

WaterSMART Grant: Small-Scale Water Efficiency Project

Installation of 31 SL3-Lite Radios and SDR-001-1SD Data Loggers on Flow
Measurement Devices

Applicant:
Truckee-Carson Irrigation District

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TABLE OF CONTENTS

| | |
|-----------------------------------------------------------------------------------------|-------|
| Title Page | 1 |
| Table of Contents..... | 2 |
| Technical Proposal and Evaluation Criteria | |
| Executive Summary..... | 3 |
| Project Location..... | 3 |
| Project Description..... | 3-4 |
| Evaluation Criteria..... | 4-9 |
| Project Budget | |
| Funding Plan and Letters of Commitment..... | 9 |
| Budget Proposal..... | 9 |
| Budget Narrative..... | 9-10 |
| Environmental and Cultural Resources Compliance..... | 10-11 |
| Required Permits or Approvals..... | 11 |
| Official Resolution..... | 11 |
| Appendix A- Estimated Water Saving Table and Map of Meter Locations..... | 12-13 |
| Appendix B- Water Releases Lahontan Reservoir 2020 | 14 |
| Appendix C- Goal Area D: Measurement, Accounting and Reporting..... | 15 |
| (Strategic Plan of Contract No. 07-07-20-X0348 Newlands Federal Reclamation Project) | |
| Appendix D - Water Right Holders served by Project..... | 16 |
| Appendix E - Photos of Meter Installations..... | 17 |

TECHNICAL PROPOSAL AND EVALUATION CRITERIA

Executive Summary

- Date: April 27, 2022
- Applicant Name: Truckee-Carson Irrigation District
- City: Fallon
- County: Churchill
- State: Nevada
- The applicant, Truckee-Carson Irrigation District (TCID or District), is a Category A applicant. The District is an irrigation district and is a political subdivision of the State of Nevada. TCID operates and maintains the Newlands Federal Reclamation Project under contract with the United States, Bureau of Reclamation, and Lahontan Basin Area Office (Contract No. 7-07-20-X0348-X).

This proposed project will take place in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (Project). The work to be completed will be to install SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at thirty-one (31) sites within the Project and will provide monitoring of real time conditions which will result in water savings through better water management.

Most of the installation can be completed whether or not there is water flowing in the Project. We anticipate programming and installation will take approximately twenty-one (21) man-hours per meter. The installation phase of the project is estimated to take approximately one (1) year to complete, commencing January 31, 2023 and ending on or before January 31, 2024.

The entire project will take place within federal facilities located in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (Project).

Project Location

This proposed project will take place in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (District). There are currently 193 meters located throughout the District. **Appendix A** includes a map of the locations of the current meter sites. This proposed project includes the installation of SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at thirty-one (31) of the existing meter sites located in the Carson Division.

Project Description

The work to be completed will be installation of SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at thirty-one (31) sites within the District. The planned project is to install each water meter box structure according to the following requirements.

- Purchase new equipment.
- Program each of the SatLink 3 Lite Radios and SDR-001-1SD Data Loggers with GPS coordinates for each of the selected sites.
- Install SatLink 3 Lite Radios and SDR-001-1SD Data Logger hardware and GOES-YAGI antennas in each of the thirty-one (31) water meters using schematics provided from the manufacture. Tools used to install the units are basic hand tools and a cutting torch for those performing the labor.
- Connect new equipment to the existing solar panels.
- Download or check meter data from the GOES website to verify connectivity.

Evaluation Criteria

Evaluation Criterion A – Project Benefits

This proposal to install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at thirty-one (31) meter sites will allow the District to manage the water delivered to the 210 farms served by these meters more efficiently and reduce spills, while using renewable energy to power the SatLink 3 Lite Radios and SDR-001-1SD Data Loggers. This makes the flow meter project “self-supporting” as it applies to energy.

Installing this new technology will allow the District to monitor water deliveries and flows within an hour of the delivery. The benefits of this project are to enhance our current bi-monthly manual data retrieval system and transform it into a near real time data acquisition system using the GOES 17 satellite and NOAA systems, as well as our own retrieval and decoding systems, and have data available to very quickly notify us as to the status of water flow in any particular part of the system.

We currently have 127 meters connected to GOES by this same method with not only gains in efficiency, but also durability with downtime of .02 of 1% loss of data due to unforeseen circumstances.

The installation of SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at the water meter will reduce spills or over deliveries and ultimately the amount of water released from Lahontan Reservoir. Last water year, it was calculated that the District had 18,665 acre feet spill over 102 meters in the Carson Division. This figure was calculated using the amount of water measured over the meter when there were no orders. This calculation can only be done after the water season or long after anything can be done to correct it. Installation of the SatLink 3 Lite Radios and SDR-001-1SD Data Loggers will allow the District to see the meter data once every hour. This is invaluable in helping the District analyze the data in the big picture to determine the efficiency of a specific delivery system and the timing of deliveries on that system that would significantly reduce the losses from spilling.

The metered data is currently downloaded after the delivery, most times after several deliveries on the same lateral. A District employee drives to the meter and downloads the data onto a card that is brought back to the office and loaded onto a computer. The time

lapse between delivery and download can be as much as a couple of weeks or more. The employee that currently analyzes the data must await downloads to come in and analysis is forestalled with delay in data retrieval. There is no time to manage and analyze the data to account for inefficiencies. Moreover, no method exists to know when water is being over-delivered and/or spilled until the end of the year. A graph is included herewith depicting all the water released from Lahontan Reservoir in 2021. See **Appendix B**.

The increased reliability gained from this project will come as a result of the shortened time-frame in discerning delivery system activity and flow analysis for spill reduction - as well as expedited analysis for charging deliveries, and reporting on those deliveries, than the quantity of water across the measurement device. Ultimately, the basis and true benefit of this project is quicker response to delivery volume, spillage, and theft of water from near real time monitoring and alerting. Better monitoring means being more reactive to situations that we currently have no control over, including being alerted of potential over delivery, spillage or theft. More efficient delivery through improved water measurement means more water in Lahontan Reservoir, resulting in less water being diverted from the Truckee River with which to establish the water supply for the Carson Division of the Newlands Project.

With the SatLink 3 Lite Radios and SDR-001-1SD Data Loggers, record of each delivery will be received an hour from when a water delivery begins and ends to insure that the water orders are accounted for accurately and quickly. Water management will be more efficient with the ability to apply the delivery to the water user's allocation immediately after delivery. This enables the water user to manage his water with greater efficiency. Thus benefits accrue to the water user, the District, and the entire community.

The average annual acre-feet in a normal, to above average run-off from Lahontan Reservoir is 300,000 acre-feet. Last year 288,265.72 acre feet of water was released from Lahontan Reservoir. The amount of releases from Lahontan in a 100% year is between 280,000 and 290,000 acre feet. Of those releases about 107,909 acre feet are needed to meet the demands for deliveries that use the thirty-one (31) water meters selected for this project. With a savings of just 26.54% of the 11,582.06 acre feet that was spilled over the water meters in 2021, that would leave that much more stored in Lahontan Reservoir and that much less water that would be supplemented from the Truckee River off the Truckee Canal.

This project to install SatLink 3 Lite Radios and SDR-001-1SD Data Loggers will provide the above-mentioned water savings through better water management through monitoring of real time conditions. The water savings were determined by comparing the amount of water that flowed over the water meters shown in **Appendix A** without any water orders in the system. **Appendix B** depicts a graph that accounts for all the water for the 2021 water season.

The ability to download the flows across the meters at any time, through internet access, such as during actual water delivery or at any time when there is water flowing over the

meter, will allow the District to make corrections before the end of the year, and most certainly closer to the time when the spill occurs.

Water savings, made possible by this project, can be determined by the use of the same spreadsheet (**Appendix A**) that was provided in support for the water savings stated herein above.

Improved water management is the ultimate purpose of this project through the installation of SatLink 3 Lite Radios and SDR-001-1SD Data Loggers. Again, the amount of water that was released from Lahontan Reservoir in 2021 was 288,265.72 acre feet. Of that, the total allocation that was allowed for the water users serviced by the thirty-one (31) selected water meters was approximately 31,917.15 acre feet. This is 11.07% of the total water released from Lahontan in the 2021 water season, using the following formula:

Estimated Amount of Water Better Managed = Percentage of Water Better Managed

Average Annual Water Supply (based on normal, to above average run-off)

$$31,917.15 \text{ acre feet} / 288,262.72 \text{ acre feet} = 11.07\%$$

Using the figure calculated in the section above of approximately 11,582.06 acre feet being reduced in releases as a result of this project, the percentage of conserved water relative to total water supply is 4.02%. This number seems insignificant but combined with more efficiently managed water, the use of renewable energy, and the reductions in fossil fuel use, the benefits outweigh the amount of water conserved.

$$11,582.06 \text{ acre feet} / 288,262.72 = 4.02\%$$

Evaluation Criterion B – Planning Efforts Supporting the Project

The District's current 25 year contract with the United States Bureau of Reclamation to operate and maintain the Newlands Federal Reclamation Project commenced January 2022. The new contract includes a Five Year Strategic Plan. The purpose of this Strategic Plan is to collaborate with the Bureau of Reclamation in serving the communities within the Newlands Project by maintaining the conveyance system and maximizing available water supply for all beneficiaries of the Project and its stakeholders. The Strategic Plan identifies Measurement, Accounting and Reporting (Goal Area D), **Appendix C**, as a way to increase operational efficiencies. The following objectives are listed in this goal area and this proposed project will help the District work toward meeting these objectives.

- Increase the percentage of more accurate and timely submitted reports.
- Increase the accuracy and timing of water card delivery.
- Maintain an accurate accounting of water measurement.

While a new contract is in effect with Reclamation (No. 7-07-20-X0348-X), provisions made a part of the past contract remain relevant, such as the following:

Pursuant to the Contract, the District continues to develop the water measurement program, in order to achieve compliance with the Operation and Maintenance Contract, OCAP, and applicable Decrees. Significant improvements in the water measuring facilities and the actual taking of water measurements have been instituted.

Heretofore, the District and Reclamation, in collaboration with Cal Poly's ITRC, produced an alternative water measurement program as provided for in Article 11 (b)(2) of the O&M Contract to become part of the Water Conservation Plan (Plan). The Board of Directors adopted the ITRC's recommendations in the 2010 Plan on December 7, 2010. The District continues to rely upon the elements of the ITRC Report.

Because the Newlands Project was designed and constructed without measuring devices, the District has installed measuring devices throughout the Project, taking into consideration unique conditions found at specific sites. The rated sections are calibrated by current meter measurements at least once a year. Sites with recorders are visited every two weeks. For purposes of this Plan, the level of accuracy for all such devices is generally accepted at plus or minus 10 (ten) percent of the total volume delivered.... Devices such as ramp flumes, Parshall flumes, metered gates, trapezoidal flumes, acoustical meters, among others, have been and continue to be used where practicable.

The ITRC Report indicates that the degree of accuracy of the existing measurement program is unknown because of the wide range of factors that are present on the Project. The report recommends that the accuracy of all measuring devices be verified to determine if modifications need to be made. The District is committed to following the Cal Poly report in order to determine the accuracy of existing measuring devices and to repair, modify or replace those that are not providing accurate information.

Accurate and continual water measurement is, and must be, a priority for the Newlands Reclamation Project as indicated in the current contract with the Bureau of Reclamation and the Operational Criteria and Procedures for the Newlands Federal Reclamation Project, Nevada (OCAP). See 45 C.F.R. Part 14. The expected benefits from the new technology proposed by this project are supported by current and future plans, contracts and decrees that govern the activities of the District. This project supports 231 water right holders in the Newlands Federal Reclamation Project. See **Appendix D**.

Evaluation Criterion C – Evaluation Criterion C-Project Implementation

Installation is scheduled to begin January 31, 2023, and be completed by January 31, 2024. Because this project involves meter stations that are already in place, no

requirements exist to obtain permissions, permits, cultural or environmental compliance for the project as a whole or for the individual water meter structures. This project simply entails replacing outdated equipment with new equipment at each site.

Following is the outline of the District's plan to install each water meter box structure:

- Program each of the Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers with GPS coordinates for each of the selected sites.
- Install SatLink 3 Lite Radios and SDR-001-1SD Data Logger hardware and GOES-YAGI antennas in each of the thirty-one (31) water meters.
- Connect existing solar panels to the new equipment.
- Download or check meter data from the GOES web site.

The project will be monitored and managed with the use of Microsoft Excel 2010. This would allow the District to provide regular and timely reporting to meet the requirements of the grant as well as Reclamation.

No engineering or design work will be performed in support of this project. Manufacturer's electrical schematics are included with each unit when purchased. Also, critical experience has been gleaned from prior GOES installation projects allowing the District to move forward immediately with installation and test contemplation.

There will be no new policies required to implement this project. Administrative action includes approval of the grant application by the Board of Directors.

This proposed project will not impact the surrounding environment. No earth-disturbing work will be required for this project as all sites currently exist. We do not foresee whatsoever any individual or cumulative significant environmental effect or impact made pursuant to application of the National Environmental Policy Act (NEPA).

For a visual depiction of a typical installation performed at existing water meter boxes, see **Appendix E**.

Evaluation Criterion D – Nexus to Reclamation

The District has been under contract with the Bureau of Reclamation for the Operation and Maintenance of the Newlands Federal Reclamation Project since 1926. A new contract is now effective as of January 1, 2022. In addition to the items listed in Evaluation Criterion A-Project Benefits which discusses some benefits of the proposed project that will help the District collaborate with the Bureau to reach goals of the Strategic Plan, the proposed project has the potential to benefit other entities as well.

This project can and will benefit the Pyramid Lake Tribe and the Fallon Paiute-Shoshone Tribe (FPST) through timely response to more timely data. Water saved through efficiency gains through near real time data will put more water into the Lahontan Reservoir. This will benefit the FPST. This will allow water for additional irrigated acres as defined in Public Law 101-618. ensuring that the FPST will have more water in water

short years with fewer diversions from the Truckee River into Lahontan Reservoir, resulting in a storage gain in Pyramid Lake.

PROJECT BUDGET

Funding Plan and Letters of Commitment

Funding for this project will be obtained through the District’s General Fund. The District will not rely on any third-party funding sources for this project and no letters of commitment are here submitted or required. The District will not incur any costs for this project prior to award.

Budget Proposal

Total Project Cost

| SOURCE | AMOUNT |
|-----------------------------------------------------------|---------------------|
| Costs to be reimbursed with the requested Federal funding | \$100,000.00 |
| Costs to be paid by the applicant | \$120,717.00 |
| Value of third-party contributions | \$0.00 |
| TOTAL PROJECT COST | \$220,717.00 |

| BUDGET ITEM DESCRIPTION | \$/Unit | Quantity | Quantity Type | TOTAL COST |
|--------------------------------------|------------|----------|---------------|---------------------|
| Salaries and Wages | | | | |
| Project Manager | \$35.00 | 248.00 | Labor | \$8,680.00 |
| Meter Technician | \$22.00 | 248.00 | Labor | \$5,456.00 |
| Meter Technician | \$18.00 | 248.00 | Labor | \$4,464.00 |
| Fringe Benefits | | | | |
| Full-Time Employees | \$50.00 | 248.00 | Fringe | \$12,400.00 |
| Equipment | | | | |
| Truck 332 | \$20.00 | 248.00 | Rental Rate | \$4,960.00 |
| Truck 38 | \$18.00 | 248.00 | Rental Rate | \$4,464.00 |
| Truck 718 | \$18.00 | 248.00 | Rental Rate | \$4,464.00 |
| Supplies and Materials | | | | |
| Sutron SL Lite | \$2,956.00 | 31.00 | Materials | \$91,636.00 |
| Sutron SDR-0001-1SD | \$2,023.00 | 31.00 | Materials | \$62,713.00 |
| Miscellaneous Parts | | | Supplies | \$21,080 |
| Other | | | | |
| Other | | | | N/A |
| TOTAL DIRECT COSTS | | | | \$175,429.00 |
| Indirect Costs | | | | |
| Type of rate | Percentage | \$base | | \$400.00 |
| TOTAL ESTIMATED PROJECT COSTS | | | | \$220,717.00 |

Budget Narrative

The District’s Systems and Technologies Manager is the Project Manager for this project. Two staff will support the manager. The hourly wage rates for each employee are the actual labor rates paid to the employees performing work on this project. Fringe benefits are listed separately.

Equipment will include use of District owned vehicles and tools.

All work to be performed on this project will be completed by employees of the District and not by an independent contractor.

There will also be minimal administrative support for reporting duties. The cost for this support is included in indirect costs.

| Task | Name | Title | Hourly Wage | Benefit per Hour | Estimated Hours |
|-------------------------|---------------|------------------|--------------------|-------------------------|------------------------|
| Purchase new equipment | Michael Adams | Project Manager | \$35.00 | \$20.00 | 25 |
| Program GPS coordinates | Michael Adams | Project Manager | \$35.00 | \$20.00 | 18 |
| Installation | Michael Adams | Project Manager | \$35.00 | \$20.00 | 190 |
| Installation | Jay Kearney | Meter Technician | \$22.00 | \$16.00 | 233 |
| Installation | Rachel Enox | Meter Technician | \$18.00 | \$16.00 | 233 |
| Connect to Solar | Jay Kearney | Meter Technician | \$22.00 | \$16.00 | 15 |
| Connect to Solar | Rachel Enox | Meter Technician | \$18.00 | \$16.00 | 15 |
| Check meter data | Michael Adams | Project Manager | \$35.00 | \$20.00 | 15 |

Environmental and Cultural Resource Considerations

The proposed project will not impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat). No earth-disturbing work will be required for this project.

We are nor 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. No wetlands will be impacted.

Construction of the water delivery system began in 1903. Although there are historical sites located within the Newlands Federal Reclamation Project, the proposed project will not result in any modification of, or effects to, individual features of an irrigation system (e.g., head gates, canals or flumes), no buildings, structures, or features are affected by creation or installation of this project. There are no known archeological sites in the proposed project area.

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

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

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

Require Permits or Approvals

No Permits or approvals are required. This project does not result in individual or cumulative significant effects or impacts within the meaning of the National Environmental Policy Act (NEPA), nor does the project constitute a substantial change as defined by contract 7-07-020-X0348-X, effective January 2022, for the operation and maintenance of the Newlands Federal Reclamation Project. This project consists of improvements to be made to existing facilities only!

Approval by Governing Body for District

Formal approval by the governing body for the Truckee-Carson Irrigation District will follow on May 3, 2022.