

# Lake Chelan Reclamation District

PO Box j, Manson, WA 98831-1043

509-687-3548

## FLOW METER REPLACEMENT

### Replace Propeller Meters Having Analog Readouts with Electromagnetic Meters Having Automated Meter Reading Readouts

*Eligible Project Category: Irrigation Flow Measurement  
(per Funding Opportunity Announcement No. BOR-DO-17-F011 Section  
C.3.1)*

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## EXECUTIVE SUMMARY

April 25, 2017  
Lake Chelan Reclamation District  
Chelan County  
PO Box J  
Manson, WA 98831-1043

The Lake Chelan Reclamation District (District) is submitting this WaterSMART grant application to seek financial assistance for its plan to replace approximately 104 old propeller-style water meters currently beyond their 15-year expected operating life. The new meters will be equipped with digital encoders and transmitters that will radio meter data to a data collector. An employee using the data collector will be able to gather data from all meters at only two or three locations. This Automatic Meter Reading System (AMR) meter replacement and upgrade project will result in improved water management through increased water measurement accuracy and efficiency and will save labor and reduce fuel costs by eliminating the need to visit each meter location. The granted funds would be used to purchase and install the meters with existing District staff. The replacement of the District's approximately 549 large meters is identified in Section 6.3 of the District's *2017 Comprehensive Water Conservation Plan*, which is scheduled to be approved in May 2017 upon completion of SEPA, as a primary opportunity to increase water measurement accuracy and conserve energy. The District plans to implement the project over the course of several years, with an estimated completion date for this phase (104 meters) of April 30, 2018. The remaining large meters will be replaced in future years under a separate project.

The District is a federal reclamation project within the Chief Joseph Dam Project of the United States Bureau of Reclamation's (Reclamation) Pacific Northwest Region. This grant application is submitted pursuant to Funding Opportunity Announcement No. BOR-DO-17-F011, Section C.3.1: Irrigation Flow Measurement.

## BACKGROUND DATA

### *Description of the District*

#### **General Information and History**

The Lake Chelan Reclamation District (District) is located in Chelan County, Washington. The District serves lands from the community of Manson to the City of Chelan on the north shore of Lake Chelan. The District was formed in 1920 by acquiring the assets of the Lake Chelan Water Company. Assets at the time included approximately 6,860 acres of land, of which 4,359 were classed as irrigable but only 1,198 of those acres were being irrigated at the time. The assets also included a 14-mile collection system from Big Grade Creek to the Antilon Reservoir (no longer in use) and a partially completed distribution system and the Wapato Lake Reservoir.

During the years between 1920 and 1940 the District accumulated considerable debt to expand and complete the system. The District had to overcome periods of drought and the necessity to rebuild sections destroyed by fire.

In 1955, U.S. Bureau of Reclamation (USBR) was asked to investigate the expansion and rehabilitation of the District. The application to be part of the Chief Joseph Dam irrigation project was authorized by Congress in 1966. In June of 1969 the first appropriation for construction was approved by Congress for the pumping and storage facilities alternative, with the contract between the District and USBR signed in April of 1971. The irrigation system is owned by the USBR and the District is its operating agent. The total project cost for the system was \$18,778,000, with completion occurring in 1975.

The current system includes 73 miles of pipeline in the distribution system, together with 10 miles of drains, 13 pumping plants, and 13 reservoirs. A total area of 6,336 acres can be contractually served by the irrigation system. (**Vicinity Map** attached).

## **PROJECT DESCRIPTION**

### *Flow Meter Conversion and Upgrades*

The District is in the process of adopting the current *Comprehensive Water Conservation Plan (WCP)*. The following are excerpts from Chapter 6 of the WCP describing the District's long-range plans regarding flow meters:

#### *6.3 Opportunities for Improvements - Structural*

##### ***"Meter Improvements***

*Rehabilitating irrigation meters on a continuing program will maximize control of the District's water. Meter replacement should be scheduled on a 15-year rotation. Accurate water measurement is an important feature in overall water management.*

*There are approximately 282 large (2inch, 3 inch, 4inch, and 6inch) original mechanical meters that need to be replaced due to wear and inaccuracy... Meters this large are expensive, and the District is pursuing a water efficiency grant to help with the cost of replacement."*

The District has identified that the large propeller-style meters are a large source of inaccurate water measurement, continually under estimating the amount of water delivered and thus under billing the water users and leaving the District continually short on funding.

Approximately 282 large (greater than 3-inch) meters, along with another 267 2-inch meters, have been identified as needing to be replaced within the 2017 WCP. Of which 104 are planned to be replaced as part of this project. It is expected these meters can be replaced within a year.

Besides being more accurate than the existing meters the AMR meters transmit meter data by radio where it can be read by an employee using a data collector at a few strategic points within the District. This system will provide the future opportunity to add radio relay sites that can relay the meter data from the data collection points to the District's supervisory control and data acquisition (SCADA) system.

The District plans to acquire the software and hardware necessary to read and record the meter data as Phase 2 of the project. A portable device receives the meter readings that are encoded in radio signals. This will provide an immense labor savings compared to the current situation where an employee must visit each meter location every month. After the meter replacement is complete, monthly data collection may be performed by a single employee (requiring less than a day to visit all

the data collection sites) or it may be assigned to a couple of employees who can visit the data collection sites located within their work area as they go about their normal duties. Either method will provide a significant increase in labor efficiency and will also eliminate most of the 200 miles of driving now required each month to visit each meter location.

Meter data collected is downloaded to this laptop and the integral software then processes the meter information for input to the District's water records and billing processes.

Each propeller meter will be replaced with a Badger Meter Turbo Series Models 200 (2"), 450 (3"), 1000 (4"), and 2000 (6") Flow Meter. These mechanical meters will totalize in acre-feet (af) with the instantaneous flow reading in cubic feet per second (cfs) or gallons per minute (gpm). The meter does not require an external alternating current (AC) power source. This capability is necessary because very few of the meters currently have AC power. The District has selected these Badger meters because they are field programmable and battery powered.

Each meter will be equipped with a Badger Meter Absolute Digital Encoder. This device encodes the meter data into a format compatible with the Trimble Ranger Data Collector and the ORION AMR Laptop.

Each meter will be equipped with a Badger Meter ORION transmitter. This radio transmitter broadcasts the meter data that has been encoded by the Absolute Digital Encoder to the Trimble Ranger Data Collector. This transmitter is battery powered and operates in a band width that does not require a Federal Communications Commission (FCC) radio license.

Replacing these meters will result in water better managed through increased efficiency and measuring accuracy.

## **TECHNICAL PROPOSAL EVALUATION CRITERIA**

### ***E.1.1. Evaluation Criterion A — Planning Efforts Supporting the Project (35 points)***

*Up to 35 points may be awarded based on the extent to which the proposed on-the-ground project is supported by an applicant's existing water management plan, water conservation plan, System Optimization Review (SOR), or identified as part of another planning effort led by the applicant.*

*Describe how your project is supported by an existing planning effort.*

- *Does the proposed project implement a goal or address a need or problem identified in the existing planning effort?*

**The District is in the process of completing its most recently updated WCP this spring (2017). Section 6.3 identifies the need for and the goal of replacing all existing meters that are past their usable lifespan with new meters with AMR and SCADA capabilities. That section of the WCP are reprinted in the opening pages of the PROJECT DESCRIPTION section. This AMR meter replacement and upgrade project will directly implement the goals of Section 6.3 of the District's 2017 WCP.**

- *Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to other potential projects/ measures.*

The WCP identified various other opportunities for improvements in addition to the District-wide programmatic meter replacement effort, but they consist of significant infrastructure upgrades to consolidate/replace/upgrade aging pump stations or reservoirs. The programmatic meter replacement effort reflects an easily achievable, but relatively high-payoff project that can readily be implemented and that will immediately result in benefits to the District. Upfront effort is relatively low compared to the more significant infrastructure upgrades also included in the WCP, as engineering and design efforts are minimal and the meters can be replaced with in-house labor and without onerous permitting.

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

*Up to 35 points may be awarded upon evaluation of the benefits that are expected to result from implementing the proposed project. This criterion considers a variety of project benefits, including improving the management of water supplies, the significance of the anticipated water management benefits, the public benefits of the project, and any expected environmental benefits.*

- *Describe the expected benefits and outcomes of implementing the proposed project.*
  - *What are the benefits to the applicant's water supply delivery system?*

This meter replacement project will result in water better managed through increased measurement accuracy and operational efficiency and save labor and reduce fuel costs by eliminating the need to visit each meter location. The primary benefit to the District is improved water management. The upgraded metering system with improved accuracy and automatic reading capabilities will allow the District to better quantify leakage and over-deliveries. New propeller-style meters typically have an accuracy of +/- 2 percent (source: Badger Meters, Inc.), while the District as estimated accuracy of +/- 8 to 10% within the existing meters, the new meters will be a four-fold increase in measurement efficiency over existing conditions. In addition, the ability to frequently review up-to-date metering data will allow the District to identify inefficiencies or other issues quickly so the District can respond appropriately.

- *If other benefits are expected explain those as well. Consider the following:*
  - *Extent to which the proposed project improves overall water supply reliability*
  - *The expected scope of positive impact from the proposed project (e.g., local, sub-basin, basin)*
  - *Extent to which the proposed project will increase collaboration and information sharing among water managers in the region*
  - *Any anticipated positive impacts/benefits to local sectors and economies (e.g., agriculture, environment, recreation, tourism)*

Once the AMR meters are in place District-wide, stationary data collectors at radio relay sites can be added in each of the three units to radio meter data directly to the District's SCADA server. This will be a final phase of this project and is not within the scope of this grant application. Prior to the meter conversion program, the District's meter reader drove about 50 miles per week reading meters. That works out to about 200 miles per month or 1,200 miles during the 6-month irrigation season. At a cost of \$0.56 per mile, this vehicle expense equates to about \$672 per irrigation season. This driving time and vehicle expense will be nearly eliminated once the entire AMR meter replacement and upgrade project is completed. The

project does have the potential to increase collaboration and information sharing among water managers in the region. Many of the District's orchardists use irrigation water management (IWM) techniques to accurately schedule crop irrigation needs based on meteorological conditions, soil moisture content, and agronomic need. This AMR meter system will have the capability to interface directly to the District's SCADA system, which could then provide real-time metering data to water users that would further enhance IWM irrigation scheduling. However, the District does not plan to make this interface to SCADA until after all meters have been replaced. This project will have only minor effects on water supply reliability and the local sectors/economies.

***E.1.3. Evaluation Criterion C — Project Implementation (15 points)***

*Up to 15 points may be awarded based upon the extent to which the applicant is capable of proceeding with the proposed project upon entering into a financial assistance agreement. Applicants that describe a detailed plan (e.g., estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates) will receive the most points under this criterion.*

- *Describe the implementation plan for the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.*

The District is currently capable and prepared to immediately start replacing meters. The District has included \$75,000 in its 2017 Construction Budget intended to be a 50 percent cost share for implementation. These funds are intended to enable the following implementation schedule:

- |                                 |                           |
|---------------------------------|---------------------------|
| ○ June 2017 –                   | Notice of award (assumed) |
| ○ August 2017 –                 | Funds awarded (assumed)   |
| ○ *August 2017 –                | Purchase meters           |
| ○ *September 2017 -April 2018 – | Install meters            |
| ○ April 2018 –                  | Project completion        |

\*These dates can be accelerated if funds are awarded earlier.

- *Describe any permits that will be required, along with the process for obtaining such permits.*

No permits are required. This project changes out existing plumbing components within existing facilities, all within existing facility footprints. Therefore, no environmental permits, local planning department permits, or building permits are anticipated.

- *Identify and describe any engineering or design work performed specifically in support of the proposed project.*

The District will perform all of its own engineering work on this project.

- *Describe any new policies or administrative actions required to implement the project.*

There are no new policies or administrative actions required to implement the project.

#### ***E.1.4. Evaluation Criterion D— Nexus to Reclamation (15 points)***

*Up to 15 points may be awarded based on the extent that the proposal demonstrates a nexus between the proposed project and a Reclamation project or activity. Describe the nexus between the proposed project and a Reclamation project or activity, including:*

- *How is the proposed project connected to a Reclamation project or activity?*
- *Will the project help Reclamation meet trust responsibilities to any tribe(s)?*
- *Does the applicant receive Reclamation project water?*
- *Is the project on Reclamation project lands or involving Reclamation facilities?*
- *Is the project in the same basin as a Reclamation project or activity?*
- *Will the proposed work contribute water to a basin where a Reclamation project is located?*

The District is part of Reclamation's Chief Joseph Project and was authorized by Congress in 1966. The District is within Reclamation's Pacific Northwest Region, Columbia-Cascades Area Office, Ephrata Field Office. A majority of the District's facilities were planned, designed, and constructed by Reclamation, and title to those facilities is held by the United States. The District and its water supply are within the Columbia River basin. The project is not expected to affect Reclamation's trust responsibilities to any Tribe(s).

### **ENVIRONMENTAL AND CULTURAL RESOURCE COMPLIANCE**

This AMR meter replacement and upgrade project will be changing out meters in existing facilities. All work will be within the existing footprints of existing facilities. No excavations or other site disturbances are anticipated. No local planning department or building permits will be required. As will be covered in the responses to the following questions, there will be no applicability of the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), or other federal or state environmental laws.

• *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.*

**No.** This project will be changing meters within existing pipe systems. Meters are located in existing shallow vaults. There will be no excavation or other site 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?*

There are no anadromous fish in Lake Chelan and no threatened or endangered species in the lake. There are species of salmon and steelhead within the Columbia River downstream the District's area that are listed as "threatened" under ESA. The District's operations are covered under an ESA Section 7 consultation known as the Federal Columbia River Power

**System Biological Assessment.** The District's ESA coverage thereunder is pursuant to Reclamation's coverage. This AMR meter project will take place away from the river and will not affect any endangered species.

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

**Yes, there are both surface waters and small wetlands within the general project boundary. However, the project will not disturb any soil not impact these waters/wetlands in any way.**

*• When was the water delivery system constructed?*

**Construction of the initial conveyance system began in 1906, rebuilt in 1971 and was generally completed in 1975.**

*• 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. This AMR meter project will be changing meters within existing pipe systems.**

*• 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.*

**None will be affected since this project will be changing meters within existing pipe systems.**

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

**Yes. However, none will be affected since this project will be changing meters within existing pipe systems.**

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

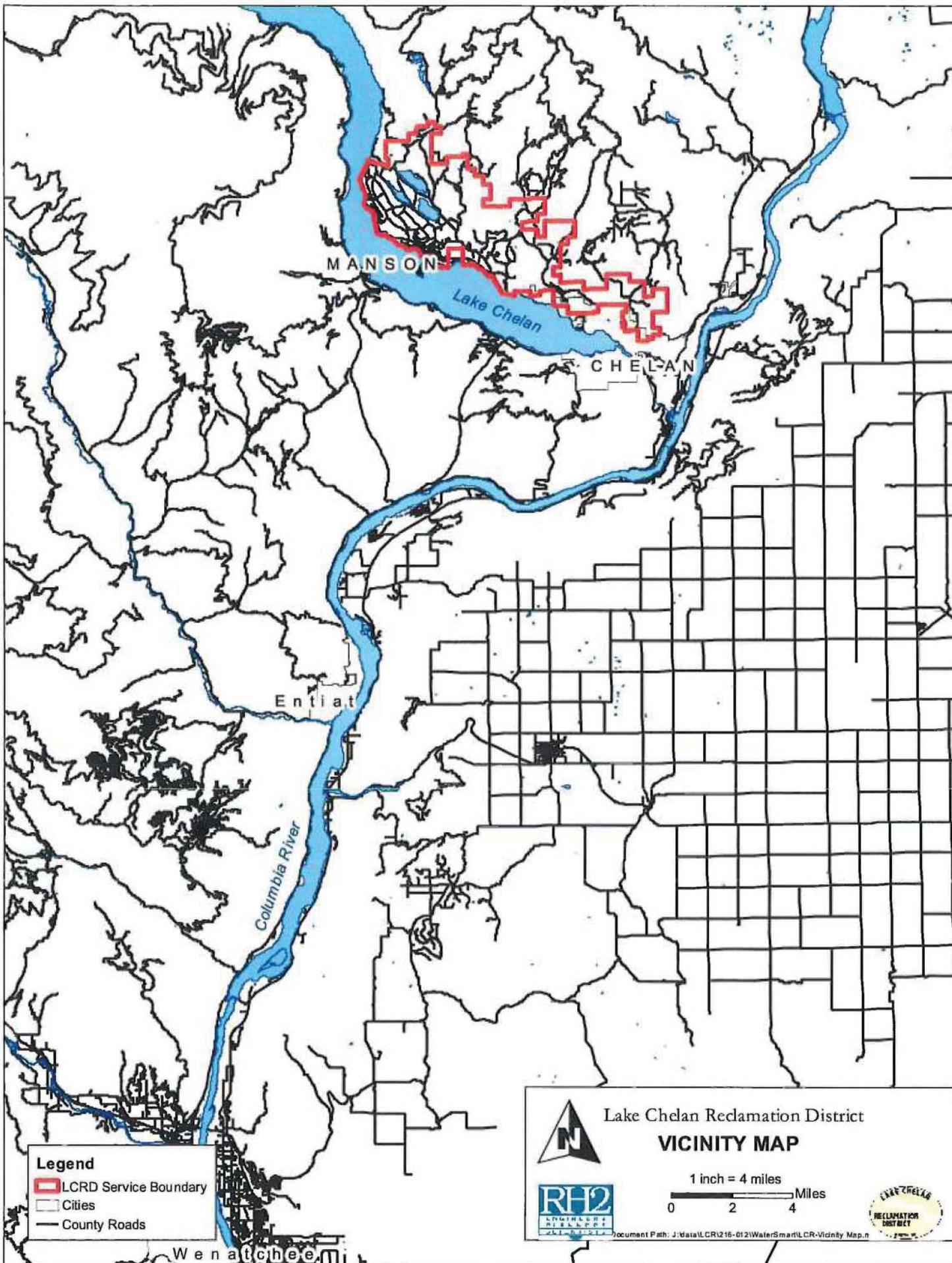
**There will be no effect since this project will be changing meters within existing pipe systems.**

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

**None will be affected since this project will be changing meters within existing pipe systems.**

*• 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. There will be no excavation or other soil disturbance since this project will be changing meters within existing pipe systems.**



LAKE CHELAN RECLAMATION DISTRICT

MANSON, WASHINGTON

**RESOLUTION 2017-03**

WATERSMART GRANT

THE BOARD OF DIRECTORS OF LAKE CHELAN RECLAMATION DISTRICT HEREBY RESOLVES AS FOLLOWS:

Secretary/Manager Rodney Anderson is hereby authorized to pursue WaterSMART Grant BOR-DO-17-F011. By adopting this resolution, the Board of Directors has designated Rodney Anderson as the appropriate official to pursue this grant.

The Board also confirms there will be matching funds available upon acceptance of this Grant. Upon adoption, LCRD agrees to work with Reclamation to meet all established deadlines for entering into a cooperative agreement.

Resolved this 21<sup>th</sup> day of April, 2017 by the Board of Directors.

APPROVED

By: Bob Christopher  
President

ATTEST

By: [Signature]  
Secretary-Manager