveys recycled water to farmers where they access the supply through turnouts, allowing them to reduce groundwater pumping and thereby help minimize seawater intrusion.
- Water Resources Center (WRC) which houses the staff and systems necessary to operate the RWTF.

The RWTF is the primary source of the Agency's supplemental water supply. Recycled water is blended with up to 3,000 AFY of surface- and groundwater to increase supply and meet water quality targets for irrigation of salt sensitive crops. Delivery of the blended recycled water to the coastal area allows agricultural water users to reduce pumping from the over-drafted groundwater basin and helps alleviate the seawater intrusion threatening the region's agricultural economy. The use of delivered water supply is considered "in-lieu recharge."

The WAWRP is a completed cost-effective project that encompasses a watershed perspective to enhance regional water supply, improve environmental and water quality, promote energy efficiency, and provide benefits to this disadvantaged community. The RWTF and CDS work together to provide a sustainable water supply to the severely impacted coastal region of the Pajaro Valley and achieves multiple water supply objectives:

- Develops a reliable, drought tolerant, sustainable, local water supply;
- Reduces demand on the over-drafted groundwater basin;
- Helps protect the groundwater basin against seawater intrusion and protects the beneficial use of the groundwater;
- Reduces future dependence on CVP supplies; and
- Utilizes high efficiency equipment and renewable energy resources to treat and deliver the water supply.

The Coastal Distribution System delivers recycled water to agricultural water users through sixty-one (61) turnouts in the 8,440 acre CDS service area. The CDS consists

of approximately 21 miles of transmission and distribution pipelines ranging in diameter from 8 to 42 inches. This area is home to what is considered one of the most fertile and ideal agricultural areas in the country and is well suited for a variety of crops.

In addition to the agricultural ground irrigated by the CDS, approximately 900 groundwater irrigation wells exist in the Pajaro Valley irrigating over 28,000 acres. The fifty-nine wells identified for this project are some of the highest production irrigation wells in the PV Water. Therefore, improving the irrigation management on these wells and the irrigated acres they serve will have the greatest impact on reducing the over-draft of the Basin's aquifers.

A problem with the current program is that PV Water staff must read mechanical meters manually; turnout meters on a monthly basis, while meters on irrigation wells are read quarterly. Site conditions (mud, pesticides) frequently prevent staff from safely accessing meters. Customers are billed quarterly, and occasionally usage must be estimated, a process that often takes considerable staff time and is not as accurate as measured flow from a meter, if the meter happens to fail in-between site visits. Staff has seen through the existing Small-Scale Water Efficiency Program grant-funded project, that these types of issues can be alleviated with the use of telemetry equipment. As noted above, PV Water has already deployed telemetry equipment at most of the metered turnouts in the CDS, and the result has been very positive. This project will complete the addition of telemetry on **eight** (8) CDS metered turnouts and expand on this previous project by upgrading **fifty-nine** (59) meters on high-capacity irrigation wells to provide remote water use data to the agency as well as the farmers.

The PV Water has had a successful working relationship with the Bureau of Reclamation in the past. The Bureau provided significant funding under the Title XVI Water Reclamation and Reuse Program in FY'15 to develop the WAWRP. In addition, PV Water was a recipient of a Small-Scale Water Use Efficiency grant in FY'18 for a project similar to the one described in this proposal to upgrade meters with telemetry on turnouts within the CDS. This proposed project will build upon the success of these previous projects by providing technology that will improve the water use efficiency in the PV Water.

Project Location

The Pajaro Valley is a coastal valley that straddles southern Santa Cruz County and northern Monterey County. The Valley covers approximately 120 square miles. The Valley is bordered on the northeast by the coastal Santa Cruz Mountains and on the southwest by the Pacific Ocean. The northern boundary of the valley is generally considered to be the drainage divide between the Aptos Creek watershed and the Pajaro River watershed. The southern boundary of the valley is generally considered to be the drainage divide between Elkhorn Slough and Morro Coho Slough (Johnson et al., 1988). The PV Water agency boundary and the coastal area receiving deliveries of recycled water are shown on Figure 1 above. The Remote Water Use Data Acquisition for High Production Wells and the Coastal Distribution System Turnouts project will

occur on **59** high production wells within the PV Water agency boundaries and on **eight** turnouts on the CDS as shown in Figure 1.

Technical Project Description

High production groundwater irrigation wells and newly activated turnouts are currently metered with mechanical propeller flow meters. Existing propeller meters are primarily Water Specialties strap-on saddle meters. **Fifty-nine** of these meters on wells, and **eight** of these meters on turnouts, as shown in Figure 1, will be upgraded with the addition of battery-powered FlowConnect™ remote telemetry technology to operate free from commercial electricity. In addition, the FlowConnect™ remote telemetry units (RTUs) will be equipped with digital (rather than mechanical) registers. Digital registers have a decreased incidence of repairs which will provide more reliable data to the district as well as the water users within the PV Water.

The current metering program provides PV Water with water measurement data, but presents a number of issues that can be resolved with this proposal:

- Manual meter reading is time consuming for agency staff and can create human errors.
- On-farm line breaks and unauthorized use can result in losses to the CDS system, which can be addressed much faster and efficiently with remote telemetry.
- Mechanical meter registers are more likely to malfunction than digital registers, and take longer to be find, which can result in lost water use data.
- Remote telemetry data can be used to streamline billing practices for the agency and stabilize revenue streams.
- Irrigators are not aware of accumulated in-season water usage until PV Water quarterly water use bills are received. Irrigators can have the option to access PV Water's remote data to track, plan, and maximize efficient water use.

FlowConnect also features ExactReadTM technology which ensures the flow reading on the meter's register in the field and the data remotely viewed on the web are always the same. Flowmeter totalizer data is generated and transmitted directly from the meter register which eliminates miscommunication of raw pulse data that can lead to confusion and result in poor data. With the data captured by these telemetry units, irrigators and conservation partners will be able to use irrigation flow meters as wireless data collection tools for water conservation. Water managers can help reduce water consumption, optimize irrigation water applications, ensure water reporting accuracy, and meet scheduled deliveries. The FlowConnect system provides battery operated wireless telemetry of flow data from Water Specialties propeller meters as well as has the capability to transmit data from other sensors such as rain gages or pressure transducers. The FlowConnect system can be used with mechanical or digital registers and can be mounted on the meter or remotely. This project proposes the use of digital registers which will improve the data quality of the meter readings received by the agency. The FlowConnect system utilizes either cellular or satellite communication to

transmit data to a web-based server where it can be accessed by the irrigator, PV Water staff, or agency hydrologists for water management purposes. The FlowConnect system on groundwater wells in PV Water will be battery-operated or powered by commercial power where well operators agree to provide electricity at the pump.

The upgrading of meters with telemetry equipment will be conducted by PV Water staff. PV Water staff are proficient in repairs and maintenance of Water Specialties propeller meters. Consequently, PV Water staff will provide the field work to install the equipment for this project. McCrometer technical support staff will provide additional training to PV Water staff prior to the deployment of equipment for this project. Installation will take place over a two-year period. Roughly half of the RTUs will be installed each year over the two-year span of the project primarily during the "shoulder months" of the growing season. The peak water use months in the Pajaro Valley are May through September. The shoulder months are the months before and after (January, February, March, April, October, November and December) the peak water use months. During the shoulder months the irrigation demand is not as high as the peak months and consequently field staff will be able to incorporate the installation of the telemetry RTUs.

The FlowConnect™ RTUs will be programmed to report water use data daily for groundwater wells, and every 15 minutes for CDS turnouts, providing accurate and timely water use data to the district as well as farmers for the CDS system and on-farm irrigation management. Currently, these meters must be read manually by PV Water staff on a quarterly basis. This requires the dedication of a considerable amount of PV Water staff time and resources including fuel and wear and tear on vehicles. In addition, when PV Water staff reads meters and finds broken mechanical registers, this represents not only lost water use data and potentially lost revenue, but also additional time in the field to schedule work on the meter. As a result, staff needs to estimate water use based on previous season's usage. This is time-consuming and inaccurate for billing purposes. All agricultural wells are assessed augmentation fees based on pumping volumes, which are used to fund projects in the district to implement the Basin Management Plan. The addition of remote telemetry equipment will not only provide better data to PV Water, but also provide an indicator of leaks, pump issues, needed repairs to the meter, and improved water use data for billing and hydrologic modelling.

Remote water use data will be provided to the farmers via the web-based server to assist them with irrigation water management. Once the farmers have accurate remote water use data, they will be able to match water use application to crop water use demands based on local evapotranspiration rates. Local evapotranspiration rates are available from CIMIS weather stations located within and near the PV Water.

Evaluation Criterion A—Project Benefits

The addition of remote telemetry on farm turnouts and groundwater irrigation wells will have several benefits to improved water management on the farm as well as throughout the Pajaro Valley, aiding water conservation efforts, helping to prevent unauthorized or excessive use of CDS water, aiding in irrigation management and improving water use data accuracy and data collection of groundwater.

PV Water is currently working with the Resource Conservation District of Santa Cruz County (RCD), the University of California Cooperative Extension, and independent consultants to implement a Basin Management Plan agricultural water conservation program and promote Irrigation Water Management (IWM) in the Pajaro Valley. PV Water's Basin Management Plan (BMP), contains a suite of projects and programs to bring the groundwater basin into balance and halt seawater intrusion. PV Water has partnered with the RCD and other partners to implement IWM Practices such as wireless soil moisture monitoring. PV Water also provides technical support to growers to help them apply for funding through the NRCS EQIP to improve on-farm irrigation efficiency practices. The use of remote water use data will assist with the implementation of these IWM practices once these priorities have been achieved.

Farmers are already using meters as irrigation management tools in the Pajaro Valley, however, remote water use data will allow farmers to match water use application to crop water use demands based on local evapotranspiration rates. Local evapotranspiration rates are available from CIMIS weather stations located within the Pajaro Valley. PV Water would like to improve the use of CIMIS data within the district for IWM and believes that remote water use data will help facilitate this.

Remote data will allow PV Water to conserve supplemental water resources by providing water system operators (and the growers/irrigators themselves) the ability to identify, monitor, and stop large leaks or unauthorized or excessive use on the CDS. On some occasions tractors or other vehicles have broken pipelines on the farm which have resulted in significant water loss. Telemetry alarms can alert agency staff or irrigators of such an event through increased flow rates or loss of pressure and enable them to respond quickly and to the correct location to close valves. This will not only conserve water, but also staff time that would be wasted driving the length of a lateral to find the break.

This proposal improves overall supply reliability of water from the WAWRP by improving distribution and application efficiency. The WAWRP produces up to 4,000 AFY of recycled water which is a reliable, drought tolerant, sustainable water supply. Since this project will improve the distribution of recycled water, it will continue to reduce groundwater pumping from an over-drafted groundwater basin. This project allows for conjunctive use and flexibility for improved groundwater management in the Pajaro Valley to limit further seawater intrusion in the Pajaro valley. Improved Irrigation Water Management also reduces future dependence on imported CVP supplies. The groundwater wells prioritized for this project are the highest production wells in the Pajaro Valley and therefore the largest groundwater users. Consequently, improved

management on acres irrigated by these wells will have the greatest impact on reducing the drawdown of the aquifer in the Pajaro Valley.

The Pajaro Valley Hydrologic Model (PVHM) is a tool collaboratively developed with the United States Geological Survey that has been used to simulate a baseline scenario 34 years into the future to estimate the water budget of the Basin. Projects built and implemented by PV Water to date were confirmed to reduce both the seawater intrusion and the groundwater over-draft problems in the future simulation. A simulation of the PVHM estimate the long-term average annual shortfall of the Basin's water budget to be approximately 12,100 AFY. Data gathered remotely from the installation of telemetry equipment to high-capacity production wells will provide higher frequency and more reliable data for the PVHM and to water resource managers, including daily usage.

The implementation of telemetry equipment to obtain water use data will increase collaboration and information sharing among irrigators, water suppliers, and even academics who often look to PV Water to support research projects related to water resources management. Remote data will help water system operators improve the distribution of recycled water within the CDS, which results in reduced groundwater pumping in the over-drafted basin. Currently, irrigators order water from PV Water which is scheduled by operations staff. Telemetry will provide visibility to what is actually used; excessive use, unscheduled use, or unused water, and provide water system operators the information they need remotely to contact the user to resolve issues as they arise. More frequent water use data will alert PV Water staff of lesser or greater demand sooner and they will be able to respond sooner to water demands. Water use data will also help with pump plant efficiency since unscheduled use, at times, requires the use of additional pumps that otherwise would not have been necessary. These applications of water use data will significantly reduce waste in the system, improving supply reliability.

Remote water use data will improve on-farm irrigation water management for farmers as well as management for the agency throughout the Pajaro Valley. The delivery of remote data will improve the accuracy of data received by the agency by eliminating human error, reducing data gaps from mechanical failures, and will streamline billing practices through improved record keeping and data acquisition. Remote data will also alert the agency to meter issues which may be an indication of needed repairs or signal an on-farm line break and alert staff or irrigators to shut off water to prevent leaks.

The project will have positive impacts on the local agricultural economy in the state-designated Disadvantaged Community of Watsonville, CA. It sustains high-value agricultural production with an estimated annual value of $900 million on over 30,000 acres of agricultural land and maintains or supports regional agricultural employment of over 12,000 jobs.

The addition of remote water use data acquisition will modernize data collection for billing in the PV Water. This will cut down on mistakes by eliminating human error. PV Water currently bills by the acre-foot and readings are only gathered on a quarterly basis for groundwater irrigation wells. As a result of this project, water use data for

these wells will be available to the district and the individual water users on a daily basis instead of quarterly. Currently, if the irrigation flowmeter is broken, then pumping may continue without the knowledge of the agency for up to 3 months and therefore without billing for the usage. This project will improve the ability of the agency to capture water use records and seamlessly bill for augmentation charges thus supporting the water operations of PV Water. In addition, the gathering of remote data from production wells and turnouts will reduce staff time for gathering meter data as well as miles accumulated on district vehicles.

In 2009 PV Water initiated a rate re-establishment process, in compliance with Proposition 218. The process ensures that anyone who benefits from existing facilities are paying their proportionate share of developing and delivering water and increasing the sustainable yield of the basin. The Augmentation Charges and Delivered Water Charges were required to pay for the operation and maintenance of the PV Water supplemental water and delivered water services. The data acquired by the district on water usage from meters confirms this district policy of assessing augmentation fees based on water usage within the district.

Evaluation Criterion B—Planning Efforts Supporting the Project

The PV Water Board of Directors adopted its first Basin Management Plan (BMP) and supporting Environmental Impact Report in 1999. The Board directed staff to revise the plan in 2002, and most recently, undertake a major update to the plan in 2010, which led to the adoption the BMP Update and certification of the BMP Update Environmental Impact Report in 2014. The most recent effort occurred over a four-year period and was a stakeholder driven process. The Ad Hoc Basin Management Planning Committee (Committee) was composed of 21 stakeholders representing a wide variety of interests in the Valley including both the Monterey County and Santa Cruz County Farm Bureaus. Over a several year period, the Committee evaluated the state of the groundwater basin and 44 potential programs and projects to eliminate groundwater over-draft and halt seawater intrusion. Water conservation activities were at the forefront of these programs.

The Committee worked to address a 12,100 AFY shortfall in the water budget as determined by the Pajaro Valley Hydrologic Flow Model (Hanson et al., 2014). After two years of work, the Committee voted to save 5,000 AFY through a voluntary water conservation program, optimize existing water supply facilities to obtain 3,000 AFY, and develop 4,100 AFY of new supplemental water supplies. At just over 40% of the of the proposed solution, water conservation is the largest component of the plan. This project has been identified as a method that can help achieve a significant portion of the water conservation needed in the Pajaro Valley.

Hydrologic modeling has shown that by reducing groundwater extractions in the coastal area, PV Water can halt seawater intrusion. To keep farming viable in the coastal area while also working to reduce coastal groundwater extractions, PV Water has been

securing, producing, testing, and delivering supplemental water supplies for irrigation use.

PV Water completed a Salt and Nutrient Management Plan (SNMP) in 2014 following a multi-year, stakeholder driven process. The SNMP evaluates the quality of water in the groundwater basin, the primary mechanisms for salt and nutrient flow into the basin, and strategies for managing salt and nutrient loading. The delivery and use of supplemental water resources is a major component of the plan to stop seawater intrusion, and as a result, eliminate salt loading occurring through intruding seawater.

In 2014, Governor Jerry Brown signed into law the Sustainable Groundwater Management Act (SGMA), which requires that critically over-drafted groundwater basins such as the Pajaro Valley Groundwater Basin achieve sustainability by 2040. As a requirement of SGMA, Groundwater Sustainability Agencies (GSA) like PV Water are required to work with stakeholders to develop Groundwater Sustainability Plans (GSP). SGMA allows for GSAs to submit an Alternative to a GSP, and the PV Water Board of Directors provided direction to staff to submit the BMP, SNMP, and other supporting documents as an Alternative in 2016.

The *Remote Data Acquisition for High Production Groundwater Wells and Coastal Distribution System Turnouts* project will help staff achieve the goals set forth in the BMP for the reasons below:

- Telemetry on meters supports BMP water conservation plans in that remote data can be used as a tool by water users to increase irrigation efficiency, and leaks at turnouts or irrigation line breaks on farms can be detected immediately, preventing large amounts of water loss.
- Installing telemetry that reports remote water usage will enable PV Water operators to more efficiently deliver recycled water, which will help reduce need for groundwater pumping in the seawater intruded zone.
- Telemetry deployed on the largest producing irrigation wells in the Pajaro Valley will improve the irrigation management for some of the largest groundwater users in the district and consequently, reduce the drawdown of the aquifer causing seawater intrusion.
- Accumulation of accurate remote data sets of irrigation events will be valuable resources for future basin management planning and conservation programs.

Evaluation Criterion C—Project Implementation

This project proposal will upgrade **fifty-nine** mechanical flow meters at large capacity groundwater wells with telemetry equipment for the collection data of irrigation water use. In addition, this project will upgrade **eight** mechanical flow meters at turnouts in the CDS with the equipment necessary for remote telemetry for remote monitoring of water use at each turnout that did not receive telemetry retrofit during the last grant project. The Agency has conducted an inventory of meters, line sizes, and serial

numbers in order to develop a cost budget. The flow meter manufacturer has been contacted and a quote has been received for cost of the telemetry equipment to modify the existing meters for remote telemetry. No permits are required for this project. Prior to deployment of the RTUs, portions of the agency with poor cellular coverage will be evaluated through a site survey to determine needs for satellite placement or use of an external antenna.

Training will be conducted for PV Water Staff by McCrometer Technical Support Staff to ensure the proper installation of the Flow Connect equipment. Field tests will be conducted at the beginning of installation to ensure accurate transmission of data.

PV Water staff plans to complete the upgrade of half of the meters in the first year (Spring, Fall and Winter of 2022), starting with the remaining turnouts in the CDS, then proceeding with the groundwater irrigation wells. The remaining meters will be upgraded for telemetry in the second year of the project (Spring, Fall and Winter of 2023). Installation will need to be scheduled with farmers during down-time. PV Water staff plan to schedule installation primarily in the 'shoulder months' of March, April, October and November and winter months of December through February.

Evaluation Criterion D— Nexus to Reclamation

PV Water has had success working with the Bureau in the past on water projects. The Watsonville Area Water Recycling Project (WAWRP) was approved for a $20 million grant under the Bureau's Title XVI funding in P.L. 104-266. PV Water funded the construction of the WAWRP through a combination of a City of Watsonville loan and other state loans and grants. PV Water has demonstrated (through past accomplishments) the ability to cooperate with the Bureau as well as local partners such as the City of Watsonville and local irrigators to facilitate a successful federally funded water project.

The WAWRP has reduced PV Water's future dependence on the Central Valley Project (CVP) entitlement by an equivalent 4,000 AFY. PV Water has a CVP entitlement of 19,900 AFY reserved for it by the Bureau. However, in 1992, Title 34 - CVP Improvement Act (CVPIA) (Public Law 102-575) became law. The CVPIA has several provisions that prohibit the USBR from entering into new water contracts until certain environmental goals are attained. It is expected to be several years before the Bureau fulfills these requirements. This has delayed negotiations with PV Water for a new CVP contract for the 19,900 AFY entitlement. Due to the unmet CVP entitlement and the critical need to solve the groundwater basin over-draft and stop seawater intrusion, the PV Water and the City of Watsonville collaborated on the WAWRP to deliver a local, sustainable 4,000 AFY water supply. The reduced future demand represents a 20% reduction (4,000/19,900 AFY).

In addition, PV Water was a recipient of a Small-Scale Water Use Efficiency grant in FY'18 from the Bureau for a project similar to this to upgrade meters with telemetry on turnouts within the CDS. This proposed project will build upon

the success of these previous projects by providing technology that will improve the water use efficiency in the Pajaro Valley.

Project Budget

Budget Narrative

The projected budget for the proposed has total cost of $150,005. The breakdown between Non-Federal funding and Federal funding is shown in Table 1, below.

Table 1. Summary of Non-Federal and Federal Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
PV Water	$75,005
Other Federal Entities	
1. None	$0
Other Federal Subtotal	$0
Requested Reclamation Funding	$75,000
Total Study Funding	$150,005

The budget detail is shown on Table 2, below. The proposed budget includes staff time for the General Manager, Brian Lockwood, and Water System Operator, Shinehah Bigham, for grant administration. The majority of staff time associated with this proposed project would be for the Water Meter Program Coordinator, Leonard Villanueva, who would have primary responsibilities pertaining to equipment procurement, equipment installation, training, record keeping and diagnostics / data acquisition. Other personnel that would be involved in the project include a Field Technician, Water System Operations Supervisor, and Operations and Maintenance Technician. They would participate in the equipment installation process and training activities in support of the Water Meter Program Coordinator. Tables 4a and 4b below, provide the details pertaining to the tasks associated with each member of the team.

Table 2. Proposed Budget

Budget Item Description	Computation $/unit	Computation Quantity	Quantity Type (unit)	Total Cost
Salaries and Wages*				
General Manager	113.87	24	hours	2,732.88
Water Systems Operations Supervisor	72.86	8	hours	582.88
Water Systems Operator	69.50	48	hours	3,336.00
Meter Program Coordinator	53.10	173	hours	9,186.30
Field Technician	27.91	91	hours	2,539.81
Maintenance & Operations Technician	51.18	34	hours	1,740.12
Subtotal				**20,117.99**
Fringe Benefits*				
General Manager	51.13	24	hours	1,227.12
Water Systems Operations Supervisor	72.86	8	hours	582.88
Water Systems Operator	69.50	48	hours	3,336.00
Meter Program Coordinator	33.98	173	hours	5,878.54
Field Technician	10.92	91	hours	993.72
Maintenance & Operations Technician	32.50	34	hours	1,105.00
Subtotal				**13,123.26**
Travel				
None				0
Subtotal				-
Equipment				
Flow Connect Telemetry Modules (GW)	1,424.00	59	ea	84,016.00
Flow Connect Telemetry Modules (CDS Turnouts)*	1,638.00	8	ea	13,104.00
Satellite Option*	185.00	6	ea	1,110.00
Subtotal				**98,230.00**
Supplies and Materials*				
Cellular Antennae Extension	$105.00	8	ea	840.00
Masts	$130.00	8	ea	1,040.00
Solar Panels	$260.00	8	ea	2,080
Subtotal				**3,960**
Contractual*				
Diagnostics and Data Acquisition	152.00	29	Yr #1	4,408
Diagnostics and Data Acquisition	152.00	58	Yr #2	8,816
Training	1,350.00	1	Day	1,350
Subtotal				**14,574**
Total Project Costs				**$150,005**

* potential matching funds

PV Water would utilize $75,000 in grant funds to purchase 59 Flow Connect Telemetry Modules for the groundwater wells at a cost of $1,424 each for a total of $84,016. PV Water would pay for the balance of these Flow Connect Telemetry Modules ($9,016), in addition to the costs of 8 Flow Connect Telemetry Modules for turnouts at ($1,638) each for a total of ($13,104), satellite option for 6 modules for a total of ($1,110), supplies and materials ($3,960), and contractual costs ($14,574) for a total $75,005. PV Water proposes to use staff time and in-kind match contribution. The projected value of staff time salaries and wages is $20,118, and fringe benefits is $13,123, for a total in-kind contribution of $33,241.

Of the total project cost, PV Water would cover $75,005, or 50% and the grant would cover $75,000 or 50%.

PV Water's primary sources of revenue include an augmentation charge on groundwater production and delivered water sales. Other sources of revenue include management fees, interest income, grant income, and other income. Audited financial statements reflect the revenue as follows during fiscal year ending June 30, 2020 as shown in Table 3. Special revenue funds in combination with in-kind contributions through staff time will be used to meet the non-Federal share of costs.

Table 3. PV WATER Revenues from Audited Financial Statements

Fiscal Year Ended June 30, 2020	General Revenue	Special Revenue	Debt Service	Total
Management Fee	283,614			283,614
Augmentation Charges		11,429,592		11,429,592
Interest Income	52,652	240,729	1,164	294,545
Water Sales		2,293,841		2,293,841
Grant Income		413,659		413,659
Other Income		29,121		29,121
Total Revenue	336,266	14,406,942	1,164	14,744,372

Table 4a. Proposed Staff Hours and Tasks

	General Manager (GM)	Water Systems Operations Supervisor (WSOS)	Water System Operator (WSO)	Meter Program Coordinator (MPC)	Operations and Maintenance Technician (OMT)	Field Technician (FT)
Grant Administration	16		24	4		
Equipment Procurement/Tracking				8		
McCrometer Training		8	8	8	8	8
Equipment Installation				114	24	63
Meter Record Keeping				15	2	4

Diagnostics and Data Acquisition	8		16	24		16
Total Hours for two year project	**24**	**8**	**48**	**173**	**34**	**91**

Table 4b. Justifications

GM	Meeting with Staff to give direction on grant administration and digital data coordination, final oversight of grant administration
WSOS	Supervisory coordination of Ops and Meter staff time, training, assisting in field at challenging sites
WSO	Working with GM on grant administration, Working with MPC on coordinating work under grant, data diagnostics and acquisition, training, assisting in field at challenging sites
MPC	General coordination and execution of all aspects of physical and digital project details, including working directly with Contractor at each site.
OMT	Training, assisting in field at challenging sites
FT	Training, Assisting MPC in physical and digital project details

Table 4c. Equipment Installation

Equipment Installation Procedure:

Before retrofit:

- Coordinate shut-down time with irrigator
- Travel to site
- Lock out well controls (see PV Water Meter Replacement Procedure)
- Isolate meter
- Drain the line

Telemetry Installation:

- Unbolt meter saddle or meter head from pipe or mainline tube
- Lift entire meter with propeller out of pipe/tube
- Take apart and install retrofit parts to the meter
- Wire meter, inside & out
- Install meter back to pipe/tube
- Return well site to irrigator/ remove lock out tags from pump controls
- Equipment Installation consists of approximately 3 hours per site

PV Water's contribution to the cost-share requirement will come from the augmentation charge and water sales (special revenue fund) as noted above. Grant administration and compliance with reporting requirement will be overseen by the General Manager and completed by the Water System Operator.

Certification of Labor Rates

The labor rates provided above are taken from the Board of Directors approved and adopted budget for the fiscal year ending June 30, 2020. The rates for fringe benefits are pulled from the same Board adopted budget.

Equipment

The equipment necessary for this project includes 59 Flow Connect Telemetry Modules for groundwater wells at a cost of $1,424 each for a total of $84,016, in addition to the costs of 8 Flow Connect Telemetry Modules for turnouts at $1,638 each for a total of $13,104, and 6 devices that allow for a satellite option (if cellular service is not available at some sites) at a unit cost of $185 for a total of $1,110.

Materials and Supplies

The materials and supplies needed included 8 masts for turnout installations at $130 each for a total of $1,040, 8 solar panels at $260 each for a total of $2080 and 8 cellular antenna extensions at a unit cost of $105 each for a total of $840.

Contractual

As shown on the Table 2, above, Contractual work accounts for $14,574 in the proposed budget. Diagnostics and Data Acquisition provide the remote service and allow for data to be stored and accessed on the cloud. One day worth of training is budgeted at a total cost of $1,350 and is a necessary component of the project.

Environmental and Regulatory Compliance Costs

The WAWRP and CDS construction is complete and the project is operational. The PV WATER obtained all environmental compliance documentation as required and the CEQA and NEPA compliance is complete.

The Environmental Impact Report (EIR) for the project was completed in October 2001. A copy of the completed EIR is available on the PV WATER website at www.pvwater.org. The Environmental Impact Statement (EIS) for the project was completed in August 2003. A copy of the completed EIS is also available on the PV WATER website.

No additional environmental documentation is required for the installation of telemetry units at the turnouts.

Other Expenses

No other expenses are anticipated.

Indirect Costs

No indirect costs are anticipated.

Total Costs

The total estimated cost for this project is $150,005.25, with $75,000 or 50% coming from the Federal cost share, and $75005.25 or 50% coming from the non-Federal (PV Water) cost share.

D.2.2.6. 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 WAWRP and CDS construction is complete and the project is operational. The PV WATER obtained all environmental compliance documentation as required and the CEQA and NEPA compliance is complete.

The Environmental Impact Report (EIR) for the project was completed in October 2001. A copy of the completed EIR is available on the PV WATER website at www.pvwater.org. The Environmental Impact Statement (EIS) for the project was completed in August 2003. A copy of the completed EIS is also available on the PV WATER website.

Staff and contractors will utilize existing farm roads to access the turnouts. Minor dust disturbance may occur when driving on dirt roads. The work does not include earth-disturbance.

- *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? If so, would they be affected by any activities associated with the proposed project?*

The project area where the meters are located is regularly accessed by tractors and other heavy equipment used for farming operations. There are no anticipated impacts to any endangered or threatened species, wetlands, archaeological sites, low income or minority populations, or Indian sacred sites as the meters are located in agricultural fields.

- *Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.*

The meters are located in agricultural fields. No work will take place in wetlands.

- *When was the water delivery system constructed?*

Most sections of the CDS were constructed between 2000 and 2009, with additional branches completed in 2015 and 2020.

- *Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*

No.

- *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.*

No.

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

No.

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

No.

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

No.

- *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?*

No.

D.2.2.7. Required Permits or Approvals

The permitting tasks associated with construction and operation of the WAWRP and CDS are complete. Permits obtained include the Santa Cruz County permits, Department of Public Health (DPH) permits, and Regional Water Quality Control Board (RWQCB) permits as shown in Table 5.

Table 5. Key Milestones for Approved Permits for the Project

Permit Required	Issue Date
Santa Cruz County Coastal Development Permit (1)	April 2006
Santa Cruz County Local Coastal Plan Change	April 2006
DPH Title 22 Engineering Report	September 2007
RWQCB Master Reclamation Permit	November 2008
Santa Cruz County Coastal Development Permit (1)	April 2020
Note: The Coastal Development Permit includes the grading permit, building permit and riparian exclusion permit.	

No new permits or other approvals are necessary for this project. PV Water owns the appurtenances and the meters. No ground disturbance is necessary to complete the proposed project.

D.2.2.8. Official Resolution

The PV Water Board of Directors is aware and in support of this grant proposal and resolution requirement. The Board is scheduled to meet on March 17th, 2021 to approve a resolution that meets the grant proposal requirements.

Attachment 1:

McCROMETER

3255 West Stetson Avenue
Hemet, CA 92545 USA
Tel (951) 652-6811
Fax (951) 652-3078
www.mccrometer.com

March 12, 2021

Pajaro Valley Water Management Agency
Attn: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

Re: Bureau of Reclamation, Small-Scale Water Efficiency Application; **"Remote Data Acquisition for High Production Groundwater Wells and Coastal Distribution System Turnouts"**

Dear Mr. Lockwood:

McCrometer is proud to be a partner in the project titled **"Remote Data Acquisition for High Production Groundwater Wells and Coastal Distribution System Turnouts"**. McCrometer will commit to providing technical support and training for meter and telemetry installation, software applications, and data management upon the successful award of this grant proposal.

McCrometer has provided durable and accurate flow measurement devices for the agricultural irrigation industry for over 65 years. This project will support agriculture, improved water management for groundwater preservation, and disadvantaged communities in the State of California.

McCrometer applauds the Bureau of Reclamation for the recognition of practices that will enhance irrigation water management in the industry of agriculture by supporting projects through the Small-Scale Water Efficiency Project and strongly encourages the approval of this proposal.

Respectfully Submitted,

Kenneth A Quandt
Market Development Manager
McCrometer, Inc.