Del Puerto Water District

WaterSMART: Water and Energy Efficiency Grants for FY 2017

Funding Opportunity No: BOR-DO-17-F012
Group 1 Project
CFDA No. 15.507

Del Puerto Water District Remote Flow Monitoring Program Phase I

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Executive Summary

Name: Del Puerto Water District Date: January 16, 2017

City: Patterson County: Stanislaus State: California

The proposed remote flow monitoring project (Project) will update Del Puerto Water District's (District) monitoring system to allow for real-time, accurate flow tracking of individual growers' water use throughout the District. Water use is currently determined using a combination of totalizing propeller meters measuring flow out of turnouts serving the District off of the federal Delta-Mendota Canal, which are maintained by the San Luis and Delta-Mendota Water Authority (Authority), and totalizing propeller meters measuring individual grower use, which are maintained by the District. District meters are currently calibrated using the Authority meter as the standard, and are maintained to achieve a +/- 6% accuracy per the District's Water Management Plan. Phase 1 will be completed by December 2018, and will include the following:

- Perform a radio signal survey of the proposed metering locations throughout the District and along the main radio backbone line.
- Install one of the main backbone radio towers at or near the District office to allow for the addition of more backbone towers as the project progresses through future phases.
- Establish a network and user interface for collecting and displaying flow data from throughout the District and making this data available for grower use.
- Improve two of the highest priority turnout locations to update current metering, install additional meters if needed, and install telemetry equipment. These two turnouts service 2,600 acres of irrigable land, delivering approximately 4,550 acre-feet of water per year.

The proposed benefits of the project include:

- Accurately monitor and record water use throughout the District, which will provide District staff with real-time information on water use.
- Allow growers access to their water use data and provide training about how to best use this data to support conservation practices. This should provide an estimated 10% of water conserved over 4,550 acre feet of use, totaling 456 acre feet conserved.
- Reducing the number of hours required by District staff to accurately monitor and bill water use.

Table 1 summarizes the funding requirements of the project by source. Funding for this proposal falls under Group I Funding.

Table 1: Funding Chart

Funding Source	**Funding Amount**
Del Puerto Water District (non-federal)	$110,741.40
Requested Bureau of Reclamation Funding	$106,398.60
Total Project Funding	$217,140.00

Background Data

Del Puerto Water District (DPWD or District) is located along the west side of the San Joaquin Valley and extends from Vernalis to Santa Nella. The District provides agricultural irrigation water to 45,229 irrigable acres of productive farmland and 128 growers in San Joaquin, Stanislaus, and Merced Counties. Currently, DPWD's sole source of supply is from its long-term renewal contract with the United States Bureau of Reclamation (Reclamation or USBR) for the delivery of up to 140,210 acre-feet (AF) of Central Valley Project (CVP) water annually. The majority of the crops grown in the district consist of almonds, apricots, wheat, tomatoes, and walnuts. A location map of the District is shown in **Figure 1**, and the proposed components of Phase 1 of the project are detailed in **Figure 2** and **Figure 3**.

Since the early 1990's, DPWD's CVP water allocations have been significantly reduced due to drought conditions and Delta pumping restrictions resulting from the passage of the Central Valley Project Improvement Act (CVPIA) and the National Marine Fisheries Service (NMFS) salmon and United States Fish and Wildlife Service (USFWS) Delta smelt biological opinions. In 2009, DPWD received only 10 percent (i.e. 14,210 AFY) of its contract allocation. DPWD's contract supply for minimal for the previous three years, 2014 and 2015 was zero percent (0%) of its contracted allocation, and 2016 was five percent (5%). While future contract water deliveries to DPWD are uncertain, it is anticipated that restrictions on CVP operations will result in the District receiving an average of only thirty-five percent (35%) of its contract allocation (i.e., 49,074 AFY) on an annual basis under normal hydrologic conditions (i.e. non-drought conditions).

These shortfalls in water deliveries from Reclamation have required DPWD to find alternative water sources to supplement its CVP deliveries, which has been accomplished by irrigation improvement programs, temporary water transfers from other agencies, and the use of groundwater from privately owned wells. While these have been effective temporary methods to supplement the District's diminishing water supply, they do not provide a reliable, sustainable, or affordable long-term solution, causing the District to continue its efforts in the areas of technological efficiencies and most recently, studying the possibility of putting recycled water to beneficial agricultural use.

The District has no conveyance facilities of its own. Water supplies are delivered directly from the Delta-Mendota Canal (DMC) into landowner-owned facilities. The District owns and maintains the flow meters and monitoring equipment necessary to track and bill individual water use at these facilities.

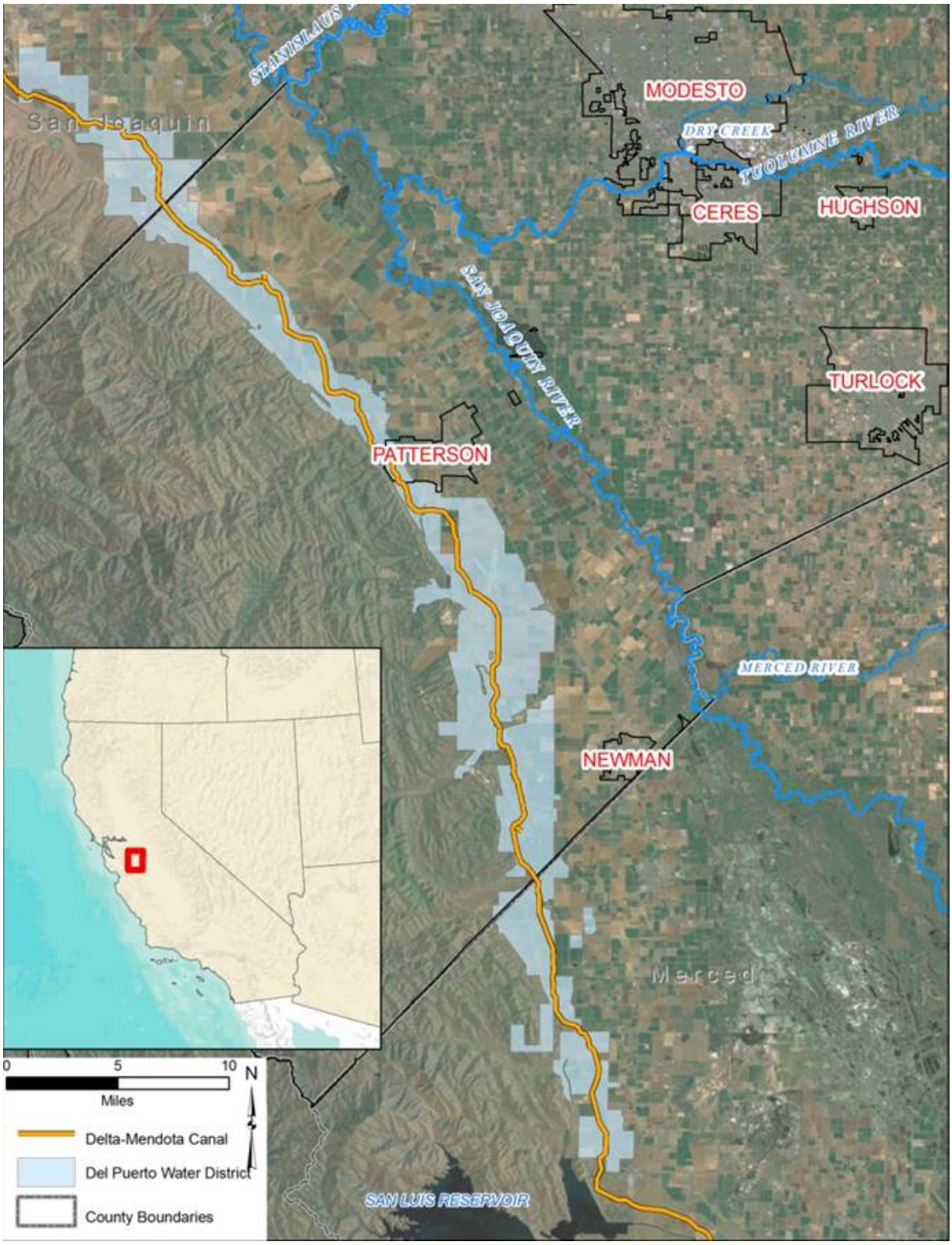

Figure 1: Del Puerto Water District Boundary

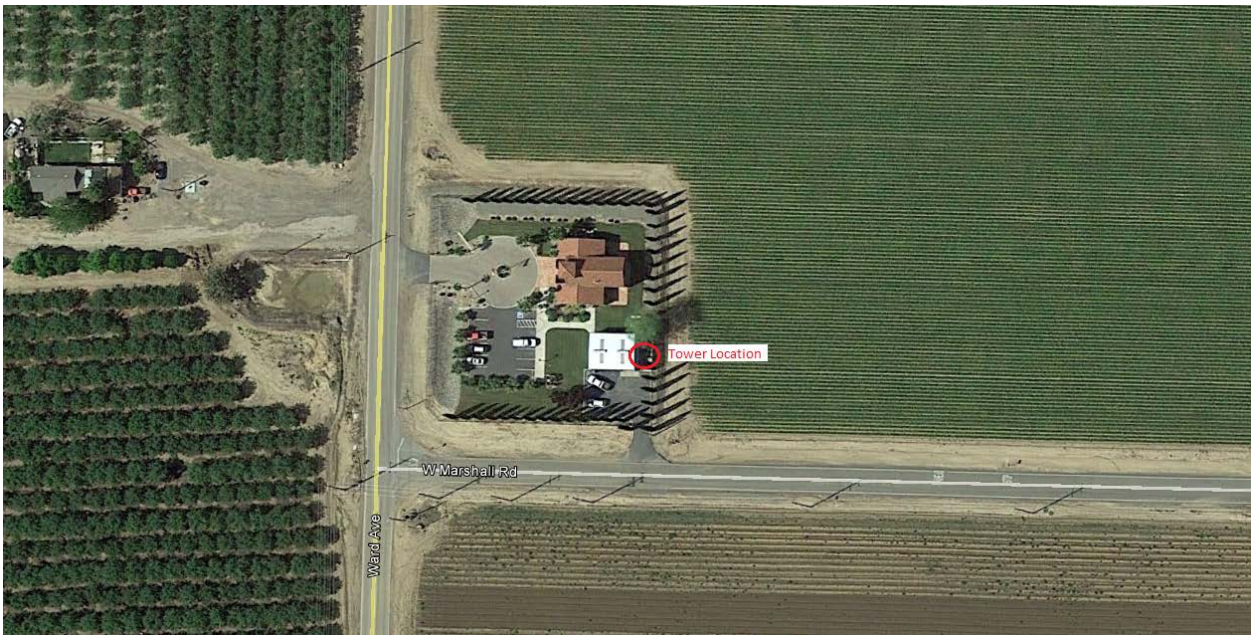

Figure 2: DPWD Office Tower Location

Figure 3: Sites 1 and 2 Location

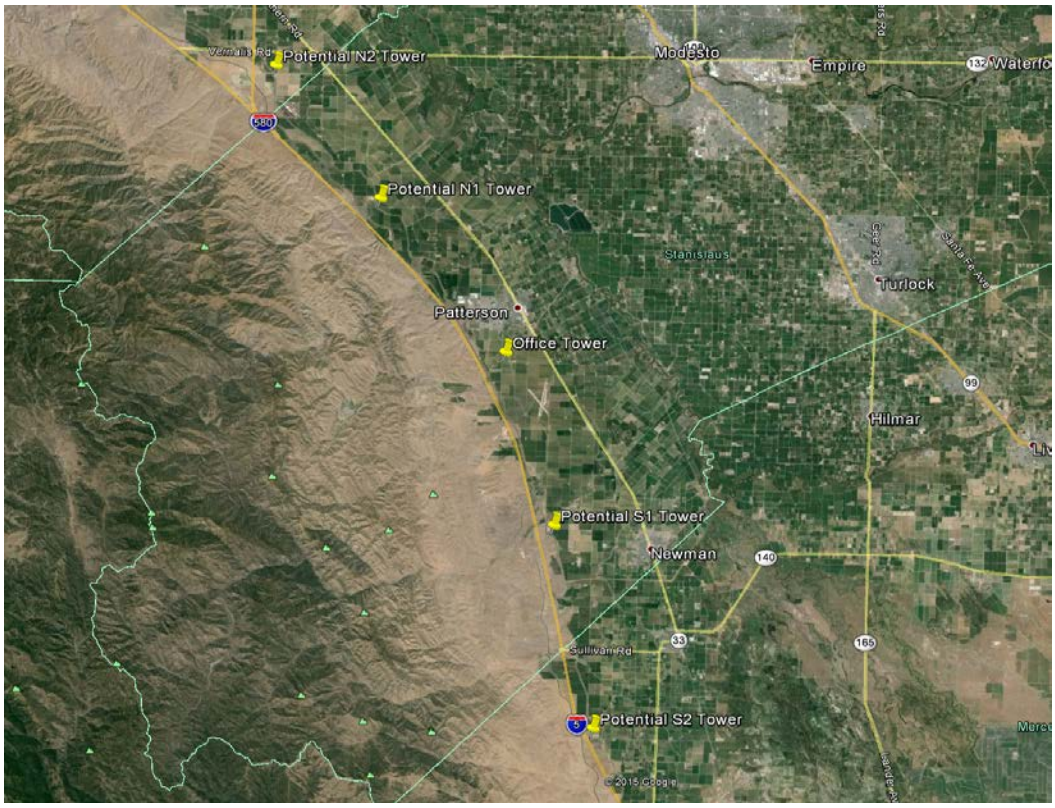

Figure 4: Backbone Tower Locations

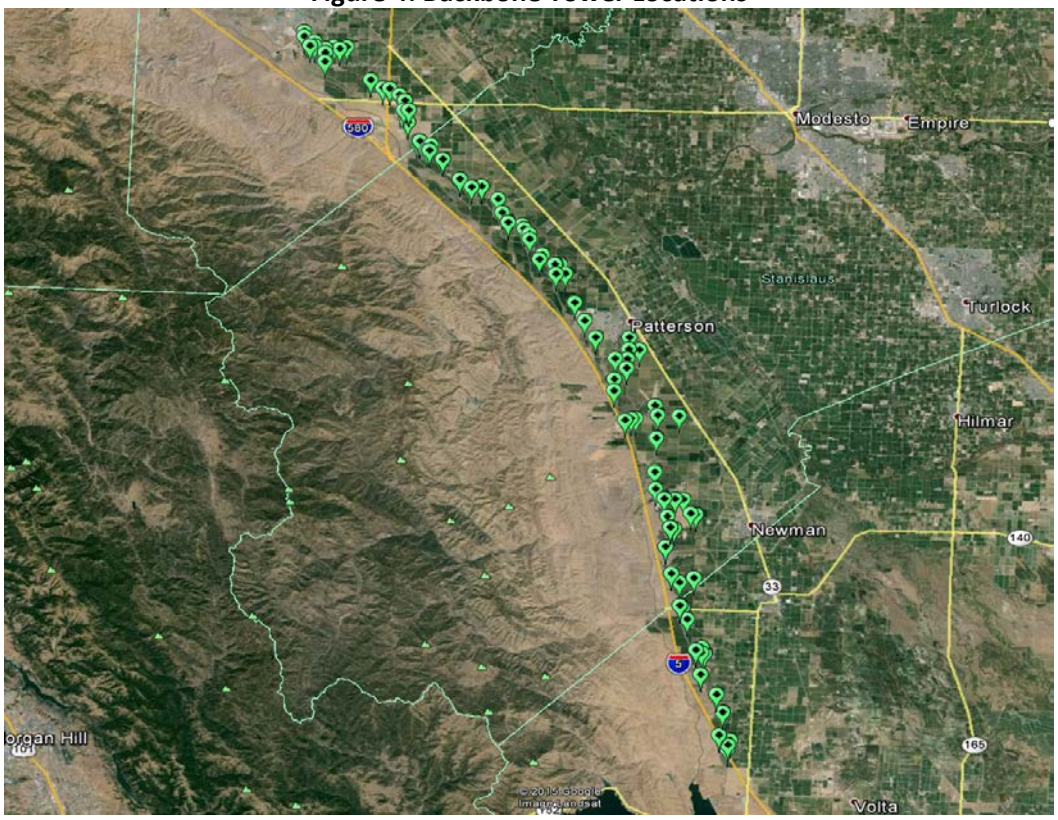

Figure 5: DPWD Meter Locations

The District's primary relationship with Reclamation is supported by Contract No. 14-06-200-922, which established terms for the delivery of CVP supplies from June 10, 1953 through February 28, 1994. Similar contracts were entered into between 1953 and 1961 between Reclamation and certain other local District's named Davis, Hospital, Kern Canon, Salado, Sunflower, Mustang, Orestimba, Quinto, Romero and Foothill. The contracts of those ten districts were assigned to the Del Puerto Water District on February 13, 1995, the Districts formally consolidated their contracts into Contract No. 14-06-200-922 and subsequent Interim Renewals thereof, and on February 25, 2005, the District and Reclamation culminated the long-term renewal of its contractual relationship by executing Contract No. 14-06-200-922-LTR1, providing water service for the term March 1, 2005 through February 28, 2030, with the possibility for renewal for an additional 25 years.

Recently, the District has cooperatively worked with Reclamation on a number of single and multi-year Warren Act Contracts, Refuge Water Supply Program Water Purchase/Exchange Agreements, Cooperative Agreements, and currently is collaborating with Reclamation under Letter Agreement No. 14-WC-20-4541 to advance a joint NEPA/CEQA effort in support of the North Valley Regional Recycled Water Program.

In addition to these contractual agreements, the District has been a partner with Reclamation in multiple venues and processes, and its staff has worked cooperatively through many issues, including but not limited to Long-Term Contract Renewals, Municipal & Industrial Shortage Policy development, CVP Financial matters, Multi-Year Warren Act Contracting process development, BOR WORKS updates, the USBR Stakeholder Technical Team, and most recently has actively participated in drought-related Stakeholder efforts between Reclamation and its CVP customers.

Technical Project Description

The proposed project will give the District the ability to remotely monitor and track individual grower water use which will allow users to get instantaneous information about their deliveries. Phase I of this project will perform a radio signal survey, establish an initial backbone radio tower, establish a network and clearSCADA interface to collect and display data for District use, and connect two high priority turnouts to the network.

The radio signal survey will be performed to evaluate whether a "free to use" signal band can be used or if the district would need to utilize a registered frequency. A survey would also verify that each of the proposed metering locations throughout the district would be able to connect to proposed radio backbone. Because the District is more than 40 miles in length, verifying that each site would be able to connect to the network is essential to the viability of using a radio network. If the survey reveals that there are areas that would likely be a problem, another type of network may be necessary, such as cellular.

The radio signal survey would also ensure that the proposed radio network backbone would have minimal interference and a thus a strong signal. The proposed project relies heavily on a series of large radios strategically placed throughout the district that would relay each of the smaller radio stations at the turnout locations. This backbone radio network would utilize much stronger radios than the individual stations and would be connected to each other to send data back to the main network hub.

Figure 4 shows a map of the proposed backbone radio locations for the entire project and **Figure 2** shows the main hub that would be constructed as part of Phase 1 of the Project.

The radio tower constructed in Phase 1 would be centrally located to connect to the higher priority metering locations. As more funds become available and more sites demand remote monitoring, new backbone towers could be tied in to the existing network. The radio tower would be require a footing of between 6 and 10 feet square with the same depth and be between 50 and 80 feet high, depending on the outcome of the signal survey, and would require A/C or solar power. Because the tower is proposed to be located at the District office, A/C power would be the likely source as it is readily available at this location.

Because the data gathered from the metering locations requires little storage space, new servers currently used by the District (installed in late 2015) will also be used to store the data. Using clearSCADA, a user interface that effectively and simply shows the data collected by the District would also be established. This user interface would have pre-established templates to allow for the easy addition of new sites as sites are added to the network. The data would be moved to offsite storage and a website will be established to allow growers to log on and view only their data. This is important as it reduces the likelihood of having the District's network compromised from allowing outside access. It also protects the privacy of the District's Landowners and Water Users.

The two sites initially selected for Phase 1 of this project are sites that were deemed high priority for the District. The DMC turnout locations have multiple users, are within radio range of the initially planned backbone tower, and service a large acreage. The plan for these sites is to have one small radio, likely near the turnout, that connects to the backbone that receives data from each of the metering sites. Each of the metering sites would have an even smaller radio that would require only a small battery to operate and send a signal to the radio at the turnout.

Project Tasks

- **Environmental Compliance**: The proposed project would be in the footprint of existing sites. Depending on the outcome of the signal survey, it may be necessary to put a concrete pad and tower in at the individual sites. If this is the case, a study will likely be required to comply with the California Environmental Quality Act (CEQA). The areas considered for potential gateway towers are heavily trafficked and near developed areas, so the District does not anticipate any significant environmental consequences and likely no mitigation measures will be required. Any data acquired for the CEQA documentation will be shared with the Bureau of Reclamation for NEPA compliance.
- **Radio Signal Survey**: A signal survey of the proposed backbone network, detailed in **Figure 4**, and the District's metering locations, detailed in **Figure 5** will be performed in the spring of 2016. The survey will verify that all of the sites will have radio connectivity to the proposed backbone network. It will also establish a background level of radio noise in the area to determine how reliable a radio network would be over broadband radios. If it is determined that there is too much background noise, a commercial radio frequency may be required.
- **Permitting**: The District will work through the Authority to acquire a license(s) from Reclamation if the radio gateways for sites 1 and 2 are required to be installed on USBR Right-of-Way, or easements from private landowners if located on private property. The District has a long-

standing relationship with the Authority, Reclamation, and its landowners, and does not expect this to present any challenge.

- **Radio Tower Installation:** Phase 1 of the project will install between a 50 and 80 foot tall radio tower to act as a main hub for the backbone radio network. The exact height of the tower will be determined based on the results of the signal survey. Installation of the tower will require the construction of between a 6 and 10 foot cubed footing. The exact dimensions of the required footing will be determined based on the exact height of the tower. The proposed tower is to be installed at the District's Office and Maintenance Facility, which is fenced and protected with an alarm system, so extra security will not be required.
- **Gateway Radio Installation:** The project will require a radio gateway at each of the turnout locations. These gateways require either A/C power or a solar panel, so the size of the pad would be based on whether A/C power is readily available at the site. For both sites 1 and 2 it appears that A/C power would be available, so a very small pad would be required. Site 1 already has a pad and fence installed which the district could utilize. The size and location of the pad for site 2 will be determined after the radio signal survey.
- **Meter Radio Installation:** Each of the flow meters has either 4-20 mA or pulse outputs, so no electrical conversions will be required. Available power is not a concern with the meter radios, as the meter radios only require a small battery. The box for the radio would be mounted on concrete boxes or poles already installed near the flow meters. If the results of the signal survey reveal that an antennae attached to the top of a pole is required at any of the sites, a pole will be installed.
- **Network Setup and Integration:** The project will establish a network for connecting the radio backbone to the office. The office server will be partitioned to allow for storage of the data collected. Firewalls will be installed to protect the stored data. A clearSCADA user interface will be programmed for the District as a part of this project. The data will be ported to an offsite web page, and will be organized such that it allows growers to have access to only their information.

Evaluation Criteria

Criterion A: Water Conservation

Subcriterion A.1- Quantifiable Water Savings.

The proposed project will allow for accurate and instantaneous monitoring of water usage by both the District and growers in areas that are difficult to monitor regularly. Many users have land throughout the District, and some of this land can be separated by many miles. It can often be difficult to perform all of the other duties associated with operating a farm while trying to monitor water use in a district that is so spread out.

Many of the growers in the area use current conditions and changes in evapotranspiration rates to determine the quantity of water and application rate they apply to the fields. In situations like this is it easy to over-irrigate due to a lack of ability to gather the required information to make informed decisions about how long and what total volume they should be irrigating. Having a system that allows them to view instantaneous flow rates and total volumes gives them that information. Most of the irrigation methods currently used in the district would be considered high efficiency methods, predominantly drip and micro-sprinkler. The District has assumed that these irrigation methods result in between 80-90% irrigation efficiency. Based on feedback from irrigators in the area, typical irrigation

sets are between 48 and 72 hours. Several of the irrigators mentioned to the District that having real-time water use information would allow them to customize their sets better and avoid over irrigation. They estimated that having this data could reduce their irrigations as much as 12 hours. Reducing the irrigation times by 12 hours would result in a 16-25% reduction in water use. Therefore, the District conservatively estimates that 10% of the water used through these monitored turnouts could be conserved. **Table 2** shows the total usage through these two turnouts for the last 6 years.

Table 2: Water Use in Sites 1 and 2

	46.83L	**47.37L**	**District Total**
	ac-ft	ac-ft	ac-ft
10-'11 Use	2,721	2,211	57,592
11-12 Use	4,253	3,388	82,390
12-'13 Use	2,364	2,706	67,067
13-'14 Use	2,138	1,864	58,067
14-'15 Use	215	186	25,974
15-'16 Use	353	678	27,703
Average	2,007	2,542	53,132

Calculation of Water Conserved from Phase I:

4,550 ac-ft * 10% = 456 afy

Currently any water loss is either runoff or percolation into the ground. This is problematic as the District and its growers have a very limited supply of water. Every gallon of water saved in one area is one that could be been used on another crop elsewhere. With more than 13,000 of the District's irrigable acreage currently fallowed, the District and its growers are highly motivated to conserve as much supply as possible.

Water use at Sites 1 and 2 will be compared to previous years to verify effectiveness of the remote monitoring program.

Subcriterion A.2- Percentage of Total Supply

The amount of water conserved by the proposed project represents 0.86% of the water supplied during the last few drought years.

(Conserved Water: 456 ac-ft) / (Total District Water Use: 53,132) = 0.86%

While this number seems very low, Phase 1 only covers two of the District's turnouts. Because Phase 1 will also include the establishment of a backbone network, water conserved as a percentage of total District supply will rise rapidly as more turnouts and flow meters are added to the network.

Criterion B: Energy-Water Nexus

The proposed project will include components that will improve energy efficiency related to the management of water.

Subcriterion B.2- Increasing Energy Efficiency in Water Management

The proposed project will connect two of the more difficult to manage multi-user turnouts in the district to a data acquisition system that will allow the District to monitor water use in real-time without the need of field visits, thus resulting increased efficiency for the District's Field Operations department . Currently, multiple trips per week are required to Sites 1 and 2 to verify flow rates. The estimated distance travel is 11 miles round trip to each Site. At two times per week, this equates to 1,540 miles per year (44 miles per week * 35 weeks). Based on EPA equations, reducing or eliminating these trips could equate to a reduction of approximately 0.81 tons of CO_2 emission per year. This reduction would increase as more sites are added to the network.

Criterion C: Benefits to Endangered Species

The proposed project will not result in a significant change in the surrounding environment and will not have a direct impact to any special status species. However, the proposed project plans to improve the balance between water supply and water demand. This will have positive effects on the quality of habitats throughout the central valley.

Criterion D: Water Marketing

As mentioned earlier, due to the drought and restrictions on the CVP, it is likely that the District will receive only thirty-five percent (35%) of its contract allocation (i.e., 49,074 AFY) on an annual basis under normal hydrologic conditions (i.e. non-drought conditions). **Figure 6** shows the percentage of contract supply the District has received over the last 10 years. It is likely that the District will receive a zero percent (0%) allocation again in 2017. The District will not make the conserved water available for resale, however, the conserved water will be extremely beneficially for the health of the District and its growers. This water will be made available for use throughout the District. The 456 ac-ft that the Phase 1 of this project will conserve could be used to put as much as 200 fallowed acres back into production, thus creating jobs and supporting economic activity within the district and the surrounding communities. Although this is a small portion of the more than 13,700 fallow acres in the District as more turnouts are added to the network, and more water is made available, more ground will be put back into production.

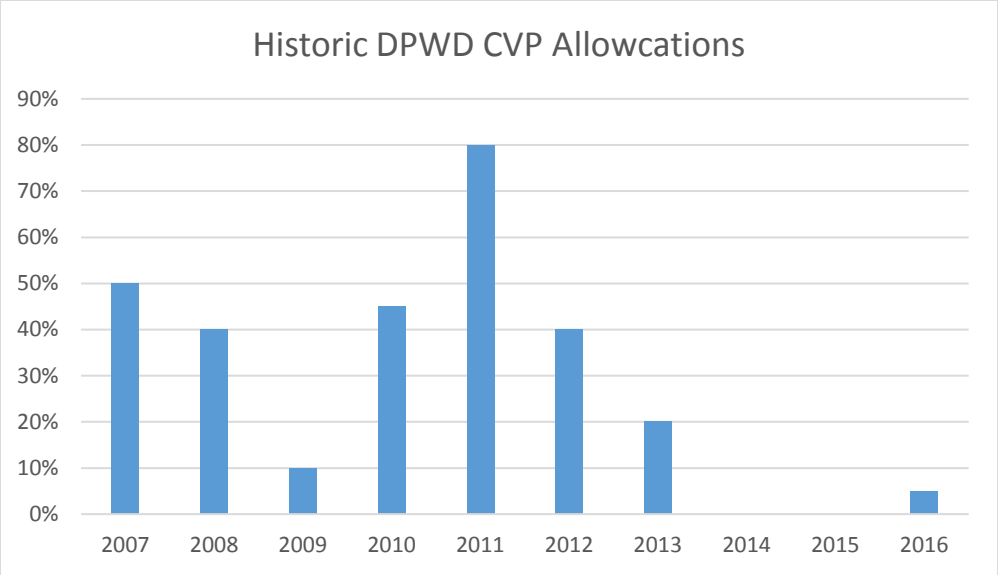

Figure 6: Historic DPWD CVP Allocations

Criterion E: Other Contributions to Water Supply Sustainability

This project includes additional components that will contribute to water supply sustainability.

Subcriterion E.2- Expediting Future On-Farm Irrigation Improvements

The proposed project will establish a network that will allow for each field in the district to have access to real-time flow monitoring. Every turnout will have a gateway that connects to the radio backbone, and as a part of the upgrade plan, every site will be metered. Growers will be given immediate access to water use data, providing them with valuable information for improving irrigation efficiency.

Because the project has the capability and the goal of eventually applying these improvements to every location served by the District, water users would have the same opportunity to improve his/her on-farm irrigation practices. As previously noted, the District serves 45,229 irrigable acres, which at full contract allotment could deliver 140,210 AFY. If the in the project improves irrigation efficiency by decreasing water use by 10%, at full build out, the District and its customers would conserve as much as 14,021 AFY.

The information provided through this project will support growers in their efforts to seek funding assistance from the Natural Resource Conservation Service (NRCS) through the Environmental Quality Incentives Program (EQIP) or similar programs. All of the growers in the District would likely qualify for some kind of funding through these programs and the District is prepared to and has provided technical assistance to those growers pursuing funding assistance. The District informs growers of funding opportunities as they are made available through mailings, newsletters, and emails.

Subcriterion E.3- Other Water Supply Sustainability Benefits

As mentioned earlier, due to the drought and restrictions on the CVP, it is likely that the District will receive on average only thirty-five percent (35%) of its contract allocation (i.e., 49,074 AFY) on an annual basis under normal hydrologic conditions (i.e. non-drought conditions). **Figure 6** shows the percentage of contract supply the District has received over the last 10 years. It is likely that the District will receive

a zero percent (0%) allocation again in 2017, leaving its growers far short of meeting their irrigation needs. **Table 2** shows the District's total deliveries between water years 2010 and 2016 The District is projected to use less than 30,000 ac-ft during the 2016-2017 water year. All of this supply has come from sources other than the District's contract, and are prohibitively expensive. Conserving available supply allows the District's growers to avoid excessive use of groundwater, as well. In the first year after Phase I completion, the District estimates that 456 ac-ft will be made available from conservation. That would represent an increase in supply of 1.5% compared to the 2015-2016 water year (456 ac-ft / 30,000 AFY) from just Sites 1 and 2 planned in Phase 1 of the project. As more sites are added to the project, this number will also increase.

Criterion F: Implementation and Results

Subcriterion F.1- Project Planning

Although the project is not discussed in any District or area plans, it has long been a goal to update and optimize the flow metering system. In future District Water Management Plans, it is likely that improving flow tracking will be a focal point, including remote monitoring.

Subcriterion F.2- Readiness to Proceed

Phase 1 of the project is being proposed as a one-year effort under Group I Funding. The project is ready to proceed, with survey work scheduled to begin upon notice of award, and construction and implementation to immediately follow any required CEQA/NEPA review. A large portion of the work will involve the establishment of a database and network to collect and store retrieved data. This task can be performed simultaneously with the survey and construction work, so the District does not anticipate delays in the project. Environmental review and documentation will be developed after sites are identified following the radio signal survey, with construction scheduled to begin soon after. The District proposes to proceed according to the following approximate schedule:

- October 2017 – Radio signal survey. Results from the survey are required for design of the network
- October 2017-April 2018– License or easement acquisition based on location of sites 1 and 2. Network setup and installation to begin. Environmental documentation will also be started.
- December 2017 – Begin construction of backbone tower at District Office & Maintenance Facility
- January-February 2018 – Finalize CEQA documentation and provide environmental details to Reclamation for NEPA compliance
- April 2018– Finalize NEPA documentation and begin construction of site 1 and 2
- July 2018– Finalize construction of site 1 and 2 and begin SCADA integration and system testing
- October 2018– Submit Draft Final Report and As-Built Drawings
- November 2018– Submit Final Report

Subcriterion F.3- Performance Measures

The primary benefit of the proposed project is water conservation through more efficient water application. This continuous and long-term benefit will be measured directly by comparing water use applied per acre per irrigation in the years following construction to previous years. A direct comparison of past and future use of water will be difficult as water availability changes dramatically from year to year. As more water becomes available, growers will use more water. The goal of the project is to improve irrigation efficiency, thus a comparison showing a reduction in applied water per irrigation will

be a positive indicator of the success of the project. Measured water saved will not be remarketed, but the conserved water will be water that was not removed from the District supply, indirectly increasing available water.

A secondary benefit of the proposed project is the reduced District staff hours and energy cost of site visits during the season. Some site visits will still be required for meter calibration and verification, however, these will be substantially reduced. The district plans to track the number of visits to Sites 1 and 2 in the years following construction to quantify the reduction.

Subcriterion F.4- Reasonableness of Cost

Phase I of the project will conserve an estimated 456 ac-ft of water and improve water management on 2,600 acres of District lands. A breakdown of the costs of the project is included in **Table 4**. The anticipated life of the network and radios is 20 years, based on similar systems. The Reasonableness of Cost of this phase of project is:

$217,140/((456 ac-ft) * 20 years) = $23.81/af

This Reasonableness of Cost does not take into account potential savings from increasing the number of sites served in future phases of the project. The costs will be substantially less with the addition of new sites, as a good portion of the investment in the project is associated with the initial design and construction of the network.

Criterion G: Additional Non-Federal Funding

The District will allocate $110,741.40 of its reserve funds for this project. The total cost of the project is estimated at $217,140.00. The cost ratio of non-federal funds is:

($110,741.40/$217,140.00)= 51%

Any overruns will be borne by the District.

Criterion H: Connection to Reclamation Project Activities

(1) The District and proposed project are located in the Sacramento-San Joaquin Rivers basin as well as the CalFed Solution Area. The proposed project will conserve surface water through increasing irrigation efficiency making that supply available to other areas, therefore reducing the need for pumping groundwater in those areas, both of which are priorities for Reclamation.

(2) The District's sole source of supply is its USBR water service contract to receive CVP supplies from the DMC.

(3) The project would involve monitoring flow rates of water delivered from the DMC. The results of the radio signal survey may require gateway radios to be installed on USBR Right-of-Way.

(4) The water conserved by the project would be made available to growers within the District, and thus within the Sacramento-San Joaquin Rivers Basin.

Performance Measures

As discussed in **Subcriterion F.3**, the primary performance measure will be a comparison between historical and future water applied per acre per irrigation. The District determined that a direct comparison of water used through the turnout would not be valuable, as the water use will increase as

more water is made available. The District will continue to monitor water use to ensure the continued success of the project and will add sites to the project as funding and time allows.

Environmental and Cultural Resources Compliance

The proposed project will construct new facilities for the remote monitoring of water deliveries. Under the CEQA, this project will require an initial study to review potential environmental impact. The District anticipates that the initial study will result in a negative declaration with little to no mitigation required. This work will be completed prior to any construction. CEQA documentation will be provided to Reclamation for compliance with any necessary NEPA requirements.

1. Will the project impact that surrounding environment?
   The proposed project will involve construction of footings for anchoring a radio tower and small pad structure for mounting the gateway radios. During construction a small amount of dust may be generated, however, standard dust control measures will be utilized to minimize the impact and the construction areas are fairly small. Post-construction, facilities will be consistent with the existing landscape. Lands surrounding the proposed project are heavily trafficked or actively farmed. The proposed project will not result in the loss of any farm land.

2. What endangered or threatened species are in the project area?
   There are several special status species have been identified to exist within the district's boundaries. These include the San Joaquin Kit fox, Giant Garter snake, and others. However, the proposed project area is actively traveled and maintained, so it is unlikely that any special status species will be in the project area during construction. A qualified biologist will survey the project area prior to construction to determine if there are any special status species in the project area and will make recommendations for any additional actions required.

3. Are there wetlands inside the project boundary?
   There are no wetlands in the project boundary. The project will be constructed within existing District footprint or maintained dirt access areas. The State of California purchased 450 acres of District land to protect and preserve a native California Sycamore grove that comprises approximately 50 acres. However, the project will not have any effect on this property.

4. When was the water delivery system constructed?
   DMC was completed in 1951. Private landowner delivery systems have evolved over the years, and consist primarily of underground pipelines.

5. Will the project result in any modifications of or effects to, individual features of an irrigation system (e.g. headgates, canals, or flumes)?
   The proposed project will not affect any features of an irrigation system.

6. Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places (NRHP)?
   The DMC is considered by Reclamation to be eligible for listing on the NRHP as a contributing property to the CVP, which is eligible for listing for its association with the development of irrigation and agriculture in California. As part of the environmental and regulatory compliance,

the District will supply all necessary information to Reclamation so they can coordinate with the appropriate State Historic Preservation Officer (SHPO). Much of the work for the proposed project is near existing facilities, so the District does not anticipate any issues with adverse effects.

7. Are there any known archeological sites in the proposed project area?
   There are no known archeological sites in the proposed project area.

8. Will the project have a disproportionately high and adverse effect on low income or minority populations?
   The proposed project will have no impact on low income or minority populations.

9. Will the project limit access or use of Indian sacred sites or impact tribal lands?
   There are no tribal lands within the project or its service area. The proposed project will have no impact on tribal lands or sacred sites.

10. Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species in the area?
    The project will have no impact on noxious weeds or non-native species.

Required Permits or Approvals

The project will need to comply with the applicable provisions of CEQA and NEPA as discussed under **Project Tasks**. A license to construct, operate, and maintain will need to be acquired if the results of the signal survey require the gateway radio structures to be built on USBR Right-of-Way(s), and easement(s) will be acquired if the results require the structures be built on private landowner property. As all construction would be near existing structures, the District does not anticipate there being any issues with obtaining the required permits or approvals.

Official Resolution

An official Resolution is included in **Appendix C** of the application.

Project Budget

Funding Plan and Letters of Commitment

The total estimated cost of the proposed project is $217,140. This cost was based on estimates provided to the District by Sierra Controls (provided in **Appendix A**), and District experience in similar projects. This application is requesting $106,198.60 in federal funding assistance and will utilize $110,741.40 of District Funds.

- District funds. The District's contribution to the project will be through direct funding of administration, design, and construction of the project. The District has budgeted $110,741.40 to complete the project. This funding has been allocated in the District's 2017 reserves and is available to complete the project.

The District expects to utilize federal funding assistance for a portion of the survey, engineering, and construction costs and utilize District funding for all other costs, including design, remaining construction, administration, and inspection.

The District has not incurred any costs that would be used to meet its match obligation.

No other federal funding has been requested or received for this project.

If the funding requested by this application is denied, the proposed project would not be implemented at this time and other funding opportunities will be pursued. Should a lesser amount of funding be provided, the District may implement a sub-phase of the project, depending on the funding provided.

The source and amount of project funding is summarized in **Table 3**.

Table 3: Funding Chart

Funding Source	Percent of Total Project Cost	Funding Amount
Del Puerto Water District (non-federal)	51%	$110,741.40
Requested Reclamation Funding	49%	$106,398.60
Other Federal Funding (non-Reclamation)	0%	$0
Total Project Funding	**100%**	**$217,140**

Budget Proposal

Table 4 shows the project budget proposal.

Table 4: Budget Proposal

Item	Budget Item Description	Computation			District	Reclamation	Total
		Quantity	Unit	Unit Cost	Funding	Funding	Cost
1	Salaries and Wages	0					$0
2	Fringe Benefits	0					$0
3	Travel	0					$0
4	Equipment	0					$0
5	Supplies/Materials	0					$0
6	Contractual/Construction						
6.1	Signal Surveying	1	each	$19,500	$9,750	$9,750	$19,500
6.2	Engineering Services	1	each	$15,000	$7,500	$7,500	$15,000
6.3	Construction						
6.3.1	Radio Tower	1	each	$8,500	$4,250	$4,250	$8,500
6.3.2	Furnish and Install (F&I) Footing for Tower	1	each	$8,700	$6,671.40	$2,028.60	$8,700
6.3.3	F&I Pad for Gateway Radio	2	each	$1,370	$1,370	$1,370	$2,740
6.3.4	Gateway Radios	2	each	$3,750	$3,750	$3,750	$7,500
6.3.5	Flow Meter Radios	10	each	$2,000	$10,000	$10,000	$20,000
6.3.6	Tower and Site Radio Install and Training	1	each	$46,500	$23,250	$23,250	$46,500
6.3.7	F&I SCADA Server Network and Access Site	1	each	$80,000	$40,000	$40,000	$80,000
6.3.8	Miscellaneous Installation Hardware	1	each	$3,000	$3,000	$0	$3,000
7	Environmental and Regulatory Compliance						
7.1	Reclamation Costs (assumed)					$4,500	$4,500
7.2	Engineering Consultant	8	hours	$150	$1,200		$1,200
8	Other Costs						
8.1	Review and Reporting						$0
	Total Direct Costs:				$110,741.40	$106,398.60	$217,140
9	Indirect Costs (not charged to the project)				$0	$0	$0
	Total Project Costs:				$110,741.40	$106,398.60	$217,140
	Percent of Total Cost:				51%	49%	

Budget Narrative

a. Salaries and Wages. Although District Staff will likely spend time administering and supervising the project, the District does not intend to separate that time from other daily duties of the staff. No District staff time will be charged to the project.

b. Fringe Benefits. The District will not charge fringe benefits associated with District staff to this project.
c. Travel. No travel is associated with this project.
d. Equipment. No equipment will be purchased as part of this project.
e. Materials and Supplies. No materials or supplies will be charged to this project.
f. Contractual. The proposed project will make use of consultants and contractors for its completion.
    - Signal Surveyors. A specialist trained in surveying radio signals will be used to determine signal quality and strength at strategic locations as advised by the District. Sierra Controls will analyze the data and inform the District about the appropriate locations and types of radios required. Hourly rate depends on the individuals and the type of equipment required to perform the work. An estimate or quote is attached in **Appendix A**.
    - Engineering Services. Sierra Controls will perform system design including, but not limited to, initial drawings, initial configurations, and system installation and testing. They will also supply engineering support as required to fulfill the scope of work.
    - Construction. Sierra Controls has been selected by the District to perform or oversee the design and implementation of the radio network and establishment of a SCADA system. A specialist trained in establishing radio networks will ensure all connections are sufficiently strong.
        i. Radio Tower. A backbone radio tower will be required at the District office. The size of the tower will be determined after the survey is completed. Cost for the tower and radios was supplied by Sierra Controls. Cost for the footing installation was supplied by Joe Garza Concrete Construction.
        ii. Gateway Radio Tower. A gateway radio tower will be required at each of the turnouts. Cost for the gateway radio towers were supplied by Sierra Control. Cost for the pad was supplied by Joe Garza Concrete Construction.
        iii. Electrical Equipment and SCADA integration. Electrical equipment will include any equipment necessary to transfer the signal from the backbone radio tower to the office servers. SCADA integration will include computer components and antennae necessary to connect stations. These costs will also include the time for a qualified SCADA integrator to program and establish a SCADA network and user interface for the District. Costs for these were supplied by Sierra Controls.
    - Environmental and Regulatory Compliance Costs. The proposed project will construct new facilities and will require an Initial Study (IS), likely resulting in a Negative Declaration (ND). NEPA will require an Environmental Assessment (EA) that will likely result in a Finding of No Significant Impact (FONSI). The proposed project budget includes consultant costs to develop and Initial Study and Negative Declaration to comply with CEQA. All documents and backup information developed through that process would be provided to Reclamation for the EA. Reclamation will also determine the level of effect the proposed project will have on historic properties, and if this level of effect will require coordination with the SHPO. Costs incurred by Reclamation to develop the EA and compliance with the National Historic Preservation Act are assumed to be $4,500. The environmental and regulatory compliance costs are based on previous

District experience on similar projects. The District has sufficient reserves available to cover additional environmental costs should they be required.

g. Other Costs. Other costs include construction administration, field review, and grant contract administration.
    - Field Review and Construction Administration. A small amount of construction and field work will be required. Construction Administration activities include contract execution between the District and contractors, invoice review and payments, and other associated tasks. Field review activities include trips to the sites to ensure project components are completed according to design and with sufficient standards. These tasks are expected to be performed by District staff and not be charged to the project.
    - Review and Reporting. The District plans to perform the reviews and reporting with District Staff as a part of their daily duties and do not anticipate charges to the project.
h. Indirect Costs. Indirect costs incurred by the District will not be charged to the project.
i. Total Cost. The total estimated project cost is $217,140, including $106,398.60 (49%) in Reclamation funds, $110,741.40 (51%) in District funds. The District has sufficient reserves available in its budget to fund any overruns or unforeseen costs should they arise.

Budget Form

SF 424C is included at the beginning of this application.

Appendix A
Cost Estimate from Sierra Controls

Appendix B
Letters of Intent

Appendix C
Official Resolution

Appendix D

Letter of Support from San Luis Delta-Mendota Water Authority.

Appendix A
Cost Estimate from Sierra Controls

SIERRA CONTROLS, LLC

WATER MEASUREMENT AND CONTROL SYSTEMS

DATE
January 14, 2016

ESTIMATE NO.
9601

To: Del Puerto Water District

Attention: Adam Scheuber, P.E.
Water Resources and Operations Manager

Subject: Initial SCADA Project - Budgetary Estimate

Sierra Controls, LLC (SC) is pleased to offer this Budgetary Estimate for an initial SCADA Project for the Del Puerto Water District (DPWD).

Project Description

This project includes the design, construction, installation and implementation of a new Supervisory Control and Data Acquisition (SCADA) system in the Del Puerto Water District. The primary goal of this new SCADA system is to automate collection of flow rate and total information from flow meters at farm turnouts located throughout the District. The SCADA system will consist of the following major components:

- Communications network
- Remote terminal units (RTU)
- Office computer system

The Communications Network will start with a robust backbone radio system that spans the District. This backbone will be comprised of very high-throughput Ethernet radios located on several evenly spaced radio towers, The radio towers will be located to facilitate their use not only as backbone repeater nodes but local access points to the numerous farm turnouts. An initial radio survey will be performed to ensure both backbone communications and connection of the farm turnout sites to the backbone. Note that there may be a handful of sites that will not connect to the backbone due to terrain or obstructions. A secondary cellular communications system may be implemented to overcome this issue.

The principle water source for the farm turnouts in the District is the Delta Mendota Canal. Turnouts on the Delta Mendota Canal provide water to single or multiple farm turnouts. Each of these farm turnouts is monitored by an existing flow meter. The project will provide remote terminal units (RTU) for interfacing these flow meters. Characteristics of an RTU:

- Compact modular design
- Environmentally robust for weather and temperature
- Able to operate without external power (where possible)
- Limited number of fixed types: flow meter interface, communications gateway, etc.
- Configuration only, no programming required

Types of remote terminal units will include, but are not limited to the following:

- Flow meter interface – I/O: Analog and/or digital signals for rate and/or total pulse
- Flow meter interface – direct communications: For flow meters that can communicate via Modbus
- Gateway / Radio: Aggregates communications to multiple flow meter interface RTU's
- Tower communications: Serves multiple functions including backbone radio repeater and local communications access point

940 MALLORY WAY, SUITE 1 • CARSON CITY, NV 89701 • (775) 883-0443 • FAX (775) 883-5528

The Office computer system will be the focal point of all field data and communications. Located in a secure location inside the District Office, the computer system will be comprised of a rack mount server and necessary appurtenances (UPS, Ethernet switch, monitor, etc.). The core software package for this system will be ClearSCADA from Schneider Electric. ClearSCADA is a SCADA host server software which provides communications, historical database, alarming, and visualization components. A second major software package for report generation will be Dream Report from Ocean Data Systems. A complete Remote Access solution will be provided for secure access to the SCADA system by District personnel. Some key features of the Office computer system:

- Scalable server/client architecture
- Client access will be via Web portals
- Security inherent in hardware and software design
- Future expansions including redundancy and extra clients are easily provided

As part of this project a District Web site will be started. A very important feature of this Web site will be the ability for District customers to securely log in and view their usage. This will be accomplished by linking the Web site to the database contained within the SCADA host server software.

The primary architecture of the system design is represented on the attached System Diagram.

Four ease and consideration the proposal is broken up into 2 Sections.

Section 1:

As part of the ' ! Project, SC will provide engineering services and survey services to finalize the system architecture and design. SC will also manufacture and install (1) ClearSCADA HMI Server Network and Access Website, (10) single RTU sites, (2) RTU gateway Sites and (1) Communication Tower Site RTU. After the ; Project is complete and commissioned and has verified the proof of concept, the system may be expanded as required.

Section 2:

To assist DPWD in budgeting for future site costs and system architecture needs, SC has provided basic price ranges for each component of the overall SCADA System. This will allow DPWD to budget in stages to best meet the needs of the district.

This proposal outlines the range of pricing for each component of the system in an itemized format so DPWD can budget for future project costs and needs. Volume discounts are available. Final pricing will be determined as needed once ordering quantities are confirmed.

Phase 1:

Item 1. Engineering Professional Services Budget **$10,000 – $15,000**
Includes Project Management, system design, initial RTU drawings, initial configurations, initial system testing, meetings, travel, engineering support, etc.

Item 2. Initial Radio / IT Survey **$17,500 - $19,500**
Includes complete radio and IT survey of District with travel, onsite labor, equipment rental (bucket trucks), and final report.

Item 3. ClearSCADA HMI Server Network and Access Website **$70,000 - $80,000**
Includes all equipment, labor, travel, etc. to complete the Office computer system. Subsequent Phases to expand the SCADA system may require license count upgrades.

Item 4. Communication Tower RTU (Q=1) **$8,500**
Includes equipment fabrication, shop configuration, shop initial testing and delivery. Installation, final configuration and system testing located in next item.

Item 5. Single Meter RTU Site (Q=10) **$2,000 x 10 = $20,000**
External Power Adder (if required) - $700ea
Includes SignalFire based Meter interface equipment and delivery.

Item 6. RTU Gateway (Q=2) **$3,750 x 2 = $7,500**
Solar Power Adder (if required) - $700ea
Includes combination SignalFire Gateway and radio equipment and delivery.

Item 7. Initial Tower RTU and Site RTU Installation & Training **$42,500 - $46,500**
Includes: (10) single RTU sites and (2) RTU gateway Sites and (1) Communication Tower Site RTU.

Item 8. Misc. Install Hardware **$2,500 - $3,000**

Item 9. Additional Services as requested **T&M**
See attached rate sheet.

Suggested Budgetary Price for Office Tower (by District) **$5,000 - $6,000**
80' Texas Tower HD8-80 and Accessories
(Plus Engineering, Permits, Concrete Foundation, and Field Installation)

Total: **$178,500 - $200,000**

Phase 2:

Item 10. Communication Tower RTU (per each) **$7,500 - $8,500**
Includes equipment fabrication, shop configuration, shop initial testing and delivery. Installation, final configuration and system testing located in next item.

Item 11. Single Meter RTU Site (per each) **$1,750 - $2,250**
External Power Adder (if required) - $700ea
Includes SignalFire based Meter interface equipment and delivery.

Item 12. RTU Gateway (per each) **$3,250 - $3,750**
Solar Power Adder (if required) - $700ea
Includes combination SignalFire Gateway and radio equipment and delivery.

Item 13. Additional Site Integration **T&M**
See attached rate sheet.

Item 14. Additional Services as requested **T&M**
See attached rate sheet.

Notes:

1. Pricing is based upon SC standard California wage rates without consideration for Prevailing Wage or Davis-Bacon wage requirements.
2. No permits or bonds are included.
3. Pricing does not include any local or state business license fees that may be applicable.
4. Taxes are not included in the proposal pricing. All applicable taxes will be added at time of order unless a valid CA Tax Exempt Certificate is provided.
5. All trenching, conduit, wires, and wire pulls to provide power to the RTU sights shall be existing or supplied and installed by others.
6. All wiring terminations to be by others.
7. HMI Computer system will require a Static IP address provided by the district's ISP.
8. Additional radio path surveys may be required to solve site specific communication needs.
9. DPWD to provide field monitoring instrumentation, radio antenna masts, and installation, U.N.O.
10. DPWD to provide and connect primary power to each RTU.
11. RTU's to mount to existing concrete structures.

DELIVERY: As Scheduled
TERMS: NET 30
FOB: CARSON CITY, NV
THIS ESTIMATE IS VALID FOR 60 DAYS.

RESPECTFULLY SUBMITTED,
SIERRA CONTROLS, LLC

BY _____
Danny Hunsaker, P.E., General Manager

Appendix B
Letters of Intent

DeEscobar Ranches, Inc.
P.O. Box 326
Crows Landing, CA 95313

John Escobar Farms
P.O. Box 126
Crows Landing, CA 95313

January 4, 2016

Mr. Adam Scheuber, Water Operations & Resources Manager
Del Puerto Water District
PO Box 1596
Patterson, CA 95363

SUBJECT: Del Puerto Water District Remote Flow Monitoring Project Phase I

Dear Adam,

Thank you for informing me about the remote flow monitoring project and the potential benefits it will have for water use management on my property in Del Puerto Water District. Based on the information you have provided, I believe that this project will complement and improve our ability to irrigate efficiently and conserve water. Having access to real-time flow data will allow our operation to more accurately schedule water use to minimize overages.

We understand the importance of conserving water, not just in these drought years but at all times, and have been evaluating tools that would assist us in reducing our water usage. The project would provide us with very useful information and we would be excited to participate in the first phase.

Sincerely,

John Escobar

Perez Farms
P.O. Box 97
Crows Landing, CA 95313

January 13, 2016

Mr. Adam Scheuber, Water Operations & Resources Manager
Del Puerto Water District
PO Box 1596
Patterson, CA 95363

SUBJECT: Del Puerto Water District Remote Flow Monitoring Project Phase I

Dear Adam,

Thank you for informing me about the remote flow monitoring project and the potential benefits it will have for water use management on my property in Del Puerto Water District.

The Phase One component of this project will include 1342 acres of Perez Farms. Crops grown in the Phase One area include almonds, walnuts, processing tomatoes, cantaloupes, and beans. Based on the information you have provided, I believe that this project will complement and improve our ability to irrigate efficiently and conserve water. Having access to real-time flow data will allow our operation to more accurately schedule water use to minimize overages.

We understand the importance of conserving water, not just in these drought years but at all times, and have been evaluating tools that would assist us in reducing our water usage. The project would provide us with very useful information and we would be excited to participate in the first phase.

Sincerely,

Kyle Perez

Appendix C
Official Resolution

Del Puerto WATER District
P.O. Box 1596 Patterson, CA 95363-1596
Phone (209) 892-4470 • Fax (209) 892-4469

RESOLUTION AUTHORIZING AN APPLICATION TO THE BUREAU OF RECLAMATION'S WATERSMART: WATER AND ENERGY EFFICIENCY GRANT PROGRAM FOR FY2017

WHEREAS, the District desires to implement a remote flow monitoring system to allow for real-time, accurate flow tracking of water use throughout its service area to accomplish the water conservation and measurement goals of its Water Management Plan, and desires to obtain a grant from the Bureau of Reclamation's WaterSMART Program for Phase I of such purposes.

NOW, THEREFORE, BE IT RESOLVED, as follows:

1. That, after review, the Board approves of the technical proposal titled "Del Puerto Water District Remote Flow Monitoring Program Phase I".

2. That the District submit an application to the Bureau of Reclamation for a grant to be funded from the WaterSMART: Water and Energy Efficiency Grant Program for FY2017, for the aforementioned proposal.

3. That the District provide the additional funding specified in the funding plan of the proposal.

4. That the District will work with Reclamation to meet the established deadlines for entering into a cooperative agreement.

5. That Adam Scheuber, Water Operations and Resources Manager for the District, is hereby authorized and directed to sign and file such application with the Bureau of Reclamation.

BE IT FURTHER RESOLVED:

That Anthea G. Hansen, General Manager of the District, is hereby authorized to execute the resultant grant funding agreement, and any amendments thereof, for the purpose of securing grant funds.

PASSED AND ADOPTED this 16th day of January, 2017 at a special meeting of the Board of Directors.

Ivan E Bays
Ivan E, Bays, President

Attest:
Anthea G Hansen
Anthea G. Hansen, Secretary

* *

I HEREBY CERTIFY that the foregoing is the resolution of said District as duly passed and adopted by said Board of Directors at a meeting thereof duly called and held on this 16th day of January, 2017.

Anthea G. Hansen

Anthea G. Hansen, Secretary

Appendix D

Letter of Support from San Luis Delta-Mendota Water Authority.

January 11, 2016

Mr. Adam Schueber
Del Puerto Water District
PO Box 1596
Patterson, CA 95363

Subject: DMC Turnout Flow Measurement Project

Mr. Scheuber:

This letter is to voice our support to your proposed remote flow monitoring project. This project is very closely related to a project that the San Luis & Delta-Mendota Water Authority (Water Authority) has budgeted for next fiscal year. The Water Authority has a multiple phase project titled 'DMC Turnout Flow Measurement' and phase 1 is scheduled to begin in March of this year. Phase 1 is to develop a flow measurement improvement strategy for the low volume and high volume turnouts on the Delta-Mendota Canal where we are experiencing measurement reliability issues. Just like Del Puerto Water District (DPWD), the Water Authority has plans to update our flow measuring systems in order to better manage water usage. It is imperative that every drop of water be accurately accounted for. It will be advantageous for the Water Authority and DPWD to work together as both projects move forward in order to provide the most functional system without duplicating work. Many details will need to be worked out, but we look forward to collaborating with DPWD in the future as we work toward a common goal.

If you should have any questions, please don't hesitate to contact me at (209) 832-6221.

Sincerely,

Jaime McNeil, P.E.
Associate Civil Engineer
San Luis & Delta-Mendota Water Authority

15990 KELSO ROAD

BYRON, CA

94514

209 832-6200

209 833-1034 FAX