Improving Water Efficiency
For the Town of Vilas
by Updating Water Meters

Submitted by:
Town of Vilas
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Technical Proposal

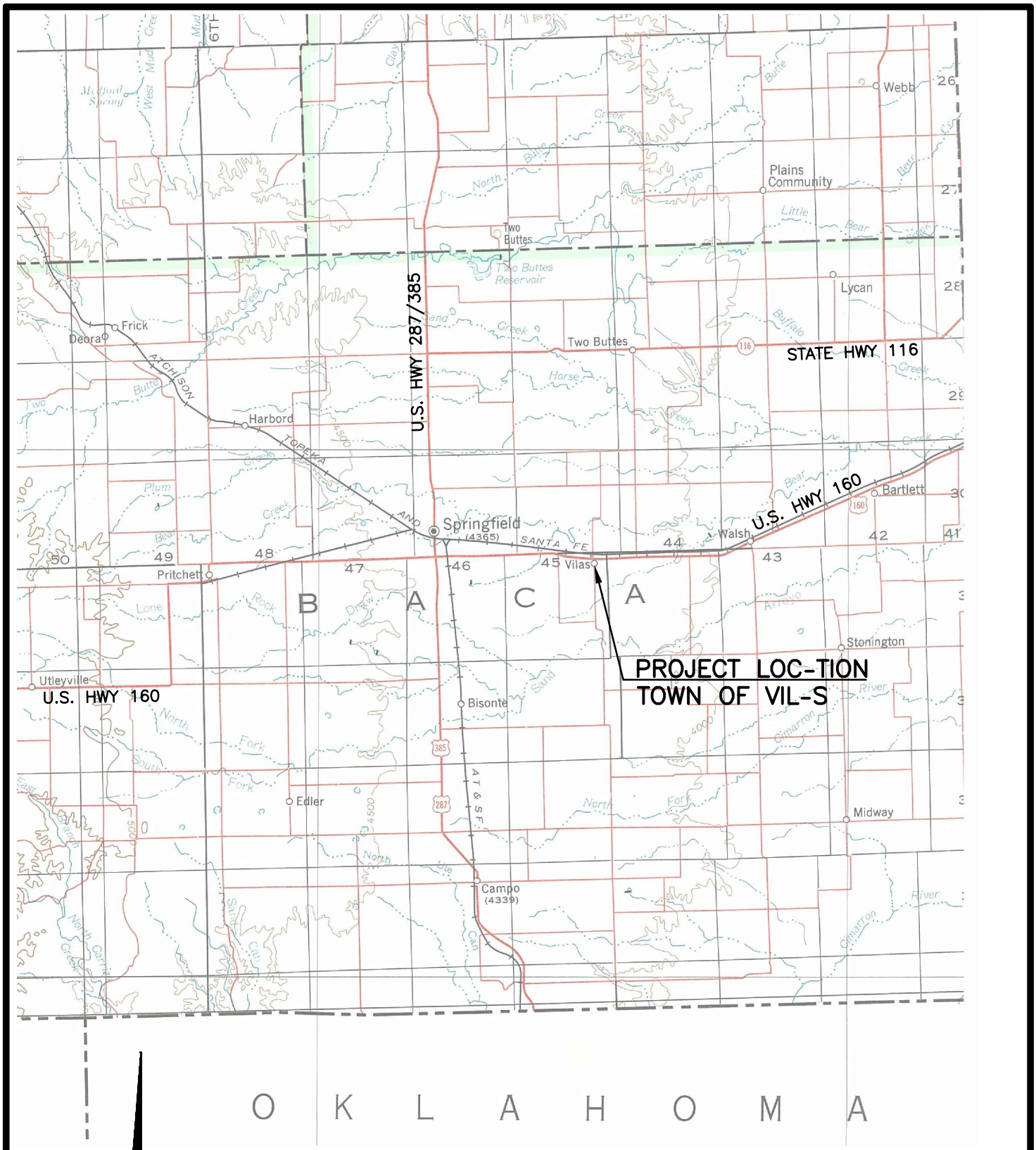
Executive Summary

January 5, 2024
Town of Vilas
Vilas, Baca County, Colorado
Category A Applicant

The Town of Vilas is located in the southeastern corner of Colorado. It lies within the central portion of Baca County in close proximity to the panhandle of Oklahoma to the south and Kansas to the east. The community of Vilas is approximately nine miles east of Springfield, Colorado and approximately 48 miles south of Lamar. This application to the Bureau of Reclamation will be a small project that is ultimately part of a larger water system improvement project: new radio-read meters, software to accompany the meters and a new tank level pressure switch. Replacing the existing meters with radio-based devices along with the tank level pressure switch will result in several benefits including improved accuracy of water usage reading, reduced man-hours, improved performance of meters, improved efficiency, reduced liability, and improved sustainability. These benefits will help to significantly reduce unaccounted-for-water loss in the system, gain efficiencies in meter reading and billing, and provide the ability to operate and monitor the water treatment plant and water storage tank. This project is in conjunction with another project and will take approximately 90 days. It is anticipated the project will be completed by March 31, 2025; additional time has been added to the schedule for potential delay in material acquisition.

Project Location

The Town of Vilas is located in the southeastern corner of Colorado. It lies within the central portion of Baca County in close proximity to the panhandle of Oklahoma to the south and Kansas to the east. The community is located approximately 9 miles east of Springfield, Colorado, which, in turn, lies approximately 48 miles south of Lamar. The Town lies to the south of US Highway 160. The Kansas state line is approximately 23 miles east of Vilas on US Highway 160. The project coordinates are 37.3747° N, 102.4474° W.



SC-LE: 1" = -PPROX. 8 miles

SOURCE: U.S. DEP-RTEMENT OF THE INTERIOR GEOLOGIC-L SURVEY TOPOGR-PHIC M-P

FIGURE 1.DWG

FIGURE 1
LOC-TION M-P
TOWN OF VIL-S

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLOR-DO SPRINGS, COLOR-DO 80903

SEPTEMBER 2023

Technical Project Description

The Town of Vilas (Town) has maintained and operated a central water distribution system since around the time of its incorporation in 1887. Potable water services are provided within and beyond the limits of the Town's existing corporate boundaries and currently has 73 accounts. The Town operates the water system under the rules and regulations established by the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (WQCD).

The Town's two groundwater wells are located within Town limits in the northwest corner of the community and were constructed in 1961 and 1975. As with the majority of the communities in eastern Colorado, the Town of Vilas derives its water supply from ground water sources. The Town currently has two ground water wells located in the northwest corner of the community. Ground water from the wells is drawn from the Cheyenne Sandstone Formation aquifer. Ground water in this region of the state is contained in the Southern High Plains Designated Ground Water Basin which is administered by the Southern High Plains Ground Water Management District (SHPGWMD) of the State Engineer's office. The Town's wells and water rights are adequate to meet current and future average day requirements; however, the Town's Well No. 2 fails to meet future maximum day scenarios when Well No. 1 is out of service. Water restrictions may be implemented during these emergency situations.

In 2003, the Town of Vilas completed a comprehensive Water System Improvements project. The improvements included extensive replacement of distribution system piping, valves and fire hydrants, a new storage standpipe, new ground water well pumps, and the installation of customer meters. A total of 73 meters and meter pits were installed. These consisted of 72 meters, 3/4-inch in size, and one 2-inch meter for the school. The new meter yokes were equipped with dual cartridge check valves to provide backflow protection. Curb stops were installed on several inactive services for future use. The meters are equipped with radio read transmitter which allows the operator to take meter readings simply by driving around. The meters are read monthly using a radio receiver data collector. The water use data is downloaded to the metering software and customer billings are then generated. The Town currently has 62 active accounts, seven inactive accounts, and four disconnected accounts. The Town's water meters are approximately 20 years old and are starting to fail; the Town cannot accurately track consumption data with these meters.

A Preliminary Engineering Report (PER) from December 2023, found that unaccounted-for-water loss was 22.1%. This can primarily be attributed to meter inaccuracies, pipeline leaks, and breaks in older line segments within the Town's distribution system, as well as other authorized and unauthorized water uses that are not metered. The American Waterworks Association (AWWA) recommends an unaccounted-for-water goal of 10% with proactive efforts taken to reach this goal. These efforts would consist of quantifying known usages as well as addressing areas of known pipe leakage.

The 2023 PER recommended improvements across the entire system to include:

- Water Treatment Plant Radium Compliance Improvements
  - Replacement of filter media
  - Installation of an additional evaporation tank for regeneration waste evaporation
- Water Distribution System Improvements

- Replacement of existing customer meters with automatically read meters and associated equipment and software.
- Well Control Improvements (new tank flow switch and pressure switch upgrades)
- Security (alarm on WTP door, fence around the storage tank, and temperature, flood, and smoke alarm in WTP)

This grant proposal to the Bureau of Reclamation is to replace all water meters and backflow prevention devices for both residential and commercial customers, including the compound meter at the community's school, and to acquire the appropriate software to manage the water meter data and billing. Water meter technology has changed drastically since their installation 20 years ago, preventing new meters from working with original software and old meters being unserviceable for parts. Even 10 years ago, the water meter technology changed enough that it was not possible to replace a single meter and keep compatibility with the metering software. Additionally, most turnkey systems incorporate an annual software fee of upwards of $2,500 annually. Small communities such as Vilas cannot afford this annual cost so a lower-annual fee-based option will be sought. There are a couple of different options available in the market for this. Additionally, this project also includes a tank level pressure switch. The tank level pressure switch will allow the Town to better operate and control the water tank levels and reduce tank overflows.

One recommendation in the 2023 PER to improve Vilas' unaccounted-for-water loss percentage is to install new radio-read meters at all customer locations, use a data management and billing system compatible with the smart devices, and install controls to minimize water loss. Specifically:

- 68 new meters including 5/8" x 3/4" meter, transmitter register and removal of existing meter. This will be bid to include the meter software and training.
- 1 new 1-1/2" meter for Town Park including dual check meter setter, 5/8" x 3/4" meter, radio transmitter register, removal of existing meter and setter, and connection to existing service line. This will be bid to include the meter software and training.
- 1 new 2" meter for School including radio transmitter register. This will be bid to include the meter software and training.
- 4 new 5/8" x ¾" meter and radio transmitter register for disconnected accounts, not to be installed
- Radio read data collection including equipment, software, and training.
- Tank level pressure switch

The existing meter pits will be utilized for the project. The existing meters will be removed and a new meter, pressure regulating valve, and backflow preventer will be installed. Additionally, the new transmitter will also be included. Minimal ground disturbance will be required since the exiting meter pits will be utilized.

The greatest challenge facing the Town in making the necessary water system improvements is funding. With a population of only 98, the Town does not have a substantial user base with which to draw ample revenue to pay for the improvements. The area population is steadily declining and while today there are 68 billable water meters, the sustainability of a small community like Vilas is to ensure reliable infrastructure.

The Town did receive the aforementioned SCG in the amount of $325,000 with a $25,000 match coming from the Town's Water Enterprise Fund. The match for this project will be the SCG which is a state funded grant. However, due to the inflationary effects on products and services as a result of COVID-19and the inflation that has since occurred, additional funds for this project are necessary.

Assisting the Town in this endeavor is GMS, Inc., Consulting Engineers. This firm will design, oversee and manage the overall project. This includes the administrative requirements for the funding being pursued for the project. GMS, Inc. has undertaken these types of projects since 1978 and has successfully performed these services on projects across the state. Given GMS, Inc.'s experience, expertise and professionalism, the Town is confident the project will be managed to the highest of standards.

This project will not begin until after the grant award and execution of other funding sources which is expected to be in October 2024 and the work will be completed by May 31, 2025. The construction is anticipated to only take 90 days; however, the construction industry is still experiencing material delays. Therefore, extra time has been added to the construction completion timeframe.

Evaluation Criteria

Evaluation Criterion A—Project Benefits (35 points)

Benefits to Applicant's Water Delivery System

Replacing the existing meters with radio-based devices will result in a number of benefits:

- *Improved accuracy of water usage reading* – unintended error while recording water usage will be eliminated at the point of reading the meter and manually entering the data for billing purposes. New meters will transmit water usage of each customer over a defined period, ensuring precisely recorded consumption while identifying anomalies in the system and helping to prevent customer fraud.
- *Reduced man-hours* - the data collection from each customer will automatically occur daily rather than manual meter reading once a month at the customer's location. Additionally, the turnkey system will not require the manual entering of the data for billing purposes. Additional man hours will be saved by installing a tank level switch to ensure that there are not tank overflows rather than a manual check to verify tank levels.
- *Improved performance of meters* – eliminating the need to open each pit to access the meters reduces potential for meter freezing in the winter months. Smart meters will alert the Town when a meter stops counting or loses efficiency.
- *Improved efficiency* – meter data will be downloaded directly into the water billing software and billing will occur automatically, reducing time and improving accuracy. This also allows each customer to be billed on their consumption making an equitable billing system. Additional improvements for system controls will improve the water system's efficiency by placing a tank flow switch and preventing tank overflows.
- *Reduced liability* – replacing meters will reduce the potential liability from completing manual reading of hard to reach meters.

- *Consequences of status quo* – If this project is not funded, the above items will not be realized. There will be no improvement in unaccounted-for-water loss, manual meter reading will continue, meter performance will continue to decline, and the risk of liability will climb over time.

Broader Benefits

The primary broader benefit of replacing the old meters with newer devices is to *improve sustainability*. With smart meters, the water supplier will have the advantage of quickly identifying anomalies in the system to repair leaks and breaks, prevent fraud and replace defective meters. This in turn will reduce water waste, thereby improving sustainability. Other modifications will also reduce water waste by allowing the Town to control the tank level. Colorado is chronically in drought conditions so having the ability to detect leaks and breaks in the water supply means the repairs will be made more quickly, thereby minimizing waste and reducing water scarcity (though on a small scale).

This project will NOT

- Improve broader water supply reliability at the sub-basin or basin scale
- Increase collaboration and information sharing
- Benefit species, recreation, or economic development
- Complement work being done in coordination with NRCS.

Evaluation Criterion B—Planning Efforts Supporting the Project (25 points)

Plan Development

The Town is seeking to remediate those concerns and provide safe, quality water for its community. The Town contracted with GMS, Inc., Consulting Engineers to complete the planning document and make the necessary recommendations for improving the water system. The Preliminary Engineering Report was completed in December 2023. In this document, the engineering firm specifically identified the measures to improve the overall system. This grant application is one piece of the overall system. It specifically speaks to the importance of new automatic read meters to reduce man hours, improve performance, sustainability, and efficiency. The SCG has been funded and the Town's ARPA money received. The match for this project will be the SCG. This Reclamation grant will complete the improvements to the water system by upgrading meters, the associated data management and billing software, and the installation of a new tank level pressure switch.

Support for the Project

Describe to what extent the proposed project is supported by the identified plan. Address the following:

- *Is the project identified specifically in the planning effort?* Yes. The Town is well aware that many of its current water meters are failing and in need of replacement. In order to maintain the entire metering portion of the water system, it is necessary for all the meters to be alike, and their water usage sent to a new data and billing management software system. The PER, which was completed in December 2023, identifies the operational improvements as well to control the tank level.

- *Explain whether the proposed project implements a goal or address a need or problem identified in the existing planning effort?* The primary goal of this metering project is to reduce water loss and reduce the energy it currently takes to read meters. There are currently unaccounted-for-water losses in the Town's system. Installing smart meters will allow the water system supplier to quickly identify where leakages are occurring and also ensure reliable, accurate meter readings. Additionally, the installation of a tank pressure switch will also reduce water loss by allowing better control of the water tank level and eliminate tank overflows.
- *Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to other potential projects/measures.* The Town has been an integral part of reviewing, evaluating, and moving this water system improvement project forward. This is evidenced by its desire to secure funding for the larger plan, which includes the metering project. This metering project was identified by both the Town and GMS, Inc. (through the PER). Its inclusion is essential in the overall water system improvement plan as supported by the Town. The Town has initiated various infrastructure projects in recent years of which the most recent was the construction of new evaporative non-discharging WWTF. This project is the Town's number one priority.

Evaluation Criterion C—Implementation and Results (20 points)

This project will be put out to bid since the Town does not have the capacity to perform the work on its own. The following describes the nature of the work performed for the implementation and completion of the project.

- Complete the design and engineering of all water system improvements – February 2024 to July 2024
- Apply for additional grant funding for water system improvements that will be done in conjunction with this project. April 2024
- All funding under contract (including USBR WaterSMART)– August 2024
- Create the bid document
- Advertise the bid document per Federal guidelines. September 2024
- Bid Award- October 2024 (all funding awarded and under contract)
- No permits are required for this project.
- All other Federal guidelines for construction projects will be followed.
- It is estimated that this project will be completed within 90 days of contract execution with the contractor. The work will begin after October 31, 2024, and will be completed by October 31, 2026.

Evaluation Criterion D—Nexus to Reclamation (5 points)

This project does not demonstrate a nexus with a Reclamation project or activity.

Evaluation Criterion E—Presidential and Department of the Interior Priorities (15 points)

Sub-criterion No. E1. Climate Change

By replacing aged underreading water meters with smart meters, this project will help prevent, identify, and repair unaccounted-for-water losses due to leaks and breakage in the distribution system. Additionally, the tank pressure switch will prevent the water tank from overflowing. Therefore, this project strengthens water supply sustainability to increase resilience to climate change.

Sub-criterion No. E2 Disadvantaged or Underserved Communities

According to the White House Council on Environmental Quality's Interactive Climate and Economic Justice Screening Tool, The Town of Vilas (in census tract 08009964600) is designated as a *Disadvantaged Community for the following reasons:* 100% of the tract is disadvantaged; 80% of the population falls below 200% Federal Poverty Level; 96% share of properties are at risk of fire in 30 years and is low income; and is 97 percentile for energy burden and is low income.

The benefits of this project includes *public safety* by ensuring there is adequate water supply by properly monitoring the Town's water tank; *economic development* by ensuring a stable water supply and system for future residential and commercial growth in the area.

Sub-criterion No. E3. Tribal Benefits

There are no tribal benefits to this project because there are no Tribes in this census tract.

Budget Proposal

Funding Plan and Letters of Funding Commitment

The total project budget for this meter project is $158,000. This proposal request is for $79,000 from the Bureau of Reclamation. The Town will provide the matching $79,000 with the Small Communities Grant.

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

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1. Town of Vilas, Small Communities Grant	$79,000
Non-Federal Subtotal	$79,000
REQUESTED RECLAMATION FUND	$79,000

Table 2. – Total Project Cost Table

SOURCE	AMOUNT
Costs to be reimbursed with requested Federal funding	$79,000
Costs to be paid by the applicant	$79,000
Value of third-party contributions	
TOTAL PROJECT COST	$158,000

Please note: this project will be put out for bid so the individual costs of materials, supplies, and labor are unknown. The budget below assumes all labor costs are included in the total cost.

Table 3. – Budget – need brand name of unit, quantity and purpose for materials and number & type of workers and their actual pay rate, complying with Fed activities.

BUDGET ITEM DESCRIPTION	$/UNIT	QUANTITY	TOTAL COST
Materials & Supplies			
New meter including dual check meter setter, 5/8" x 3/4" meter, radio transmitter register, removal of existing meter and setter, and connection to existing service line, meter reading software, and training.	$1,700	68	$115,600
New 1-1/2" meter including dual check meter setter, meter, radio transmitter register, removal of existing meter and setter, connection to existing service line, meter reading software, and training.	$6,500	1	$6,500
New 2" meter for the school including radio transmitter register	$3,500	1	$3,500
New 5/8" x ¾" meter and radio transmitter register for disconnected accounts, not to be installed	$900	4	$3,600
Meter software and training	$3,000	1	$3,000
Tank pressure flow switch and connection to the WTP control panel	$5,000	1	$5,000
Subtotal			$137,200
15% Contingency			$20,580
TOTAL ESTIMATED PROJECT COSTS			$158,000

Budget Narrative

This project will be put out to bid since the Town does not have the capacity to perform the work on its own.

- A 15% contingency is included in the budget proposal due to the increasing costs of goods and services at this time. This is standard practice for construction projects prior to bidding.
- The construction cost estimate is based on recently bid projects of similar scope and size.
- No design and engineering are required for this portion of the project.
- No permits are required for this project.
- Davis-Bacon wages will be paid and all other federal guidelines for construction projects will be followed.
- It is estimated that this project will be completed within 90 days of construction initiation. The work will begin after October 31, 2024 and will be completed by October 31, 2026.

Following are details pertinent to the bid and the actual work:

- Remove existing meter and pressure regulating valve, provide salvage to the Owner, furnish and install new meter and spool piece in existing meter pit complete with cover with 1¾" predrilled hole, radio-read 5/8" x 3/4" meter with MIU, spool piece to replace pressure regulating valve including unclassified excavation, Class "C" bedding, crushed rock, backfill, compaction, surface restoration and all incidental materials of construction, complete in place.
- Remove existing meter and pressure regulating valve, provide salvage to the Owner, furnish and install new meter and spool piece in existing meter pit complete with cover with 1¾" predrilled hole, radio-read 5/8" x 1½" compound meter with MIU, spool piece to replace pressure regulating valve including unclassified excavation, Class "C" bedding, crushed rock, backfill, compaction, surface restoration and all incidental materials of construction, complete in place.
- Furnish and install a tank pressure flow switch. Work will include connection to the existing WTP control panel.

Environmental and Cultural Resources Compliance

The project of new meter installation and a new tank pressure level switch will be fully within existing disturbed areas, which would most likely classify the project as a Categorical Exclusion (CE) to NEPA. As there will be no new ground disturbance related to this project specifically. If awarded this grant for this sub project, the Town recognizes that Reclamation will complete its own environmental review process and determine the required compliance with NEPA.

It is also recognized that Reclamation will also consider if the project will cause effects to historic properties. In previous water projects, SHPO determined there would be no adverse effect. As with the NEPA review, the Town recognizes that Reclamation may require another Section 106 review.

Required Permits or Approvals
No permits or approvals are required for this project.

Overlap or Duplication of Effort Statement
At the time of submission, there are no overlap or duplication of effort.

Conflict of Interest Disclosure
Per the Financial Assistance Interior Regulation (FAIR), 2 CFR §1402.112, the Town does not have any known conflicts of interest. If during the award process a conflict arises, the Town will inform Reclamation.

Uniform Audit Reporting Statement
The Town recognizes that any organizations expending $750,000 in U.S. Federal award funds within one year will require a Single Audit report. After the project is complete, the Town will determine if a Single Project Audit is required and will complete one if necessary.

Letters of Funding Commitment (if not above)
Please see Appendix A.

Certification Regarding Lobbying
This request for funding is less than $100,000 in Federal funding. No Certification Regarding Lobbying is required.

Letters of Support
Please see Appendix B.

Official Resolutions
The official resolution will be submitted under separate cover within 30 days.

Unique Entity Identifier
Town of Vilas UEI: DW6JJBMFR9H4

December 27, 2023

U.S. Bureau of Reclamation
Water Resources and Planning Office
Mail Code: 86-6300
PO Box 25007
Denver, CO 80225

To Whom it May Concern:

This letter of support is for the Town of Vilas' WaterSMART Small-Scale Water Efficiency Project Grant. The Town of Vilas continues to work diligently to make necessary improvements to their water system. Colorado Rural Water Association works in conjunction with many Colorado communities by offering technical support and guidance for the operation of water treatment and distribution systems. As a statewide association, we work to help all of the communities within our membership, of which the Town of Vilas is one. The Town is making every effort to improve its water system; however, due to the limited resources available, the Town of Vilas needs assistance to make important upgrades. Of these important upgrades, the replacement of the water meters with radio read meters have several efficiency benefits. First, the replacement of meters will ensure accuracy of the meters for the Town of Vilas to better assess if there is water loss. Second, the Town currently reads water meters manually, which is time consuming and is subject to human error. Another benefit of converting to radio read meters with software is that the cost to read meters and to bill will go down significantly, which greatly impacts a small community like Vilas. The upgrade of the Town's meters will make the water system more efficient.

We thank you for considering this project for funding through the WaterSMART Small-Scale Water Efficiency Project Grant. We believe that the Town of Vilas will utilize the funds well and the project will benefit all residents of the Town of Vilas, by lowering operational costs and enabling the community to be waterwise.

Best Regards,

Charles Goin

Charles Goin
Circuit Rider
Colorado Rural Water Association